Attention to the Macroeconomy[*]

Sebastian Link   Andreas Peichl   Christopher Roth   Johannes Wohlfart

December 19, 2023

Abstract

Attention to the economy plays a key role in canonical macro models, yet its empirical properties are not well understood. We collect novel measures of attention to the economy based on open-ended survey questions. Our measures are included in tailored panel surveys of German firms and households, conducted before and during a large shock to inflation. Using these new datasets, we provide three sets of stylized facts. First, we describe the cross-sectional and time variation in attention to different aspects of the economy. Attention to the macroeconomy is characterized by large and persistent cross-sectional heterogeneity, responds strongly to changes in the economic environment, and is negatively correlated with attention to household- or firm-level topics. Second, we explore the link between attention and expectation formation. More attentive respondents are more likely to adjust inflation expectations during the shock, have higher confidence in their beliefs, and hold smaller misperceptions about realized inflation, yet their expectations about future inflation deviate more strongly from professional forecasts. Third, we study the role of experiences as a potential driver of attention. Consistent with similarity-based recall, individuals with past experiences of adverse inflation outcomes pay more attention to inflation in response to the shock.

JEL Classification: D83, D84, E71.
Keywords: Attention, Expectation formation, Experiences, Inflation.

1 Introduction

Attention is a key determinant of belief formation and decision-making (Bordalo et al., 2020, 2022). In macroeconomic contexts, how much attention agents pay to aggregate developments in general and how much attention is allocated to specific variables – e.g., inflation, monetary policy, or GDP growth – should be central to agents' expectation formation and thereby affect business cycle fluctuations and the transmission of policies (Mackowiak and Wiederholt, 2009; Paciello and Wiederholt, 2014; Reis, 2006a). However, the empirical properties of attention to the economy – how it varies across economic agents and over time, its focus on specific parts of the economy, and its association with agents' beliefs – are not well understood. One potential reason is that there exists limited direct individual-level data on attention allocation. Perhaps because of this lack of empirical guidance, canonical macroeconomic theories differ in their assumptions both on how attention is allocated and on its relation to economic expectations.

In this paper, we introduce new data on households' and firms' attention to the economy, with the goal of providing guidance for theoretical work. A key challenge in the design of attention measures is to accommodate the varying notions of attention present in macroeconomic models, where agents might pay limited attention to information that is publicly available (Maćkowiak et al., 2023; Sims, 2003) but also to information that is in principle available in their memory (Gennaioli and Shleifer, 2010; Khaw et al., 2017; Woodford, 2009).

Our measure of attention aims to capture these varying notions from the theoretical literature. We rely on open-ended text responses to a prompt that puts survey respondents into the mindset relevant for their economic decision-making. Specifically, we ask respondents what comes to their mind when thinking about their own economic situation. Our measures of attention are then constructed as dummy variables indicating whether a respondent refers to a specific topic – such as inflation, monetary policy, or household- or firm-level economic topics. Compared to a more structured question format, the key advantage of this open-ended measure is that it provides a snapshot of respondents' sponta-

neous considerations, without changing participants' attention or restricting which topics are captured through the displayed response options.

We include these measures of attention into quarterly panel surveys of German households from a representative online panel and German firms participating in the ifo Business Survey. The surveys were conducted between December 2020 and March 2023, i.e., before and during a historic shock to inflation. Each wave comprises up to 5,000 households and up to 3,500 firms. Our datasets allow us to document a set of novel stylized facts on the empirical properties of attention and its link to economic expectations. We discuss to what extent different theories are consistent with the patterns we uncover, and which facts they fail to explain. While our evidence is purely descriptive, it is based on naturally occurring variation in attention, large samples of households and firms, and a period with a changing economic environment. As such, our data allow us to paint a unique and comprehensive picture of agents' real-world attention allocation to different aspects of their economic situation, as well as its potential drivers and consequences.

We document three main sets of results. In a first step, we characterize the cross-sectional and time variation of attention to different aspects of the economy. There is substantial variation in attention to macroeconomic topics both across and within the household and the firm samples. On average, firms are more attentive to aggregate developments than households. Moreover, attention to macroeconomic variables is strongly persistent at the individual level, with individual fixed effects explaining around 41% and 33% of the total variation in attention to macroeconomic variables in the household and the firm sample, respectively. The fixed effects are strongly correlated with proxies for information acquisition costs and for economic exposure to the variable of interest, consistent with attention being allocated according to its costs and benefits (Gabaix, 2014, 2019; Gabaix and Graeber, 2023; Maćkowiak et al., 2023).

Over the course of the recovery from the coronavirus recession and amidst a historic shock to inflation, both households and firms become more attentive to inflation. While in December 2020 – when inflation was close to zero – only 3% of households and 5% of firms are attentive to inflation, up to 38% of households and 43% of firms are attentive

2

to inflation over the course of 2022, when annual inflation reaches 7.9%. These patterns are in line with models in which economic agents become more attentive when the environment becomes more volatile (Gabaix, 2014; Maćkowiak and Wiederholt, 2015; Reis, 2006a,b; Sims, 2003). In addition, these patterns may reflect an increased media coverage of inflation, as in models where the news media selectively covers a subset of all economic topics and thereby independently shifts agents' attention (Chahrour et al., 2021).

Turning to the joint dynamics of attention to different topics, we document that attention to aggregate variables is negatively correlated with attention to household-level or firm-level variables. By contrast, attention is positively correlated across different aggregate variables. These relationships hold both in the cross-section and conditional on individual fixed effects. The empirical co-movement of attention to different topics is consistent with theories of costly information acquisition or processing, where attention to one topic can crowd out attention to another topic (Mackowiak and Wiederholt, 2009). Our findings suggest that this crowd-out occurs mostly between macroeconomic and local topics and less between different aggregate variables. The patterns are less supportive of sticky information models – according to which attention to different topics increases or decreases jointly (Mankiw and Reis, 2002; Reis, 2006a).

In a second step, we zoom in on inflation to examine the relationship between attention and belief formation. More attentive households are more likely to adjust their inflation expectations from one wave to the next – consistent with them being more likely to notice the rapidly changing inflation outlook over our sample period. Attention is strongly positively associated with confidence in expectations and more attentive respondents hold smaller misperceptions about realized inflation. These patterns on updating, confidence and misperceptions are consistent with the predictions of canonical models of information frictions (Mackowiak and Wiederholt, 2009; Reis, 2006a). However, the expectations of attentive households deviate more strongly upward from professional forecasts than the expectations of inattentive households. This suggests that higher attention is not necessarily associated with a convergence of beliefs to benchmarks, which is less supportive of these models. Potential explanations could be that agents rely on their

own – potentially mis-specified – subjective models of the economy when interpreting information (Andrade et al., 2016; Andre et al., 2022a, 2023; Laudenbach et al., 2023) or that agents retrieve specific experiences from their memory database when paying attention (Bordalo et al., 2023a).

Turning to expectation dispersion, attentive households disagree somewhat less about future inflation than inattentive households. There is no systematic relationship between attention and disagreement in the firm sample. Although the theoretical predictions for the link between attention and belief dispersion are less clear-cut (Angeletos and Pavan, 2007), these patterns suggest that – on top of variation in the degree of attention – other sources of heterogeneity in beliefs are important. These factors could include heterogeneity in which information agents acquire (Fuster et al., 2022; Van Nieuwerburgh and Veldkamp, 2009) or retrieve from their memory (Bordalo et al., 2023a), or disagreement about structural relationships in the economy (Andrade et al., 2016; Andre et al., 2022a; Laudenbach et al., 2023).

In a third step, we study the role of experiences as a potential driver of attention to the macroeconomy. For this step, we focus on households, as we elicited rich measures of their inflation experiences in the pre-shock period. Theories of associative memory posit that "what comes to mind" reflects (i) the experiences in an individual's memory database and (ii) the context, which triggers the retrieval of specific experiences through similarity-based recall (Bordalo et al., 2023a,c). We test the predictions of these models using both across-cohort and within-cohort variation in inflation experiences.

Respondents that experienced adverse inflation outcomes in the past pay more attention to inflation, consistent with experiences in the memory database being an important driver of attention allocation. Moreover, the relationship between experiences and attention becomes stronger during the inflation shock – i.e., as the context becomes more similar to the experiences in the memory database – consistent with similarity-based recall. The stronger increase in attention over the course of the shock among households with adverse inflation experiences is reflected in a stronger updating of inflation expectations, pushing expectations further away from professional forecasts. Thus, similarity-based

4

recall offers an explanation for our earlier finding that higher attention is not associated with a convergence of expectations to the benchmark of professional forecasts.

Our findings suggest that, when inflation increases, households may retrieve past experiences of high inflation and be more attentive to this information stored in their memory database. Agents with such experiences consequently revise their expectations upward. Thus, similarity-based recall seems to contribute to extrapolative belief formation in the context of inflation, consistent with recent evidence on stock return expectations (Jiang et al., 2023). We provide evidence against several alternative explanations for the time-varying relationship of experiences with attention and expectations, such as differences in news consumption or differences in exposure to the current inflation shock. To confirm the external validity of our findings, we also provide evidence on how experiences are correlated with the updating of inflation expectations in response to the shock using data from the US Survey of Consumer Expectations.

We build on and contribute to a growing empirical literature studying attention to the economy. Weber et al. (2023) conduct information experiments in different countries and at different points in time to show that agents respond less to exogenously provided information in high inflation contexts, consistent with higher attention and stronger priors about inflation. These findings align with the time variation of attention as measured in our open-ended data.

Some recent work has used experiments to shed light on the causal determinants of information acquisition, e.g., studying the role of perceived uncertainty (Mikosch et al., 2023) or perceived stakes (Fuster et al., 2022; Roth et al., 2022).[1] While these studies offer clean causal evidence on specific micro mechanisms operating in models of inattention, they are based on stylized measures of attention such as the willingness to pay for a professional forecast. Our measure, based on a broad and neutral prompt and implemented in large-scale panel surveys, arguably offers a more direct description of agents' real-world attention allocation and allows studying its dynamics and co-movement with individuals' expectations over time.

---

[1]Capozza et al. (2022) provide a review of the literature studying information acquisition.

Other papers have studied attention using observational data, constructing measures of attention from data on beliefs. For instance, Coibion and Gorodnichenko (2015) measure information rigidities among professional forecasters leveraging the predictability of ex-post forecast errors from ex-ante forecast revisions, uncovering increased inattention during the Great Moderation. Goldstein (2023) documents increases in attention after large shocks using the persistence of a forecaster's deviation from the mean forecast as a measure of inattention. Pfäuti (2023) uses data on professional forecasts to show that attention to inflation declined steadily during the Great Moderation. Similarly, Bracha and Tang (2022) document a positive relationship between attention and the level of inflation using the accuracy of consumers' perceptions of current economic conditions as a measure of attention. Unlike measures of attention computed from survey expectations, our measure based on a separate open-ended question allows studying the relationship between attention and beliefs rather than assuming that the two are related in a particular way.

Closer to our approach, some studies rely on measures of agents' real-world attention allocation that are not constructed from belief data. Coibion et al. (2018) show that firm managers who report tracking inflation exhibit smaller backcast and forecast errors regarding inflation. They also document that firm managers facing higher incentives to be attentive are more likely to track inflation. Korenok et al. (2023) uses data from Twitter and internet searches to show that attention to inflation increases once inflation exceeds certain thresholds. Song and Stern (2023) use text-based measures of attention constructed from 10-K filings of firms with the US Security and Exchange Commission to document that firms' attention to the macroeconomy is countercyclical and to study the role of attention in the transmission of monetary policy. Flynn and Sastry (2023) rely on a similar approach to show that higher firm attention is associated with smaller input-choice mistakes. Studies in finance have used logins as a measure of attention to financial accounts (Sicherman et al., 2016). For example, Giglio et al. (2021) show that attention as proxied by a higher number of logins is associated with a stronger pass-through of households' beliefs to portfolio decisions. We contribute to this literature by collecting

large-scale individual-level panel data that contains new measures of attention to different aspects of the economy based on open-ended survey questions as well as macroeconomic expectations, among both firm managers and households, within a changing economic environment. Compared to existing studies, we document several new stylized facts, such as the co-movement of attention across topics, the deviation of attentive households' expectations from professional forecasts, or the association of experiences with attention to the economy.

Finally, our paper is closely related to a recent literature that examines how economic beliefs are shaped by personal experiences (D'Acunto et al., 2021; Goldfayn-Frank and Wohlfart, 2020; Laudenbach et al., 2023; Malmendier and Veldkamp, 2022; Malmendier and Shen, 2023; Malmendier and Nagel, 2011; Malmendier et al., 2021) and memory (Afrouzi et al., 2023; Bordalo et al., 2023a,b,c, 2020; Enke et al., 2023; Graeber et al., 2022; Hartzmark et al., 2021; Jiang et al., 2023). We build on the seminal work of Malmendier and Nagel (2016), who show that inflation experiences persistently affect households' inflation expectations. Our study highlights that experiences are also reflected in attention allocation, and that the link of attention and expectations with experiences varies with the economic environment. Our results point to an important role of similarity-based recall in macroeconomic contexts.

2 Data

In this section, we describe the setting of our data collections, our samples, and our attention measure.

2.1 Setting

Our data collection took place between December 2020 and March 2023, covering the period just before and during a historic surge in inflation. The rise of inflation occurred in the aftermath of the Covid-19 pandemic amidst supply-chain disruptions and labor

shortages as well as demand-side pressures from loose monetary policy and fiscal stimulus programs. As shown in Appendix Figure A.1, German CPI inflation was -0.3% at the start of our sample period. It started increasing in mid-2021 and accelerated further after Russia's invasion of Ukraine, reaching levels of around 10% by the end of the year 2022 before reverting back to around 7% in mid-2023. The figure highlights that the surge in inflation was unexpected by households, firms and also professional forecasters. In response to the increase in inflation, the European Central Bank (ECB) started raising interest rates from the zero lower bound in mid-2022, reaching a level of 3.5% in March 2023. While inflation rose, aggregate unemployment remained fairly stable at values between 5% and 6% from mid-2021.

2.2 Samples

Household panel We conducted quarterly surveys of German households between December 2020 and March 2023 in collaboration with the online panel provider Dynata, which is widely used in the social sciences (Haaland et al., 2023). In each wave, we recontacted all respondents who participated in at least one of the previously conducted waves. We then supplemented the data collection with new respondents to obtain an overall sample size of approximately 5,000 respondents for each wave. From the March 2022 wave onward, the sample size was smaller at around 2,500 respondents.[2] Panels A and B of Appendix Figure A.2 depict the composition of our sample by the wave a respondent entered the panel and by tenure. Attrition is typically the strongest between the first and the second wave a respondent participates, and more limited thereafter. For instance, among respondents to wave 1, 51% participated in wave 2 and 49% participated in wave 3. Conditional on participating more than once, respondents participated on average 4.6 times.

Panel A of Table 1 shows summary statistics of our household sample pooled across all survey waves and a comparison with benchmarks from the 2020 wave of the Ger-

---

[2]We drop partial responses and duplicate responses to any given wave.

Table 1: Summary statistics

	GSOEP	Survey samples					
	(1) Mean	(2) Mean	(3) p25	(4) Median	(5) p75	(6) SD	(7) N
Panel A: Households							
Female	0.51	0.45	0.00	0.00	1.00	0.50	40,516
Age	51.19	52.53	40.00	50.00	60.00	13.85	40,516
East	0.17	0.17	0.00	0.00	0.00	0.38	40,516
Log(HH net income)	7.96	7.78	7.60	8.01	8.36	0.69	40,516
At least highschool	0.39	0.50	0.00	1.00	1.00	0.50	40,516
Employed	0.64	0.59	0.00	1.00	1.00	0.49	38,421
Homeowner	0.49	0.47	0.00	0.00	1.00	0.50	38,092
Stockowner	0.26	0.42	0.00	0.00	1.00	0.49	38,092
Panel B: Firms							
Employees		1241.38	14.00	40.00	123.00	96037.48	32,541
Export share		0.14	0.00	0.01	0.20	0.23	19,957
Manufacturing firm		0.29	0.00	0.00	1.00	0.45	32,612
Services firm		0.41	0.00	0.00	1.00	0.49	32,612
Construction firm		0.08	0.00	0.00	0.00	0.27	32,612
Retail/wholesale firm		0.22	0.00	0.00	0.00	0.41	32,612
High influence on decisions in firm		0.78	1.00	1.00	1.00	0.42	20,417

Notes: This table provides summary statistics for the household sample (Panel A) and the firm sample (Panel B). Column 1 shows population benchmarks from the 2020 wave of the German Socioeconomic Panel, which is representative of the German population. Column 7 indicates for how many observations in our panel dataset a particular variable is available, counting repeat respondents multiple times.

man Socioeconomic Panel (GSOEP), a representative household survey. Our sample is roughly representative of the population in terms of gender, age, region, and total household income. The main difference of our sample to the population is a higher average educational attainment, a common feature in online surveys (Haaland et al., 2023).

Firm panel In parallel to the household surveys, we conducted surveys containing mostly identical questions with firms participating in the ifo Business Survey (IBS), a long-standing monthly survey of a large and representative panel of German firms.[3] Re-

---

[3]The IBS provides the basis for the ifo Business Climate Index, the most recognized leading indicator of the German business cycle. See Sauer et al. (2023) for details on the IBS. The IBS micro data have been used extensively in previous research in economics (e.g., Bachmann et al., 2021, 2013, 2019; Buchheim et al., 2022; Enders et al., 2019).

spondents to the online portion of the regular IBS received a separate link to our survey module in the invitation email to the regular IBS of the last month in each quarter. Approximately half of the invited participants responded to our survey module, giving us an overall sample size of around 3,000 firms per wave at the start of our sample period, which increased to around 3,500 at the end of the period. Panels C and D of Appendix Figure A.2 display the composition of the firm samples for each wave by the first wave a firm participated and by tenure in the panel. Attrition is lower than in the household survey. For instance, among respondents to wave 1 of the firm survey, 73.2% also participated in wave 2 and 72.8% participated in wave 3. Conditional on participating more than once, respondents participated on average 7.0 times.

Panel B of Table 1 shows summary statistics for the firms who completed our survey. 29 percent of the firms operate in the manufacturing sector, 41 percent in services industries, eight percent in construction, and 22 percent are retailers or wholesalers. The median number of employees is 40 and the average share of exports in the firms' revenue is 14 percent. In wave 3 we elicited the respondent's influence on the firm's decisions regarding investment, production, personnel, and price setting. 78 percent of managers report to have "very high influence" on decisions in at least one of these areas. This is in line with Sauer et al. (2023), who document that the vast majority of respondents to the regular IBS are in an upper management position such as owner, CEO, or department head.

2.3   Measuring attention

Measurement   There are at least two challenges in designing an attention measure. First, different macroeconomic theories imply different notions of attention. Some theories posit that agents pay limited attention to information that is in principle publicly available (Mackowiak and Wiederholt, 2009; Sims, 2003). Other theories have a broader notion of attention, where agents might also pay limited attention to information that is in principle available in their memory (Bordalo et al., 2023a; Gennaioli and Shleifer, 2010; Khaw

10

et al., 2017; Woodford, 2009). A key challenge for our exercise is to measure attention in a way that is flexible enough to accommodate these different theoretical notions. Second, the measurement itself should ideally not change agents' attention allocation. For instance, the measurement should not prime individuals on a specific topic – say, inflation – and thereby make respondents attentive to inflation-related information stored in their memory.

We designed our measure of attention with the goal of overcoming these two challenges. We rely on an open-ended question format that allows survey participants to provide written responses – a method that has recently become more commonly used to measure individuals' thoughts and reasoning in economic contexts (Andre et al., 2022a,b, 2023; Bursztyn et al., 2023). To elicit attention allocation to *economic* topics, we require a prompt that puts survey respondents into the mindset relevant for their economic decision-making. Specifically, we ask our respondents the following question:

> *What topics come to mind when you think about the economic situation of your household/company?*

While this prompt could still have some effect on respondents' attention allocation, it is broad and relatively neutral and avoids priming on specific macroeconomic or household-/firm-level economic topics. Participants' written text responses to this question provide a unique snapshot of the topics that are on top of respondents' minds when thinking about their economic situation. Depending on respondents' attention allocation, we would expect them to think of either aggregate or more household- or firm-specific economic topics when confronted with this prompt. Compared to a more structured question format, our open-ended elicitation does not influence or restrict participants' responses through the displayed set of response options. Overall, our open-ended elicitation format minimizes concerns that the measurement itself might change respondents' attention.

What comes to respondents' minds when they think about their economic situation could reflect information they recently received from the external world but also more distant experiences retrieved from their memory. As such, our measure should be flexible

11

enough to accommodate various notions of attention from the theoretical literature.

We count a survey response as being attentive to a particular topic if that topic is mentioned in the open-ended question. While responses are classified as attentive or inattentive to a given issue, it is important to keep in mind that the measures contain noise, e.g., due to differences in the interpretation of the prompt or in the extent to which a respondent is explicit about the topics that are on top of mind. Moreover, respondents may only write about the issues they pay most attention to while neglecting other issues they are partially attentive to. Thus, while there is likely a *difference in the average level of attention* between responses being classified as attentive or inattentive according to our measure, it would be misleading to interpret this as *full attention* and *complete inattention*.

The survey contains several other questions, which we introduce throughout the paper when discussing the exercises that make use of them. Appendix D provides instructions of key survey questions in German and translated to English.

Coding scheme   To quantitatively analyze the unstructured text data, we devise a coding scheme that contains codes for a range of macroeconomic and household- or firm-level topics. Each response can be assigned multiple codes. Table 2 provides an overview of the main factors in our coding scheme along with example responses, while Appendix C provides the complete list of codes for macroeconomic, household-level, and firm-level topics. Our main categories of interest are mentioning (i) any macroeconomic topic, (ii) the Covid-19 pandemic, (iii) inflation, (iv) interest rates or monetary policy, (v) growth, and (vi) any household- or firm-level topic.

We instruct several research assistants to apply our coding scheme to the open-text responses. 92.1% of the open-text responses from the household survey and 99.4% of the responses from the firm survey can be assigned at least one code from our scheme. For a subset of the data (1,896 responses from waves 3 to 6 of the household survey and 1,541 responses from waves 1 to 5 of the firm survey), two research assistants code the responses independently of each other, and conflicts are resolved through discussion between the reviewers. We detect a high inter-rater reliability: when one coder assigns a

given code to a household's response, there is a 77.7% chance that the other coder does so too. The corresponding number is 79.5% for the firm survey. The inter-rater reliability increases to 91.3% (households) and 87.9% (firms) when calculating it based on the subset of topics that most of our analysis focuses on – Covid-19, inflation, monetary policy, and economic growth.

We conduct two further exercises to check the quality of our coding scheme. First, Appendix Table A.1 shows for the case of inflation that our hand-coded data are strongly positively correlated with simple counts of inflation-related words, both in the pooled sample and within each survey wave. Second, we use an AI-based approach to code a subset of the responses from the March 2023 wave of the household survey.[4] Appendix Figure A.3 compares the distribution across topics as hand-coded based on our coding scheme with the topic distribution as coded using artificial intelligence methods, while Appendix Table A.2 displays cross-sectional correlations for key topics. Both exercises demonstrate a high overlap between the two coding methods. Overall, these patterns corroborate the reliability and validity of our coding scheme.

Validation 1: News consumption   To validate our measure of attention constructed from the open-ended data, we correlate it with structured measures of news consumption that are included in some of our survey waves. First, referring to inflation in the open-ended data is strongly positively correlated with the number of reports on inflation a respondent states to have read in the news, to have seen on TV, or to have heard on the radio over the last three months, both among households and among firms (Appendix Figure A.4 Panels A and C). Second, it is strongly positively associated with the number of minutes a household or firm manager reports to have spent consuming news about inflation over the last week (Figure A.4 Panels B and D). These patterns validate the

---

[4]The AI-coding is generated using Scikit-LLM's zero-shot multi-label classifier with GPT-4 as the underlying AI-model (Pedregosa et al., 2011). The classified data is a random subsample (n=200) from the survey wave in March 2023. The provided codes are reformulated into whole sentences, as recommended by the Scikit-LLM guidelines, using exclusively information provided in the coding scheme handed to the research assistants who initially hand-coded the survey responses. The codes assigned by the multi-label classifier (per default, no more than ten per response) are then compared to the codes assigned in the hand-coding.

Table 2: Coding scheme and example responses for the open-ended data

Category	Explanation	Examples
Macro	Covid-19, inflation, (un-)employment, growth, monetary policy, fiscal policy, regulation, structural transformation, trade, pension system, health system, education system, inequality, migration, environment/climate change, stock market, housing market, uncertainty, sustainability, demographic change, exchange rate, Russia's invasion of Ukraine, energy supply, other macro topics.	"Taxes"; "The labor market"; "Politics is increasingly burdening me through levies and taxes, and through regulations on the industry, which in the end also affect me again through rising consumer prices"; "The war in Ukraine and the inflation."; "Debt crisis, financial crisis, economic upswing."; "I am afraid of the effects of the war."; "Firstly, climate change and, as a result of it, the energy crisis, which of course is also extremely intensified due to the war in Ukraine. And of course, like everyone else, we are also affected by inflation."
Covid-19	Covid-19, coronavirus, pandemic, lockdown, mask production.	"Due to Corona, I have been on short-time work for a year already. Therefore, my financial situation doesn't look too rosy. The government urgently needs to take action here."; "Tense due to Covid-19"; "Income has been halved since Corona"
Inflation	Inflation, purchasing power, rising prices, price level, increase in price.	"Rising food prices"; "Difficult times and skyrocketing prices"; "Inflation rate and the monetary value of one's own savings"; "Currently the very high inflation rate"; "Price increase in food, higher energy costs, saving not possible"; "Electricity has become very expensive."
Monetary policy	Monetary policy, interest rates, central bank, ECB, banking system, negative interest.	"Interest rates and investment"; "Low interest rates"; "No interest on assets, uncertainty in stock investment."; "Pension adjustments, interest rates, DAX."; "That credit interest rates are becoming increasingly expensive and prices are rising. Hopefully, there will be a salary increase soon."
Growth	General state of the economy, economic growth, GDP, general economic situation, business cycle, upswing, downswing, insolvencies, company bankruptcies, orders, industry, industrial production, economic crisis, recession.	"Recession, Economic Crisis"; "The faltering economy and rising inflation"; "One economic crisis after another is eroding my retirement savings, so that I will soon become a welfare case."; "The economic situation in Germany is stable, in my eyes."; "Economic crisis. High prices for food and energy."
Household-level	Income, spending, saving, investment, debt, employment, rent/housing cost, health issues, insurance, overall household situation, other household-level topics.	"Concern about job loss in the future."; "We are doing well. No debt. A vacation is possible."; "Relatively secure, due to fixed income from pension"; "old-age poverty"; "I'm just barely making ends meet with my money."; "The economic situation is bad, with only one earner with a low pension among two adults."; "We are getting along well and don't have to cut back. In addition to everyday expenses, there is also enough money left over for vacation and leisure activities."
Firm-level	Working processes, government aid programs, R&D, regulation, costs, supply chain, demand, profits, liquidity, financing, labor input, short-time work, productivity, health issues, housing cost and rent, capacity, product, overall firm situation, other firm-level topics.	"Automation + process optimization"; "Sustainability, innovation, product life cycles"; "increasing material and energy costs, personnel costs, parts supply"; "Liquidity bottlenecks, difficult storage, dissatisfaction with the banks"; "How do I get specialist staff, especially mathematicians and computer scientists?"; "There is hardly any suitable skilled personnel, investment backlog and tough competition"; "Investment in digitization and expansion of our product portfolio."

Notes: This table provides an overview of the main topics in our coding scheme, an explanation for each topic, and example extracts from open-text responses (translated into English). All example responses – except for the firm-level categories – draw on the household survey.

open-ended data and motivate its use to study predictions of macroeconomic models in which attention and information acquisition about the external world are closely linked (Gabaix, 2014; Maćkowiak et al., 2023; Reis, 2006a).

Validation 2: Structured attention measure We provide another validation using an additional data collection with a sample of German households. The survey was conducted in September 2023 on the platform Prolific, which is widely used in the social sciences (Peer et al., 2021). 502 respondents completed our survey, out of which 34 did not pass a simple screener question and are dropped from the sample.

Participants first respond to our main open-ended question on attention allocation. On the next survey screen, they are again asked which topics come to their mind when thinking about the economic situation of their household. However, instead of responding in an open-text box, the participants are asked to tick all relevant topics from a list presented to them, where the order of the topics is randomized. Compared to the open-ended elicitation, the alternative structured elicitation mitigates the concern that respondents may be unwilling or unable to write down their thoughts. At the same time, the structured elicitation mechanically changes attention by exposing respondents to cues in the form of the included response options.

As shown in Appendix Figure A.5, the baseline fractions of respondents indicating attention to different aggregate and household-level topics is higher in the structured measure across all topics, which is a common finding when comparing structured and open-ended elicitations (see, e.g., Andre et al., 2022a). This pattern could reflect both lower effort cost of indicating that a particular topic matters and mechanical increases in attention driven by the displayed response options. However, conditional on these baseline differences, the variation of attention across topics looks very similar in the two elicitation modes. Attention as measured in the open-ended question is strongly correlated with attention as measured in the structured question across respondents for the key topics that we use in the analysis below (Appendix Table A.3).

Validation 3: Google Trends data   As a final validation, we compare the evolution of our survey measure of attention to different macro variables with the evolution of Google searches, a commonly used measure of attention in the social sciences (Choi and Varian, 2012; Fetzer et al., 2021). Google Trends offers a platform to explore search data, delivering a search intensity metric for each query that ranges from 0 to 100. A score of 100 indicates the peak popularity of the terms queried within a specific area and period. Users can formulate queries using single search terms or broader topics that include multiple related terms. We follow the latter approach in our validation exercise.

In this validation exercise, we focus on attention to inflation, growth, and monetary policy.[5] We gather weekly data for the respective topic categories from Google Trends. To make the searches comparable in relative terms, we select the three topics at the same time. Appendix Figure A.6 shows that the evolution of Google searches over our sample period and the distribution of searches across the different topics (Panel B) closely resemble the patterns for our survey measures of attention (Panel A).

Survey participation and attention   After the initial question on attention allocation, each survey wave includes several questions on macroeconomic issues. Re-contacted respondents may recall the topic of our survey and therefore express more thoughts about macroeconomic topics in the question on attention allocation. To check whether this is the case, we regress dummy variables indicating whether a respondent pays attention to a given topic on a dummy variable indicating whether the response is from a recontacted participant, time fixed effects and individual fixed effects. As shown in Appendix Table A.4, repeated participation in our panel is not associated with a systematic increase in attention to macroeconomic topics, neither in the household nor in the firm panel.

---

[5]We do not include searches about Covid-19 as many of those are likely primarily motivated by health concerns rather than economic motives.

3   Attention to the macroeconomy: Descriptive facts

In this section, we present our main evidence on attention to the macroeconomy. First, we describe the cross-sectional and time variation in attention. Second, we provide evidence on the link between attention and beliefs. Third, we study the role of experiences as a potential driver of attention and beliefs.

3.1   Cross-sectional and time-variation in attention

Attention allocation across topics and groups of agents   We start by describing how households' and firms' attention varies across different topics, pooling all our survey waves. 75% of households pay attention to at least one household-level topic, while 28% are attentive to at least one macroeconomic topic. Panel A of Figure 1 shows that among macro topics, inflation is the most frequently attended topic (19%), followed by Covid-19 (6%). Households' attention to growth and monetary policy is very low at 1%. Within household-level topics, the household's general economic situation (30%), income (22%), consumption/spending (16%), and housing costs (13%) are most important.

Among firms, 80% mention at least one firm-specific topic. A similarly high fraction (67%) pay attention to at least one macroeconomic topic. Panel B of Figure 1 shows that, within macro topics, inflation is by far the most attended (28%), followed by Covid-19 (17%), growth (8%), and monetary policy (3%). The overall higher levels of attention to macroeconomic topics among firms than among households are consistent with other recent evidence on information frictions (Link et al., 2023). Within firm-specific topics, issues regarding labor input (28%), supply chains (23%), and demand for firms' own product/service (21%) are the most frequently mentioned topics.

Variance decomposition   How much of the overall variation in attention is explained by systematic changes over time and by persistent individual-level heterogeneity?[6] We shed

---

[6]We use the term "individual" interchangeably for both households and firms abstracting from the fact that different waves of the firm survey can potentially be answered by different persons working at the

Figure 1: Distribution of topics, pooled across all waves

Panel A: Households

Panel B: Firms
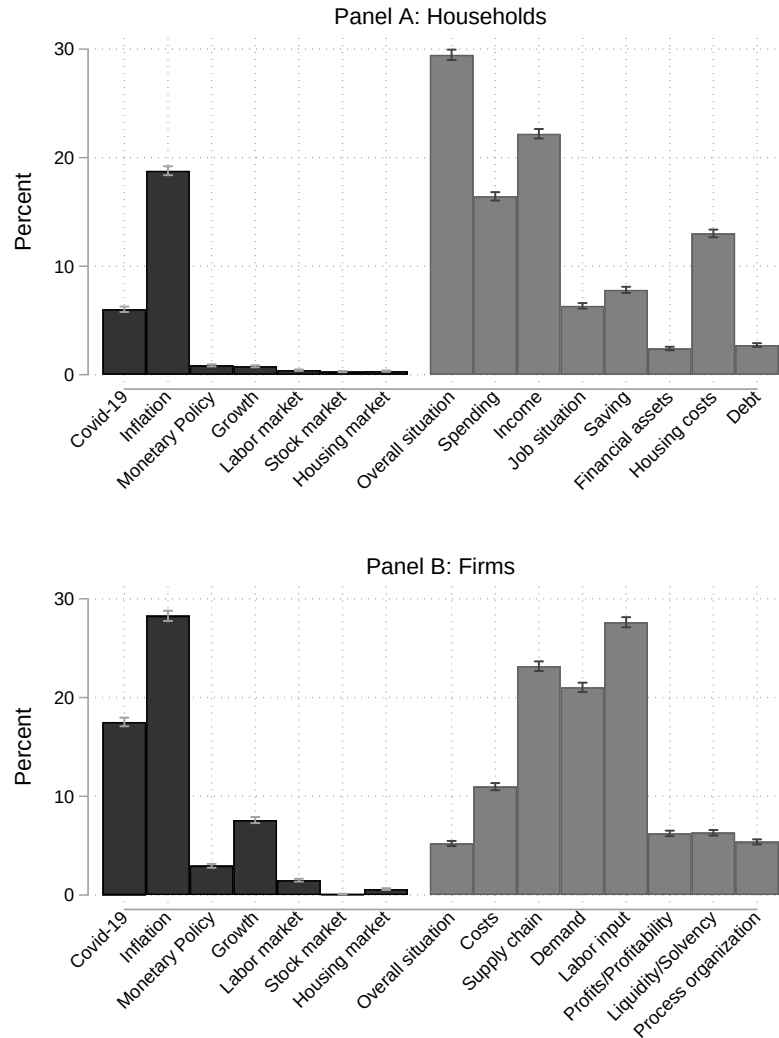
Notes: This figure presents the distribution of attention to different macroeconomic topics (black) and household-/firm-level topics (grey) pooled across all waves from December 2020 to March 2023. The bars indicate the fractions of respondents paying attention to a given topic. The measure of attention is based on people's responses to our main open-ended question: *"What topics come to mind when you think about the economic situation of your company/household?"* Panel A shows results for households. Panel B displays results for firms.

light on this issue by decomposing the panel variation of attention into three components: fixed individual characteristics, common variation over time, and a residual that captures idiosyncratic time variation at the individual level. To do this, we regress our main mea-

___

same firm. In practice, however, the questionnaires are usually filled out by the same person and churn rates are very low, see Sauer et al. (2023) for details.

sures of attention on (i) individual fixed effects, (ii) time fixed effects, and (iii) both sets of fixed effects jointly, and compare the R-squared of these regressions (see Giglio et al. (2021) for such a decomposition in the context of stock return expectations). We focus on dummy variables indicating attention to a set of macroeconomic topics as well as dummy variables for paying attention to at least one macroeconomic or to at least one household- or firm-level topic, respectively.

The results are shown in Table 3. Panel A is based on the samples of respondents that appear at least twice in our data, i.e., the largest possible samples for this exercise. Individual fixed effects are an important source of variation in attention in the household sample. Across topics, the individual fixed effects by themselves explain between 25% and 42% of the variation in attention (Column 1), while time fixed effects by themselves account for at most 10% of the variation in attention to a given topic (Column 2). Systematic time variation is most important for attention to inflation, where time fixed effects by themselves account for 10.1 percent of the overall variation. Including individual and time fixed effects together leaves between 57% and 75% of the variation in attention to a given topic unexplained (Column 3). This variation reflects idiosyncratic time variation at the household level. Similarly to the patterns for households, individual fixed effects are a central source of variation in attention in the firm sample (Column 5). The importance of time fixed effects is also similar among firms as among households, the only difference being stronger systematic time variation in attention to Covid-19 (Column 6). Between 59% and 72% of the variation in attention is idiosyncratic firm-level variation (Column 7). Panels B and C restrict the samples to households or firms that appear at least four times or at least six times in our panels. The results of the variance decomposition are very similar in these restricted samples.

Sources of individual fixed effects in attention   What respondent characteristics are driving the strong individual persistence in the tendency to pay attention to particular topics? We regress the individual fixed effects (estimated by regressing attention jointly on time and individual fixed effects) on a set of respondent characteristics. The results

19

Table 3: Variance decomposition of attention allocation

	Households R2 (%) of panel regression				Firms R2 (%) of panel regression			
	(1) Indiv. FE	(2) Time FE	(3) Time FE + Indiv. FE	(4) Obs.	(5) Indiv. FE	(6) Time FE	(7) Time FE + Indiv. FE	(8) Obs.
Panel A: At least two non-missing observations								
Any macro topic	41.1	3.2	43.3	31,348	33.0	0.7	33.7	27,554
Inflation	38.1	10.1	44.9	31,348	31.8	8.0	38.7	27,554
Monetary policy	27.9	0.0	28.0	31,348	34.3	0.7	35.0	27,554
Growth	25.2	0.1	25.3	31,348	27.4	0.5	27.8	27,554
Covid-19	37.9	2.7	39.6	31,348	32.2	10.5	41.1	27,554
Any household-/firm-level topic	42.3	1.4	43.3	31,348	32.2	2.0	33.7	27,554
Panel B: At least four non-missing observations								
Any macro topic	37.1	3.3	39.7	24,076	30.3	0.8	31.0	23,839
Inflation	34.0	9.8	41.6	24,076	29.0	8.2	36.5	23,839
Monetary policy	24.2	0.1	24.3	24,076	31.7	0.6	32.4	23,839
Growth	20.3	0.1	20.4	24,076	24.1	0.5	24.5	23,839
Covid-19	31.2	2.7	33.2	24,076	28.8	10.4	38.4	23,839
Any household-/firm-level topic	37.4	1.5	38.6	24,076	28.6	2.0	30.1	23,839
Panel C: At least six non-missing observations								
Any macro topic	34.6	3.6	37.8	15,303	28.6	0.8	29.4	19,086
Inflation	30.9	9.9	39.7	15,303	26.6	8.9	35.0	19,086
Monetary policy	21.6	0.1	21.7	15,303	30.7	0.7	31.4	19,086
Growth	16.2	0.1	16.3	15,303	21.1	0.5	21.5	19,086
Covid-19	27.6	2.9	30.1	15,303	27.0	10.5	37.1	19,086
Any household-/firm-level topic	34.4	1.5	35.8	15,303	26.4	1.9	28.1	19,086

Notes: This table displays the R-squared from regressing dummies for mentioning different topics in the response to the open-ended question on individual fixed effects (Columns 1 and 5), time fixed effects (Columns 2 and 6), and both time and individual fixed effects (Columns 3 and 7). Columns 4 and 8 display the number of observations. For each variable, only respondents with at least two (Panel A), four (Panel B), and six non-missing observations (Panel C) for the corresponding variable are included, respectively.

for the household sample are shown in Appendix Table A.5. Households' self-reported exposure to movements in a given variable is positively related to how much attention they pay to this variable, in line with recent experimental evidence (Roth et al., 2022). Conversely, self-reported information acquisition costs are strongly negatively related to attention, in line with other studies (D'Acunto et al., 2023; Mikosch et al., 2023). These patterns align with theories positing that attention is allocated endogenously depending on costs and benefits (Gabaix, 2014, 2019; Maćkowiak et al., 2023). Moreover, older and more educated household respondents are more likely to pay attention to both macroeconomic and household-level topics, while the patterns by employment status and income are less systematic. Appendix Table A.6 shows the results for the firm sample. We find

similar patterns for exposure as for households. Firm size is positively associated with attention to both macroeconomic and firm-level topics. Moreover, attention to inflation is more pronounced in the manufacturing sector than in the services and retail/wholesale sectors. In Section 3.3, we provide evidence on the long-lasting effects of prior experiences as another potential source of persistent differences in attention across individuals.

Attention allocation over time   We next turn to how attention to different variables systematically evolves over time. Panel A of Figure 2 highlights that households' attention to Covid-19 steadily declines over our sample period. At the same time, the fraction of households paying attention to inflation increases from close to 0% in December 2020 to 38% in September 2022, and then remains at this elevated level. Panel B of Figure 2 shows broadly similar changes in attention over time for firms as for households: while attention to Covid-19 declines, there is a steady increase in attention to inflation from close to 0% in December 2020 to a maximum level of 43% in June 2022. Subsequently, attention to inflation slightly declines until the end of the sample period. Both firms and households persistently pay little attention to monetary policy.

These changes in attention mirror the business cycle movements in Germany over our sample period: while the economy recovered from the coronavirus recession, it experienced increasing inflationary pressures from mid-2021, which were aggravated by Russia's invasion of Ukraine in February 2022 and the associated energy shortages. The increase in attention to inflation amidst increasing inflationary pressures is in line with models in which attention and information acquisition endogenously respond to changes in the economic environment. In particular, these models predict that agents become more attentive when the environment becomes more volatile (Gabaix, 2014; Maćkowiak and Wiederholt, 2015; Reis, 2006a,b; Sims, 2003). In addition, the increase in attention to inflation could reflect increased media coverage of inflation over our sample period, as in models where the news media selectively covers a subset of all economic topics and thereby independently shifts agents' attention (Chahrour et al., 2021). Remarkably, the sharp rate hikes by the ECB from 0% to 3.5% were not associated with strong increases in

Figure 2: Attention to different topics over time
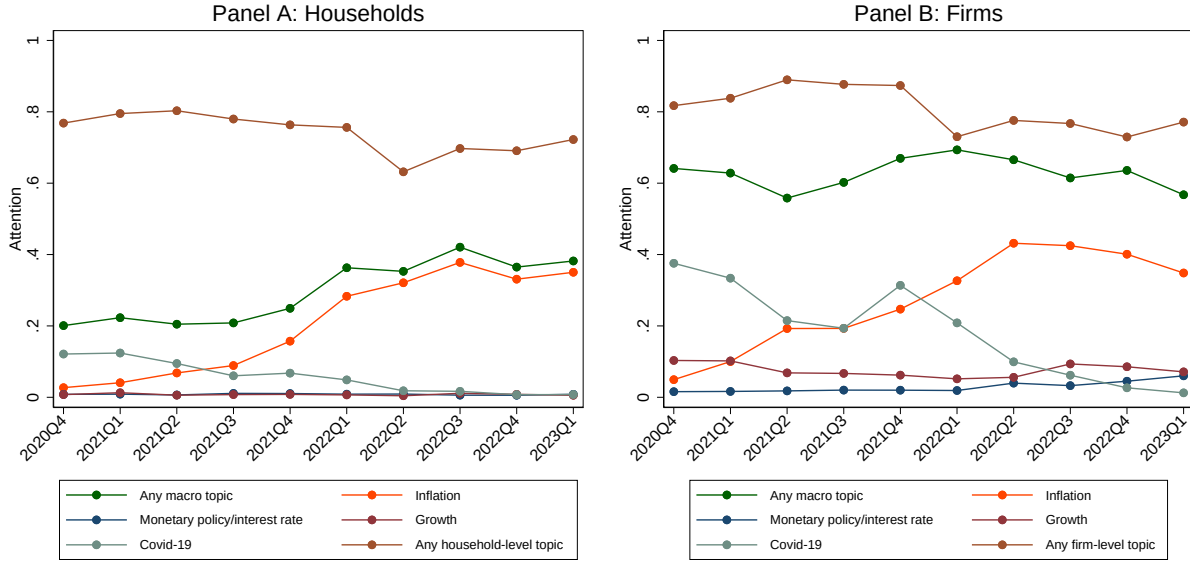
Notes: This figure displays the evolution of the fractions of respondents that raise different topics in the open-ended survey question among households (Panel A) and firms (Panel B) across survey waves. The brown and green lines summarize all household-/firm-level topics and all topics related to the macroeconomy, respectively. The remaining lines refer to specific macroeconomic topics, i.e., inflation, monetary policy/interest rates, growth, and Covid-19.

households' or firms' attention to monetary policy.

Co-movement of attention   We next turn to the question of how attention to different variables co-moves. On the one hand, in sticky information models, agents face an exogenous probability of acquiring full information (Mankiw and Reis, 2002) or endogenously decide when to acquire full information (Reis, 2006a). This implies a positive co-movement of attention to different variables. On the other hand, according to theories featuring limited cognitive resources, acquiring more information about a given topic may reduce the available capacity to acquire and process other pieces of information (Gabaix, 2014). For instance, some theories predict attentional crowd-out between aggregate and local (sector-specific) information (Mackowiak and Wiederholt, 2009). To shed light on the empirical co-movement of attention to different variables, we estimate

specifications of the following type:

$$\text{Attention topic A}_{it} = \beta_0 + \beta_1 \text{Attention topic B}_{it} + X'_{it}\Pi + \phi_t + \epsilon_{it}, \qquad (1)$$

where the attention variables indicate whether a respondent mentions topic A or B when responding to the open-ended question, respectively. X_{it} includes a set of basic controls, which in some specifications is replaced by individual fixed effects.[7] In addition, all specifications include survey wave fixed effects, ϕ_t.

Panel A of Table 4 shows the results for the household sample. Attention to inflation and attention to monetary policy are strongly positively associated with each other. Specifically, being attentive to monetary policy or interest rates increases the likelihood of being attentive to inflation by 30.1 p.p. according to our pooled OLS estimates (Column 3, $p < 0.01$) and by 13.0 p.p. conditional on individual fixed effects (Column 4, $p < 0.01$). Attention to economic growth is weakly positively related to attention to inflation or monetary policy (Columns 1, 2, 5, and 6). Lastly, attention to macroeconomic topics and attention to household-level topics are strongly negatively associated with each other, with attention to household-level topics reducing attention to aggregate topics by 19.1 p.p. and 27.9 p.p. according to pooled OLS and individual fixed effects estimates, respectively (Columns 7 and 8, $p < 0.01$). Panel B of Table 4 shows broadly similar results for the firm sample. Appendix Figure A.7 provides pairwise correlation coefficients for attention to a broader set of macroeconomic and household- or firm-level topics.

Appendix Table A.7 shows that the negative relationships between attention to macroeconomic and attention to household-/firm-level topics are robust to excluding Covid-19 from the macroeconomic topics, suggesting that the patterns are not driven by the specific circumstances of the pandemic at the beginning of our sample period. Another concern

---

[7]Specifically, we control for gender, age, education, employment status, income, homeownership, and stock ownership in the household sample, which are mostly elicited in the first wave a household participates in the panel. In the firm sample, we control for firms' number of employees (in logs) and export share, dummies for broad industry group, and a dummy taking value one if the respondent reports having "very high" influence on the firm's decisions regarding investment, production, personnel, or price setting, which is elicited in survey wave 3.

Table 4: Co-movement of attention to different topics

	Attention to inflation				Attention to monetary policy		Attention to any macro topic	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Households								
Attention to growth	0.146***	0.064**			0.013	0.012		
	(0.027)	(0.031)			(0.009)	(0.008)		
Attention to monetary policy			0.301***	0.130***				
			(0.030)	(0.031)				
Attention to any household-level topic							-0.191***	-0.279***
							(0.007)	(0.008)
Distinct respondents	10,758	10,758	10,758	10,758	10,758	10,758	10,758	10,758
Observations	34,980	34,980	34,980	34,980	34,980	34,980	34,980	34,980
R-squared	0.11	0.11	0.12	0.11	0.01	0.00	0.07	0.11
Panel B: Firms								
Attention to growth	0.030***	-0.004			0.029***	0.010**		
	(0.011)	(0.011)			(0.005)	(0.005)		
Attention to monetary policy			0.210***	0.112***				
			(0.019)	(0.020)				
Attention to any firm-level topic							-0.301***	-0.281***
							(0.007)	(0.008)
Distinct respondents	6,283	6,283	6,283	6,283	6,283	6,283	6,283	6,283
Observations	28,885	28,885	28,885	28,885	28,885	28,885	28,885	28,885
R-squared	0.10	0.10	0.11	0.10	0.02	0.01	0.07	0.06
Controls	Yes	No	Yes	No	Yes	No	Yes	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	No	Yes	No	Yes	No	Yes	No	Yes

Notes: This table displays regressions of dummy variables indicating households' (Panel A) and firms' (Panel B) attention to a given topic – i.e., an indicator taking value one if the topic is mentioned in response to the open-ended survey question – on dummy variables indicating attention to another topic. Attention to macroeconomic topics in general (Columns 7 and 8) includes all macro topics. Attention to household-level or firm-level topics covers all local-level topics. Columns 1, 3, 5, and 7 control for the individual's gender, age, education, employment status, household income, homeownership, and stock ownership, and the respondent's influence on decisions in the firm, the firm's number of employees (in logs) and export share, as well as dummies for four broad industry groups, respectively. Columns 2, 4, 6 and 8 instead control for household and firm fixed effects, respectively. All specifications control for survey wave fixed effects. Standard errors clustered at the household/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

is that the open-response format mechanically produces negative relationships between attention to different topics, as respondents are only willing to provide a response of a certain length. Given that attention is strongly *positively* correlated across some topics (e.g.,

inflation and monetary policy), this concern seems less severe. In addition, respondents only providing a response of a certain length could reflect limits to their actual "attention budget" rather than additional filtering introduced through the response format.

Our results on the co-movement of attention to different topics have important implications for modeling. Our data are consistent with attentional crowd-out between different variables, as predicted by theories featuring costly acquisition and processing of information (e.g., Gabaix, 2014; Mackowiak and Wiederholt, 2009; Zorn, 2020). Our results suggest that this crowd-out does not occur across different macroeconomic variables. Instead, the positive correlation of attention across different aggregate topics, in particular between inflation and monetary policy, points to a role for attentional spillovers in this domain. Such spillovers could be driven by the fact that aggregate topics tend to be covered jointly in the news. By contrast, our results are consistent with attentional crowd-out between aggregate and local (household- or firm-level) topics, in line with Mackowiak and Wiederholt (2009). Our findings are less supportive of sticky information models (Mankiw and Reis, 2002; Reis, 2006a), in which agents acquire information about all topics jointly.

Summary   Our first set of results can be summarized as follows:

Result 1.

(a) *Households' and firms' attention varies strongly across topics, with attention being highest for household- and firm-level topics. Attention to macroeconomic topics is dominated by attention to Covid-19 and inflation.*

(b) *Among both households and firm managers, individual fixed effects are an important source of variation in attention allocation.*

(c) *Over the course of the recovery from the coronavirus recession and amidst increasing inflationary pressures, households and firms become less attentive to Covid-19 and more attentive to inflation.*

(d) *Attention to aggregate topics is negatively correlated with attention to household- and firm-level economic topics, while attention is positively correlated across different macroeconomic topics.*

3.2   Attention and beliefs

In canonical models, attention to the macroeconomy affects economic outcomes mainly through its effects on economic agents' beliefs (Bordalo et al., 2018; Maćkowiak and Wiederholt, 2015; Reis, 2006a). In this section, we document the empirical relationship between attention and households' as well as firms' expectations. We focus on inflation, for which there is a major shift in the environment and strong variation in attention over our sample period. This exercise is purely correlational and should be interpreted cautiously. Nevertheless, we consider it a useful starting point to empirically understand the role of attention in macroeconomic expectation formation.

Belief data   In each wave of our household and firm surveys, we elicit respondents' expectations about the inflation rate over the next 12 months, as well as their confidence in their inflation expectations on a five-point categorical scale. We winsorize inflation expectations at 30% to reduce the impact of outliers. None of our findings are sensitive to the exact choice of the cutoff or to whether we set to missing extreme observations instead. Median inflation expectations in our firm and household samples closely track median inflation expectations from representative firm and household surveys conducted by the Bundesbank (Appendix Figure A.8), which suggests that our expectations data are of high quality.

Cross-sectional correlations   We start by analyzing differences in beliefs between attentive and inattentive households. In particular, we regress different aspects of respondents' beliefs about inflation on a dummy variable for being attentive to inflation as well as a set of control variables and time fixed effects.

26

Canonical theories of inattention, such as sticky information models (e.g., Mankiw and Reis, 2006) or noisy information models (e.g., Woodford, 2003), posit that more attentive agents adjust their expectations more quickly when signals change. During our sample period, which covers an unexpected surge in inflation, attentive households are indeed 2.1 p.p. more likely to change their expectations about 12-month-ahead inflation from one survey wave to the next by at least 0.5 p.p., compared to an overall fraction of 79% reporting such changes in beliefs (Table 5 Panel A Column 1, $p < 0.01$). Another prediction of models is that higher attention is associated with reduced subjective uncertainty about future inflation. Consistent with this prediction, attentive household respondents are 0.17 standard deviations more confident in their expectations (Column 2, $p < 0.01$).

In workhorse models, more attentive agents' beliefs are better calibrated, i.e., their beliefs are closer to benchmarks. In the household survey, we elicit perceptions of realized inflation over the previous 12 months, i.e., the current inflation rate at the time of the survey. Attentive households, on average, exhibit 0.1 p.p. lower inflation perceptions over the combined pre-shock and shock period (Column 5, $p = 0.13$), resulting in a 0.5 p.p. smaller absolute misperception of realized inflation (Column 6, $p < 0.01$). The choice of benchmark is more complicated for expectations about future inflation. Using the actual realization of inflation as an ex-post benchmark is not meaningful, as our sample period is short and contains extreme realizations of inflation. Thus, respondents with lower forecast errors were not necessarily better calibrated from an ex-ante perspective. We instead rely on professional forecasts – the only ex-ante benchmark available. Although professional forecasts themselves may be biased, they are typically much less dispersed than household or firm expectations (Andre et al., 2022a; Candia et al., 2021).[8] Attentive households expect 0.2 p.p. higher inflation compared to inattentive households on average over our sample period (Column 3, $p < 0.1$). However, higher attention is not associated with a smaller absolute deviation of respondents' expectations from the aver-

---

[8]We rely on professional forecasts from FocusEconomics, a company that provides economic analyses and forecasts for almost all countries in the world. Their economic forecasts are based on the consensus of a diverse range of reputable sources including investment banks, economic think tanks, and international organizations.

Table 5: Attention and beliefs: Cross-sectional correlations

	Absolute change in expectation $\geq$ 0.5 p.p.	Confidence (z)	Expected inflation	Absolute deviation from expert forecast	Perceived current inflation	Absolute deviation from current level
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Households						
Attention to inflation	0.021***	0.168***	0.167*	0.101	-0.110	-0.500***
	(0.007)	(0.016)	(0.087)	(0.085)	(0.072)	(0.061)
Distinct respondents	6,716	10,758	10,758	10,758	8,330	8,330
Observations	20,983	34,980	34,980	34,980	24,407	24,407
R-squared	0.02	0.12	0.16	0.10	0.14	0.07
Mean dep. var.	0.79	0.04	7.08	4.88	6.32	2.67
SD dep. var.	0.41	0.99	6.49	6.17	5.26	4.26
Panel B: Firms						
Attention to inflation	0.013**	0.043**	0.211***	0.198***		
	(0.006)	(0.017)	(0.046)	(0.045)		
Distinct respondents	4,402	6,193	6,235	6,235		
Observations	18,426	27,126	28,112	28,112		
R-squared	0.02	0.02	0.49	0.23		
Mean dep. var.	0.80	0.04	5.47	3.00		
SD dep. var.	0.40	1.02	3.44	2.72		
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table displays regressions of households' (Panel A) and firms' (Panel B) beliefs on attention to inflation – i.e., an indicator taking value one if inflation is mentioned in response to the open-ended survey question. The dependent variables are an indicator that is one if the respondent changed 12-month ahead inflation expectations by at least 0.5 p.p. between the previous and the current survey wave (Column 1), a respondent's confidence in their own inflation forecast (z-scored, Column 2), expected inflation over the next twelve months (Column 3), the absolute deviation of expected inflation from the mean professional forecast from FocusEconomics (Column 4), a respondent's perception of the current inflation rate over the last 12 months (Column 5), and the absolute deviation of this perception from the actually realized current inflation rate (Column 6). Besides survey wave fixed effects, all regressions control for the individual's gender, age, education, employment status, household income, homeownership, and stock ownership, and the respondent's influence on decisions in the firm, the firm's number of employees (in logs) and export share, as well as dummies for four broad industry groups, respectively. For a version with individual fixed effects, see Appendix Table A.8. Standard errors clustered at the individual/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

age professional forecast. In fact, the inflation expectations of attentive households differ more strongly from professional forecasts than the expectations of inattentive households, albeit not significantly so (Column 4, $p = 0.24$). Thus, the prediction of smaller deviations

from benchmarks among attentive households is borne out for beliefs about current but not for expectations about future inflation. Potential explanations could be that agents rely on their own – potentially mis-specified – subjective model of the economy when interpreting information (Andrade et al., 2016; Andre et al., 2022a, 2023; Laudenbach et al., 2023) or that agents retrieve specific experiences from their memory database when increasing attention (Bordalo et al., 2023a).

In the firm sample, we find similar patterns for the frequency of updating, confidence, levels of expectations, and deviations from professional forecasts as among households, as shown in Column 1-4 of Panel B. Appendix Table A.8 shows a version of Table 5 that includes individual fixed effects and therefore only exploits variation in attention and beliefs within the same household or firm over time. The estimates are mostly similar to the pooled OLS estimates, although they are somewhat smaller and less precise. One exception is that the association between attention and a household's absolute misperception of realized inflation is no longer significantly negative but close to zero and insignificant. Given that the inclusion of fixed effects shuts down most of the available variation – particularly in the household sample, where some respondents only participate a few times – we view these results as encouraging.

Disagreement How is attention associated with disagreement in expectations? Table 6 illustrates how the cross-sectional dispersion in inflation expectations as measured by the standard deviation, the interquartile range, and the difference between the 90th and the 10th percentile differs between attentive and inattentive respondents. To only capture within-wave disagreement, the inflation expectations are purged of survey wave fixed effects before calculating dispersion. The table displays these differences separately for households and for firms both for the full sample period and for different subperiods.

The table shows that disagreement in inflation expectations is lower among households that are attentive to inflation than among inattentive households according to the cross-sectional standard deviation and the difference between the 90th and the 10th percentile. The interquartile range is more similar between attentive and inattentive house-

holds, suggesting that attention is mostly reflected in the width of the tails of the distribution of inflation expectations. Differences in dispersion between attentive and inattentive households exist in all the different sub-periods of our sample period, i.e., both before and during the period of elevated inflation. The differences are quantitatively meaningful. For instance, the difference between the 90th and the 10th percentile is 9.7 p.p. among inattentive households and only 8.0 p.p. among attentive households. At the same time, disagreement is also substantial among attentive households. Among both attentive and inattentive households, dispersion first decreases in response to the inflation shock and then reverts to higher levels following Russia's invasion of Ukraine. Appendix Table A.9 highlights that also disagreement about realized inflation is lower among attentive than among inattentive households.

In contrast to the patterns among households, the differences in expectation dispersion between attentive and inattentive firms are smaller and less systematic. If anything, dispersion seems to be somewhat higher among attentive firms than among inattentive firms. Consistent with recent evidence (Link et al., 2023), dispersion in inflation expectations is much smaller among firm managers than among households. The dispersion of firms' expectations increases somewhat over the course of the shock, reverting back in the period of decreasing inflationary pressures starting in December 2022. However, these changes over time are less pronounced than among households.

The theoretical predictions for the link between attention and belief dispersion are less clear-cut than the predictions for updating, confidence or deviations from benchmarks (Angeletos and Pavan, 2007). Nevertheless, our findings of (i) a high level of belief dispersion even among attentive households and (ii) a similar degree of dispersion among attentive as among inattentive firms suggest that – on top of variation in the degree of attention – other sources of heterogeneity in beliefs are important. These factors could include heterogeneity in which information agents acquire (Fuster et al., 2022; Van Nieuwerburgh and Veldkamp, 2009) or retrieve from their memory (Bordalo et al., 2023a), or disagreement about structural relationships in the economy (Andrade et al., 2016; Andre et al., 2022a; Laudenbach et al., 2023).

Table 6: Attention and disagreement about future inflation

	Households			Firms		
	(1) SD	(2) IQR	(3) p90-p10	(4) SD	(5) IQR	(6) p90-p10
Full Sample: Dec 2020 - Mar 2023						
(A) Attentive to inflation	4.93	3.00	8.00	2.65	2.40	4.70
(IA) Inattentive to inflation	6.43	2.94	9.72	2.40	1.70	3.97
p-value: (A)=(IA)	0.00			0.00		
Period 1: Dec 2020 - Jun 2021						
(A) Attentive to inflation	5.75	2.30	8.45	2.05	1.26	2.67
(IA) Inattentive to inflation	7.20	2.80	11.95	1.95	1.03	2.47
p-value: (A)=(IA)	0.00			0.38		
Period 2: Sep 2021 - Dec 2021						
(A) Attentive to inflation	3.84	2.07	5.50	2.29	1.67	3.27
(IA) Inattentive to inflation	5.79	2.00	7.57	2.07	1.73	3.23
p-value: (A)=(IA)	0.00			0.04		
Period 3: Mar 2022 - Sep 2022						
(A) Attentive to inflation	5.32	3.42	8.80	2.93	2.85	6.00
(IA) Inattentive to inflation	6.46	3.80	12.00	2.91	2.75	5.50
p-value: (A)=(IA)	0.00			0.79		
Period 4: Dec 2022 - Mar 2023						
(A) Attentive to inflation	4.57	3.53	8.47	2.55	2.50	5.00
(IA) Inattentive to inflation	5.38	3.43	9.20	2.64	3.00	5.00
p-value: (A)=(IA)	0.00			0.92		

Notes: This table displays the standard deviation, the interquartile range, and the range between the 90th and 10th percentile of inflation expectations separately for respondents that pay attention to inflation according to our text-based measure and those who do not. Before calculating the dispersion measures, the data are purged of survey wave fixed effects. The displayed p-values refer to Levene's tests of the equality of standard deviations between respondents that are attentive (A) and respondents that are inattentive (IA) to inflation according to the open-ended measure.

Taken together, our second main result is the following:

Result 2. *Higher attention is associated with a higher frequency of expectation adjustment, higher confidence in beliefs and smaller misperceptions about realized inflation. Yet, attentive respondents' inflation expectations deviate more strongly from professional forecasts. Attentive households disagree less about future inflation than inattentive households, while expectation dispersion*

is at a similar level among attentive firms as among inattentive firms.

3.3   Experiences, attention, and beliefs

In this section, we provide evidence on the role of personal experiences as a potential driver of households' attention to the macroeconomy as well as their expectations. We focus on households, as we collected direct measures of inflation experiences in the pre-shock period for this sample. We supplement our evidence from our self-collected panel datasets from Germany with data from the US.

3.3.1   Main evidence

Theoretical predictions   Theories of associative memory posit that what is on top of individuals' minds depends on the experiences in their memory database (Bordalo et al., 2023c). In addition, these theories predict that the context determines which experiences individuals retrieve through similarity-based recall. In particular, individuals should become more likely to retrieve a specific experience – and be attentive to this piece of information – once the context becomes more similar to that experience (Bordalo et al., 2023a; Enke et al., 2023). We test these predictions by studying correlations between experiences with inflation and attention to inflation, and how the strength of these correlations responds to the inflation shock.

Experience measures   In our empirical analysis, we consider two different types of experiences. First, we consider a collective cohort-level experience: having lived through the oil crises of the 1970s, when inflation reached historically high levels. We build on prior work by Binder and Makridis (2022), who use an indicator for whether the respondent was born before 1965 as a proxy for experiencing the oil crises. We similarly define a dummy variable indicating those cohorts that were at least teenagers by the late 1970s.[9]

---

[9]We elicited respondents' age using a question with six brackets. Thus, we cannot precisely pin down a respondent's birth year and classify those aged 55 or older as having experienced the oil crises. This captures cohorts born 1965 or earlier for respondents who entered the panel in 2020 and cohorts born 1968
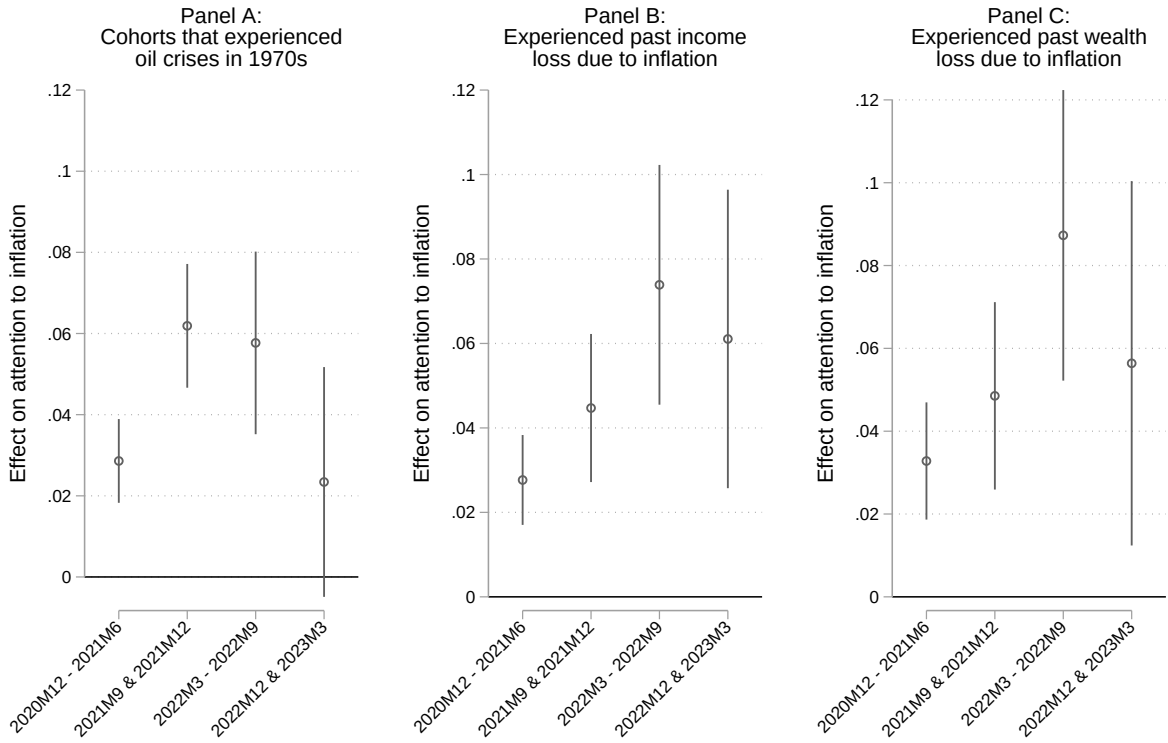
Given that the oil price shocks of the 1970s were large and persistently pushed up infla-
tion, we would expect respondents with such experiences to be more likely to retrieve
memories of extreme inflation outcomes. Second, we use survey measures of more per-
sonal experiences, which vary within cohorts. Specifically, we elicited in waves 2 and 3
of the data collection in March and June 2021, i.e., prior to the surge in inflation, whether
respondents ever incurred substantial real income drops or real wealth losses due to in-
creases in inflation.[10] These measures capture across-cohort variation arising from dif-
ferences in experienced aggregate inflation rates as well as within-cohort variation from
(i) differential co-movement of one's income or wealth with inflation, (ii) differences in
experienced household-level inflation rates, or (iii) differential encoding of a given expe-
rienced aggregate inflation rate in individuals' memory.

Results: attention Panel A of Figure 3 shows that individuals who experienced the
oil crises are 2.9 p.p. more likely to pay attention to inflation in the pre-shock period
($p < 0.01$), conditional on a set of control variables. This difference in attention becomes
significantly more pronounced – reaching a level of 6.2 p.p. – when the inflation shock
first hits the economy in September and December 2021 (p-value of the interaction < 0.01)
– and then remains at a similarly high level during the period following Russia's inva-
sion of Ukraine (March to September 2022). During the period of decreasing inflation-
ary pressures starting in December 2022, cohort differences in attention revert back to a
lower level of 2.3 p.p. We find similar patterns – i.e., higher baseline levels of attention as
well as a stronger increase in attention once inflation rises – when focusing on our direct
measures of personal experiences with inflation, though the increase in attention occurs
somewhat more gradually over the course of the shock (Panels B and C). Columns 1-3 of
Table 7 show that changes in the correlation of experiences with attention over the course
of the shock are robust to including individual fixed effects.

---

or earlier for respondents who entered the panel in 2023.

[10]We decided against eliciting positive experiences with inflation, as inflation is negatively encoded by
most individuals, particularly in the German context. For instance, recent evidence suggests that debtors
are not aware of the positive effects of inflation on their real wealth (Hackethal et al., 2023).

Figure 3: Experiences and attention over time

Panel A:
Cohorts that experienced
oil crises in 1970s

Panel B:
Experienced past income
loss due to inflation

Panel C:
Experienced past wealth
loss due to inflation

Notes: This figure displays the effects of different experience measures on households' attention to inflation as captured in the open-ended text data during the different time periods displayed on the x-axes. Panel A uses an indicator for cohorts aged 55+ at the time of the survey, i.e., those who were at least teenagers during the oil crises of the 1970s. Panels B and C use information on whether the respondent has ever experienced a real income loss or a real wealth loss due to inflation elicited in the pre-shock period (March and June 2021) and assign this value to all waves. We use the first observation for those that responded to the question in multiple waves. The coefficients shown are from interaction terms of dummies for time periods with the respective experience measure. Further, the regressions control for gender, age (only Panels B and C), education, employment status, household income, homeownership, and stock ownership, as well as survey wave fixed effects. Standard errors are clustered at the household level. Confidence intervals refer to the 95% level.

Results: inflation expectations We also explore whether experience-driven attention allocation is reflected in respondents' updating of their inflation expectations. Columns 4-6 of Table 7 display fixed-effects regressions of inflation expectations on interactions of experience measures with dummy variables for the periods of high inflation, using the pre-shock period as omitted base period. Cohort-level and personal experiences of adverse inflation outcomes are associated with a significantly stronger increase in inflation

expectations in response to the inflation shock. For instance, individuals who have lived through the oil crisis exhibit a 0.6 p.p. (Column 4, $p < 0.01$) stronger updating of inflation expectations when the inflation shock first hits the economy in the second half of 2021. The effect increases to 1 p.p. in the period following Russia's invasion of Ukraine in 2022 ($p < 0.01$). Interestingly, differences in expectations by experiences do not revert back during the period of decreasing inflationary pressures starting in December 2022.

These patterns suggest that similarity-based recall can be a source of extrapolative belief formation in the context of inflation: once the shock hits the economy, individuals with extreme inflation experiences become more likely to retrieve these experiences – i.e., to pay attention to these pieces of information stored in their memory – and increase their inflation expectations, leading to higher average expectations about future inflation.

Columns 7-9 show that the stronger increase in inflation expectations among individuals with previous inflation experiences is reflected in a stronger increase in the absolute distance of their expectations to professional forecasts. Together with our finding of a stronger increase in attention to inflation among individuals with past experiences of high inflation, these patterns suggest that similarity-based recall could be a driver of our earlier finding that higher attention is not associated with a smaller deviation of expectations from benchmarks (Section 3.2).

Taken together, our third main result is the following:

Result 3. *Individuals with past experiences of adverse inflation outcomes pay more attention to inflation. The effects of experiences on attention increase during the inflation shock, consistent with similarity-based recall, and are reflected in a stronger updating of inflation expectations.*

Alternative explanation 1: News supply   Instead of similarity-based recall, the time-varying relationships of experiences with attention and beliefs could reflect differences in news consumption across households coupled with an increase in the supply of inflation-related news in response to the shock. To address this possibility, we repeat the fixed-effects estimations presented in Table 7 including additional control variables. Specifi-

Table 7: Experiences, attention, and beliefs

	Attention to inflation			Expected inflation next 12 months			Absolute deviation from expert forecast		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cohorts that experienced oil crises									
× 1(t ∈ {21m9, 21m12})	0.037***			0.559***			0.550***		
	(0.009)			(0.130)			(0.127)		
× 1(t ∈ {22m3, 22m6, 22m9})	0.030**			1.019***			0.937***		
	(0.013)			(0.161)			(0.157)		
× 1(t ∈ {22m12, 23m3})	0.003			1.020***			0.913***		
	(0.016)			(0.187)			(0.180)		
Infl. experience: Income loss									
× 1(t ∈ {21m9, 21m12})		0.025***			0.175			0.185	
		(0.010)			(0.137)			(0.135)	
× 1(t ∈ {22m3, 22m6, 22m9})		0.050***			0.681***			0.657***	
		(0.014)			(0.176)			(0.172)	
× 1(t ∈ {22m12, 23m3})		0.050***			0.606***			0.533***	
		(0.018)			(0.209)			(0.203)	
Infl. experience: Wealth loss									
× 1(t ∈ {21m9, 21m12})			0.025**			0.030			0.066
			(0.012)			(0.176)			(0.173)
× 1(t ∈ {22m3, 22m6, 22m9})			0.046***			0.582**			0.581**
			(0.018)			(0.232)			(0.229)
× 1(t ∈ {22m12, 23m3})			0.017			0.635**			0.610**
			(0.023)			(0.258)			(0.253)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distinct respondents	10,758	5,754	5,754	12,026	5,984	5,984	12,026	5,984	5,984
Observations	34,980	24,661	24,661	40,552	28,493	28,493	40,552	28,493	28,493
R-squared	0.11	0.12	0.12	0.19	0.21	0.21	0.06	0.07	0.07
Mean dep. var.	0.08	0.07	0.07	0.07	0.06	0.06	0.07	0.06	0.06
SD dep. var.	0.27	0.26	0.26	0.26	0.24	0.24	0.26	0.24	0.24

Notes: The dependent variables are a household's attention to inflation as measured in the open-ended data (Columns 1-3), the household's expected inflation over the next 12 months (Columns 4-6), and the absolute deviation of the household's expected inflation from the mean professional forecast reported to FocusEconomics (Columns 7-9). The first experience measure is an indicator for cohorts aged 55+ at the time of the survey, i.e., those who were at least teenagers during the oil crises of the 1970s. The second and third measure use information on whether the respondent has ever experienced a real income loss or a real wealth loss due to inflation elicited in the pre-shock period (March and June 2021) and assign this value to all waves. We use the first observation for those that responded to the question in multiple waves. The interaction terms interact dummies for time periods with the respective experience measure, i.e., they estimate a differential effect relative to the base period (December 2020-June 2021). All specifications include individual fixed effects and survey wave fixed effects. Standard errors are clustered at the household level. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

cally, we control for interactions of dummy variables for the shock periods with a dummy variable indicating whether the respondent reported above-median news consumption regarding inflation in the pre-shock period. As shown in Columns 2, 5, and 8 of Appendix

Tables A.10 and A.11, our main coefficient estimates are unaffected by this exercise.

Alternative explanation 2: Current exposure to inflation Alternatively, individuals with adverse past inflation experiences could live in households that are generally more exposed to inflation shocks. Their differential tendency to increase attention to inflation may therefore reflect their current exposure to inflation rather than memory-related factors. To address this possibility, we repeat our fixed effects estimations additionally controlling for a dummy indicating whether the respondent's assessment of the extent to which their household's economic situation depends on the inflation rate as measured in the pre-shock period is above the sample median, interacted with dummy variables for the shock periods. Columns 3, 6, and 9 of Appendix Tables A.10 and A.11 show that the time-varying relationships of experiences with attention to inflation and inflation expectations are robust to these additional controls.

Placebo Columns 10-12 of Appendix Table A.10 show that experiences with inflation are unrelated to the evolution of attention to macro topics *other than inflation or monetary policy* over the course of shock. Thus, consistent with similarity-based recall, individuals with inflation experiences think specifically of inflation once the environment becomes more inflationary.

3.3.2 External validity: Evidence from the US

A potential concern is that our findings are specific to the German context. We therefore probe the external validity of our findings using household panel data from the US. Since no existing dataset from the US contains comparable data on attention to the macroeconomy, we focus on how inflation experiences are associated with the updating of inflation expectations in response to the inflation shock.

Data We leverage the New York Fed's Survey of Consumer Expectations (SCE), a high-quality probability-based panel dataset representative of the US population. The SCE

includes rich data on inflation expectations and is widely used in economic research (Armantier et al., 2017, 2016, 2015; Armona et al., 2019; Crump et al., 2022; Fuster et al., 2022). The SCE has a rotating panel structure: every month, a set of new respondents enter the survey and stay in the panel for a maximum of 12 months. Given that our identification hinges on within-person variation and that inflation in the US started increasing to elevated levels from April 2021, we focus on the period between May 2020 and January 2023, the most recent available wave of the panel.[11] Our final sample consists of 5,909 distinct households. Appendix Table A.12 provides summary statistics for our sample.

Empirical specification   Similarly as in our analysis on the German household panel, our experience measure is an indicator for the cohorts born before 1965, i.e., those who were at least teenagers during the oil crises of the 1970s. We regress respondents' expectations on individual fixed effects, survey wave fixed effects, as well as interaction terms of dummies for the period of increasing inflation (April 2021-June 2022) and the period of decreasing inflation (July 2022-January 2023) with a dummy for being born before 1965. The coefficients on the interaction terms indicate how individuals with different experiences differentially update their inflation expectations in response to the shock compared to the pre-shock period from May 2020 to March 2021.

Results   Table 8 displays the results. Respondents who have lived through the oil crises exhibit a 0.57 p.p. stronger increase in 12-month-ahead inflation expectations than younger cohorts going from the pre-shock period to the period of increasing inflation between April 2021 and June 2022 (Column 1, $p < 0.05$). As in the German data, this updating is not reversed during the period of still elevated but decreasing inflation between July 2022 and January 2023, with the difference increasing to 0.82 p.p. ($p < 0.05$). Column 2 highlights that the differential updating is reflected in a stronger increase in the deviation of expectations from expert benchmarks.[12] Cohorts that have lived through the oil crises

---

[11]Inflation increased to above 4.1% in April 2021 from 2.6% in March 2021.

[12]We rely on the average forecast from the Philadelphia Fed's Survey of Professional Forecasters (SPF) as a benchmark.

Table 8: Experiences and beliefs: Evidence from the US

	Horizon: 12 mths.		Horizon: 2-3 yrs.
	(1)	(2)	(3)
	Expected inflation	Absolute deviation from expert forecast	Expected inflation
Cohort < 1965	0.572**	0.574**	0.668**
× 1(t ∈ {21m4, 22m6})	(0.284)	(0.270)	(0.262)
Cohort < 1965	0.824**	0.665*	0.675*
× 1(t ∈ {22m7, 23m1})	(0.407)	(0.374)	(0.369)
Time FE	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes
Distinct respondents	5,903	5,903	5,897
Observations	39,560	39,560	39,563
R-squared	0.02	0.02	0.01
Mean dep. var	7.81	5.88	6.18
SD dep. var	7.94	7.36	7.55

Notes: This table examines the relationship between households' experiences and updating of inflation expectations over the shock period using data from the New York Fed's Survey of Consumer Expectations (SCE). The dependent variable is a household's point expectation about inflation over the next 12 months (Column 1), the absolute deviation of this expectation from the mean professional forecast from the SPF (Column 2), or the household's point expectation about inflation over the time period between 24 and 36 months after the survey (Column 3). The experience measure is an indicator for the cohorts born before 1965, i.e., those who were at least teenagers during the oil crises of the 1970s. The interaction terms interact dummies for time periods with the experience measure, i.e., they estimate a differential effect relative to the base period (May 2020-March 2021). All specifications include individual fixed effects and survey wave fixed effects. Standard errors are clustered at the household level. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

also exhibit a stronger updating of their expectations about inflation between 24 and 36 months after the survey (Column 3), suggesting that similarity-based recall of past experiences can be associated with a de-anchoring of expectations about future inflation. Taken together, the table confirms the patterns we uncover in the German data, demonstrating the external validity of our findings.

4 Conclusion and implications

Attention to the economy is a central element in macroeconomic models that depart from the full-information rational expectations assumption, but its empirical properties are not fully understood. To fill this gap, we collect new panel data on households' and firms' attention to the macroeconomy based on open-ended survey questions. We use these data to document three sets of novel stylized facts. In a first step, we characterize the cross-sectional and time variation in attention to the economy. Attention to the macroeconomy displays substantial and sustained variation across individuals, shifts towards inflation in response to a surge in inflation, and is negatively associated with attention to household- and firm-level topics. In a second step, we examine the link between attention to the economy and macroeconomic expectation formation, focusing on inflation. Consistent with standard models of inattention, attentive respondents adjust their inflation expectations more frequently during the shock, are more confident in their expectations, and hold smaller misperceptions regarding realized inflation. Yet, contrary to the predictions of these models, the expectations of attentive respondents differ more strongly from professional forecasts. In a final step, we then explore personal experiences as a potential driver of households' attention to the economy. Individuals with past experiences of adverse inflation outcomes pay more attention to inflation and increase their attention more strongly in response to a shock to inflation, consistent with theories of similarity-based recall. Inflation experiences are also associated with a stronger increase in inflation expectations in response to the shock.

What features would a macroeconomic model consistent with our findings need to have? While formulating a full theory is beyond the scope of our paper, we briefly sketch how such a model could look like. A model that could generate many of the patterns we document should feature a limited capacity to acquire or process information, leading to pronounced inattention to many topics. It should feature an important role for experiences and memory, which draw agents' attention to different macroeconomic or local topics depending on the context through similarity-based recall, e.g., as in Bordalo et al.

40

(2023c). Limited cognitive resources in turn lead to shifts in attention between macroeconomic and local topics. Heterogeneity in experiences, exposure and cognitive resources generates strong heterogeneity in attention to the macroeconomy, part of which is persistent at the individual level. Attention to the macroeconomy affects economic outcomes by changing agents' beliefs and increasing agents' confidence in their beliefs. Exploring business cycle dynamics and the transmission of policies through the lens of such a model could be a fruitful avenue for future theoretical work.

From a methodological perspective, our paper highlights the value of bringing new types of data to open questions in macroeconomics. The rich and detailed picture of agents' attention allocation obtained using our measure points to the promise of using open-ended text responses to measure attention in economic contexts. Such measures could be included in existing panel surveys of households and firms, and be routinely analyzed using human or AI-based coding. These data could help policymakers make informed decisions and provide new empirical insights that inform future theoretical work.

References

Afrouzi, Hassan, Spencer Y Kwon, Augustin Landier, Yueran Ma, and David Thesmar, "Overreaction in Expectations: Evidence and Theory," *The Quarterly Journal of Economics*, 2023, *138* (3), 1713—1764.

Andrade, Philippe, Richard K Crump, Stefano Eusepi, and Emanuel Moench, "Fundamental Disagreement," *Journal of Monetary Economics*, 2016, *83*, 106–128.

Andre, Peter, Carlo Pizzinelli, Christopher Roth, and Johannes Wohlfart, "Subjective Mdels of the Macroeconomy: Evidence from Experts and Representative Samples," *The Review of Economic Studies*, 2022, *89* (6), 2958–2991.

__ , **Ingar Haaland, Christopher Roth, and Johannes Wohlfart**, "Narratives about the Macroeconomy," *ECONtribute Discussion paper*, 2022, (127).

__ , **Philipp Schirmer, and Johannes Wohlfart**, "Mental Models of the Stock Market," *CESifo Working Paper No. 10691*, 2023.

Angeletos, George-Marios and Alessandro Pavan, "Efficient Use of Information and Social Value of Information," *Econometrica*, 2007, *75* (4), 1103–1142.

Armantier, Olivier, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar, "An Overview of the Survey of Consumer Expectations," *Economic Policy Review*, 2017, *23* (2).

__ , **Scott Nelson, Giorgio Topa, Wilbert van der Klaauw, and Basit Zafar**, "The Price Is Right: Updating Inflation Expectations in a Randomized Price Information Experiment," *Review of Economics and Statistics*, 2016, *98* (3), 503–523.

__ , **Wändi Bruine de Bruin, Giorgio Topa, Wilbert Klaauw, and Basit Zafar**, "Inflation Expectations and Behavior: Do Survey Respondents Act on their Beliefs?," *International Economic Review*, 2015, *56* (2), 505–536.

Armona, Luis C, Andreas Fuster, and Basit Zafar, "Home Price Expectations and Behavior: Evidence from a Randomized Information Experiment," *Review of Economic Studies*, 2019, *86*, 1371–1410.

Bachmann, Rüdiger, Kai Carstensen, Stefan Lautenbacher, and Martin Schneider, "Uncertainty and Change: Survey Evidence of Firms Subjective Beliefs," *NBER Working Paper No. 29430*, 2021.

_ , **Steffen Elstner, and Eric R Sims**, "Uncertainty and Economic Activity: Evidence from Business Survey Data," *American Economic Journal: Macroeconomics*, 2013, *5* (2), 217–49.

Bachmann, Rüdiger, Benjamin Born, Steffen Elstner, and Christian Grimme, "Time-Varying Business Volatility and the Price Setting of Firms," *Journal of Monetary Economics*, 2019, *101*, 82–99.

Binder, Carola and Christos Makridis, "Stuck in the Seventies: Gas Prices and Consumer Sentiment," *Review of Economics and Statistics*, 2022, *104* (2), 293–305.

Bordalo, Pedro, Giovanni Burro, Katherine B Coffman, Nicola Gennaioli, and Andrei Shleifer, "Imagining the Future: Memory, Simulation and Beliefs," *Review of Economic Studies*, 2023.

_ , **John J Conlon, Nicola Gennaioli, Spencer Y Kwon, and Andrei Shleifer**, "How People Use Statistics," *Working Paper*, 2023.

_ , _ , _ , _ , **and** _ , "Memory and Probability," *The Quarterly Journal of Economics*, 2023, *138* (1), 265–311.

_ , **Nicola Gennaioli, and Andrei Shleifer**, "Diagnostic Expectations and Credit Cycles," *The Journal of Finance*, 2018, *73* (1), 199–227.

_ , _ , **and** _ , "Memory, Attention, and Choice," *The Quarterly Journal of Economics*, 2020, *135* (3), 1399–1442.

_ , _ , **and** _ , "Salience," *Annual Review of Economics*, 2022, *14*, 521–544.

Bracha, Anat and Jenny Tang, "Inflation Levels and (In-)Attention," *FRB of Boston Working Paper*, 2022.

Buchheim, Lukas, Jonas Dovern, Carla Krolage, and Sebastian Link, "Sentiment and Firm Behavior During the COVID-19 Pandemic," *Journal of Economic Behavior and Organization*, 2022, *195*, 186–198.

Bursztyn, Leonardo, Georgy Egorov, Ingar Haaland, Aakaash Rao, and Christopher Roth, "Justifying Dissent," *The Quarterly Journal of Economics*, 2023, *138* (3), 1403–1451.

Candia, Bernardo, Olivier Coibion, and Yuriy Gorodnichenko, "The Inflation Expectations of US Firms: Evidence from a New Survey," *Working Paper*, 2021.

Capozza, Francesco, Ingar Haaland, Christopher Roth, and Johannes Wohlfart, "Recent Advances in Studies of News Consumption," *Working Paper*, 2022.

Chahrour, Ryan, Kristoffer Nimark, and Stefan Pitschner, "Sectoral Media Focus and Aggregate Fluctuations," *American Economic Review*, 2021, *111* (12), 3872–3922.

Choi, Hyunyoung and Hal Varian, "Predicting the Present with Google Trends," *Economic Record*, 2012, *88*, 2–9.

Coibion, Olivier and Yuriy Gorodnichenko, "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts," *American Economic Review*, 2015, *105* (8), 2644–2678.

_ , _ , and Saten Kumar, "How Do Firms Form Their Expectations? New Survey Evidence," *American Economic Review*, 2018, *108* (9), 2671–2713.

Crump, Richard K, Stefano Eusepi, Andrea Tambalotti, and Giorgio Topa, "Subjective Intertemporal Substitution," *Journal of Monetary Economics*, 2022, *126*, 118–133.

D'Acunto, Francesco, Daniel Hoang, Maritta Paloviita, and Michael Weber, "IQ, Expectations, and Choice," *Review of Economic Studies*, 2023, *90* (5), 2292–2325.

D'Acunto, Francesco, Ulrike Malmendier, Juan Ospina, and Michael Weber, "Exposure to Grocery Prices and Inflation Expectations," *Journal of Political Economy*, 2021, *129* (5), 1615–1639.

Enders, Zeno, Franziska Hünnekes, and Gernot J Müller, "Monetary Policy Announcements and Expectations: Evidence from German Firms," *Journal of Monetary Economics*, 2019, *108*, 45–63.

Enke, Benjamin, Frederik Schwerter, and Florian Zimmermann, "Associative Memory, Beliefs and Market Interactions," *Journal of Financial Economics*, 2023.

Fetzer, Thiemo, Lukas Hensel, Johannes Hermle, and Christopher Roth, "Coronavirus Perceptions and Economic Anxiety," *Review of Economics and Statistics*, 2021, *103* (5), 968–978.

Flynn, Joel P and Karthik Sastry, "Attention Cycles," *Available at SSRN 3592107*, 2023.

Fuster, Andreas, Ricardo Perez-Truglia, Mirko Wiederholt, and Basit Zafar, "Expectations with Endogenous Information Acquisition: An Experimental Investigation," *Review of Economics and Statistics*, 2022, *104* (5), 1059–1078.

Gabaix, Xavier, "A Sparsity-Based Model of Bounded Rationality," *The Quarterly Journal of Economics*, 2014, *129* (4), 1661–1710.

＿ , "Behavioral Inattention," in "Handbook of Behavioral Economics: Applications and Foundations 1," Vol. 2, Elsevier, 2019, pp. 261–343.

＿ **and Thomas Graeber**, "The Complexity of Economic Decisions," *Available at SSRN*, 2023.

Gennaioli, Nicola and Andrei Shleifer, "What Comes to Mind," *The Quarterly Journal of Economics*, 2010, *125* (4), 1399–1433.

Giglio, Stefano, Matteo Maggiori, Johannes Stroebel, and Stephen Utkus, "Five Facts About Beliefs and Portfolios," *American Economic Review*, 2021, *111* (5), 1481–1522.

Goldfayn-Frank, Olga and Johannes Wohlfart, "Expectation Formation in a New Environment: Evidence from the German Reunification," *Journal of Monetary Economics*, 2020, *115*, 301–320.

Goldstein, Nathan, "Tracking Inattention," *Journal of the European Economic Association*, 2023, *21*, 2682–2725.

Graeber, Thomas, Florian Zimmermann, and Christopher Roth, "Stories, Statistics, and Memory," *CESifo Working Paper*, 2022.

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart, "Designing Information Provision Experiments," *Journal of Economic Literature*, 2023, *61* (1), 3–40.

Hackethal, Andreas, Philip Schnorpfeil, and Michael Weber, "Households' Response to the Wealth Effects of Inflation," *Working Paper*, 2023.

Hartzmark, Samuel M, Samuel D Hirshman, and Alex Imas, "Ownership, Learning, and Beliefs," *The Quarterly Journal of Economics*, 2021, *136* (3), 1665–1717.

Jiang, Zhengyang, Hongqi Liu, Cameron Peng, and Hongjun Yan, "Investor Memory and Biased Beliefs: Evidence from the Field," *Available at SSRN*, 2023.

Khaw, Mel Win, Luminita Stevens, and Michael Woodford, "Discrete Adjustment to a Changing Environment: Experimental Evidence," *Journal of Monetary Economics*, 2017, *91*, 88–103.

Korenok, Oleg, David Munro, and Jiayi Chen, "Inflation and Attention Thresholds," *Review of Economics and Statistics*, 2023.

Laudenbach, Christine, Annika Weber, Rüdiger Weber, and Johannes Wohlfart, "Beliefs About the Stock Market and Investment Choices: Evidence from a Field Experiment," *Working Paper*, 2023.

Link, Sebastian, Andreas Peichl, Christopher Roth, and Johannes Wohlfart, "Information Frictions Among Firms and Households," *Journal of Monetary Economics*, 2023, *135*, 99–115.

Mackowiak, Bartosz and Mirko Wiederholt, "Optimal Sticky Prices under Rational Inattention," *American Economic Review*, 2009, *99* (3), 769–803.

Maćkowiak, Bartosz and Mirko Wiederholt, "Business Cycle Dynamics under Rational Inattention," *The Review of Economic Studies*, 2015, *82* (4), 1502–1532.

_ , **Filip Matějka, and Mirko Wiederholt**, "Rational Inattention: A Review," *Journal of Economic Literature*, 2023, *61* (1), 226–273.

Malmendier, Ulrike and Laura Veldkamp, "Information Resonance," *Working Paper*, 2022.

_ **and Leslie Sheng Shen**, "Scarred Consumption," *American Economic Journal: Macroeconomics*, 2023.

_ **and Stefan Nagel**, "Depression Babies: Do Macroeconomic Experiences Affect Risk-taking?," *The Quarterly Journal of Economics*, 2011, *126* (1), 373–416.

_ **and** _ , "Learning from Inflation Experiences," *The Quarterly Journal of Economics*, 2016, *131* (1), 53–87.

_ , _ , **and Zhen Yan**, "The Making of Hawks and Doves," *Journal of Monetary Economics*, 2021, *117*, 19–42.

Mankiw, N Gregory and Ricardo Reis, "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve," *The Quarterly Journal of Economics*, 2002, *117* (4), 1295–1328.

_ **and** _ , "Pervasive Stickiness," *The American Economic Review*, 2006, *96* (2), 164–169.

Mikosch, Heiner, Christopher Roth, Samad Sarferaz, and Johannes Wohlfart, "Uncertainty and Information Acquisition: Evidence from Firms and Households," *American Economic Journal: Macroeconomics*, 2023.

Nieuwerburgh, Stijn Van and Laura Veldkamp, "Information Immobility and the Home Bias Puzzle," *The Journal of Finance*, 2009, *64* (3), 1187–1215.

Paciello, Luigi and Mirko Wiederholt, "Exogenous Information, Endogenous Information, and Optimal Monetary policy," *Review of Economic Studies*, 2014, *81* (1), 356–388.

Pedregosa, Fabian, Gaël Varoquaux, Alexandre Gramfort, Vincent Michel, Bertrand Thirion, Olivier Grisel, Mathieu Blondel, Peter Prettenhofer, Ron Weiss, Vincent Dubourg et al., "Scikit-learn: Machine Learning in Python," *the Journal of Machine Learning Research*, 2011, *12*, 2825–2830.

Peer, Eyal, David Rothschild, Andrew Gordon, Zak Evernden, and Ekaterina Damer, "Data Quality of Platforms and Panels for Online Behavioral Research," *Behavior Research Methods*, 2021, pp. 1–20.

Pfäuti, Oliver, "Inflation–Who cares? Monetary Policy in Times of Low Attention," *Working Paper*, 2023.

Reis, Ricardo, "Inattentive Consumers," *Journal of Monetary Economics*, 2006, *53* (8), 1761–1800.

— , "Inattentive Producers," *The Review of Economic Studies*, 2006, *73* (3), 793–821.

Roth, Christopher, Sonja Settele, and Johannes Wohlfart, "Risk Exposure and Acquisition of Macroeconomic Information," *American Economic Review: Insights*, 2022, *4* (1), 34–53.

Sauer, Stefan, Moritz Schasching, and Klaus Wohlrabe, "Handbook of ifo Surveys," *ifo Beiträge zur Wirtschaftsforschung No. 100*, 2023.

Sicherman, Nachum, George Loewenstein, Duane J Seppi, and Stephen P Utkus, "Financial Attention," *The Review of Financial Studies*, 2016, *29* (4), 863–897.

Sims, Christopher A, "Implications of Rational Inattention," *Journal of Monetary Economics*, 2003, *50* (3), 665–690.

Song, Wenting and Samuel Stern, "Firm Inattention and the Efficacy of Monetary Policy: A Text-based Approach," *Available at SSRN 3900641*, 2023.

Weber, Michael, Bernardo Candia, Tiziano Ropele, Rodrigo Lluberas, Serafin Frache, Brent Meyer, Saten Kumar, Yuriy Gorodnichenko, Dimitris Georgarakos, Olivier Coibion, Geoff Kenny, and Jorge Ponce, "Tell Me Something I Don't Already Know: Learning in Low and High-Inflation Settings," *Working Paper*, 2023.

Woodford, Michael, "Imperfect Common Knowledge and The Effects of Monetary Policy," in Philippe Aghion, Roman Frydman, Joseph E. Stiglitz, and Michael Woodford, eds., *Knowledge, Information, and Expectations in Modern Macroeconomics: In Honor of Edmund S. Phelps*, Princeton, NJ: Princeton Univ. Press, 2003.

— , "Information-constrained State-dependent Pricing," *Journal of Monetary Economics*, 2009, *56*, S100–S124.

Zorn, Peter, "Investment under Rational Inattention: Evidence from US Sectoral Data," *CESifo Working Paper*, 2020.

Online Appendix: Attention to the Macroeconomy

Sebastian Link   Andreas Peichl   Christopher Roth   Johannes Wohlfart

Summary of the Online Appendix

Section A contains additional figures.

Section B contains additional tables.

Section C provides the full list of codes in our scheme for the open-ended data.

Section D provides the key survey questions from our household and firm panels.

A Additional figures

<div align="center">Figure A.1: Unexpected shock to inflation</div>

Panel A: Expected and Realized Inflation

Panel B: Surprise Inflation
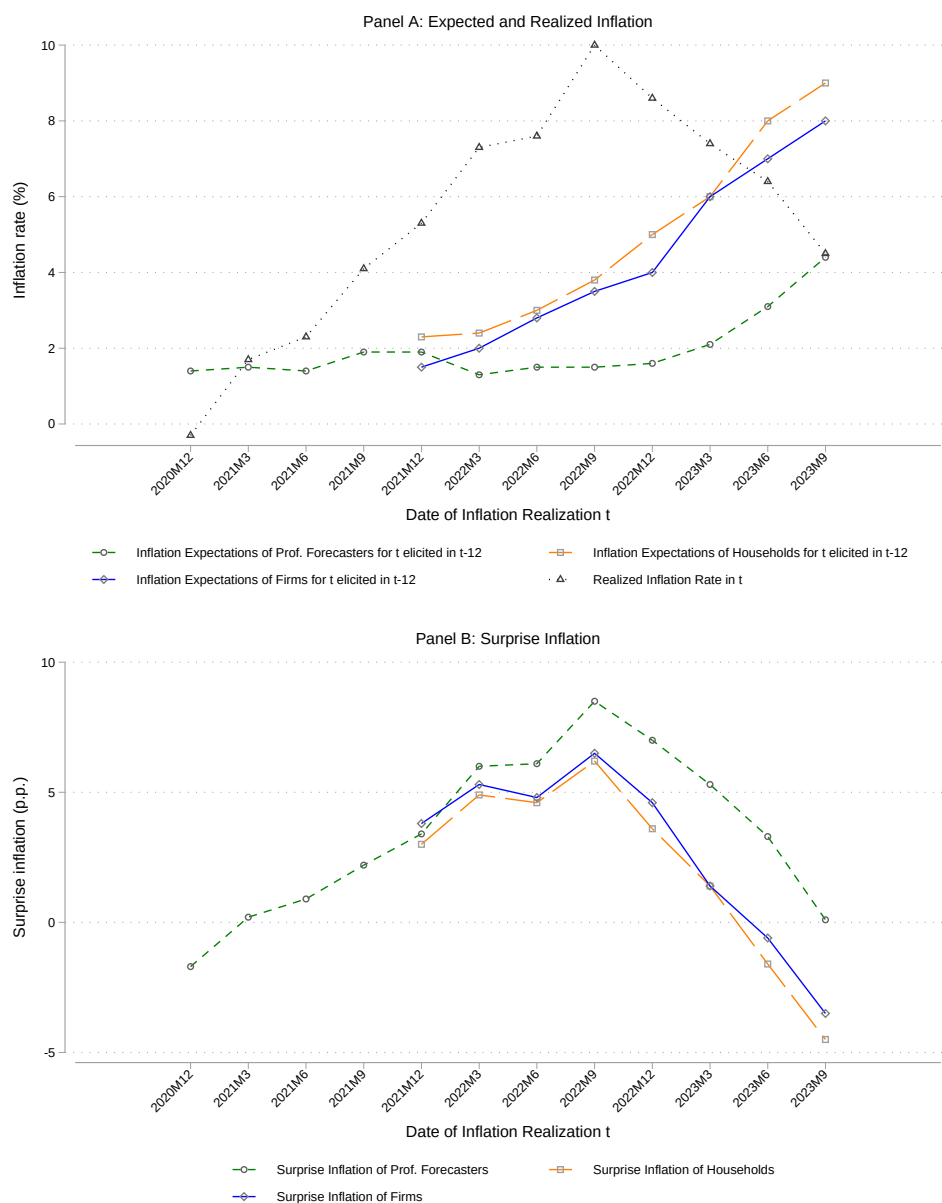
Notes: Panel A displays the median expected inflation rate over the next 12 months among households and firms along with the average professional forecast from FocusEconomics and the ex-post realized inflation rate in Germany. Expectations are shifted by 12 months such that the dates depicted on the x-axis refer to the date of the inflation realization, i.e., the date the expectations refer to. Panel B displays the "surprise inflation", i.e., the difference between forecasts and ex-post realized inflation rates in percentage points.

Figure A.2: Survey participation across waves
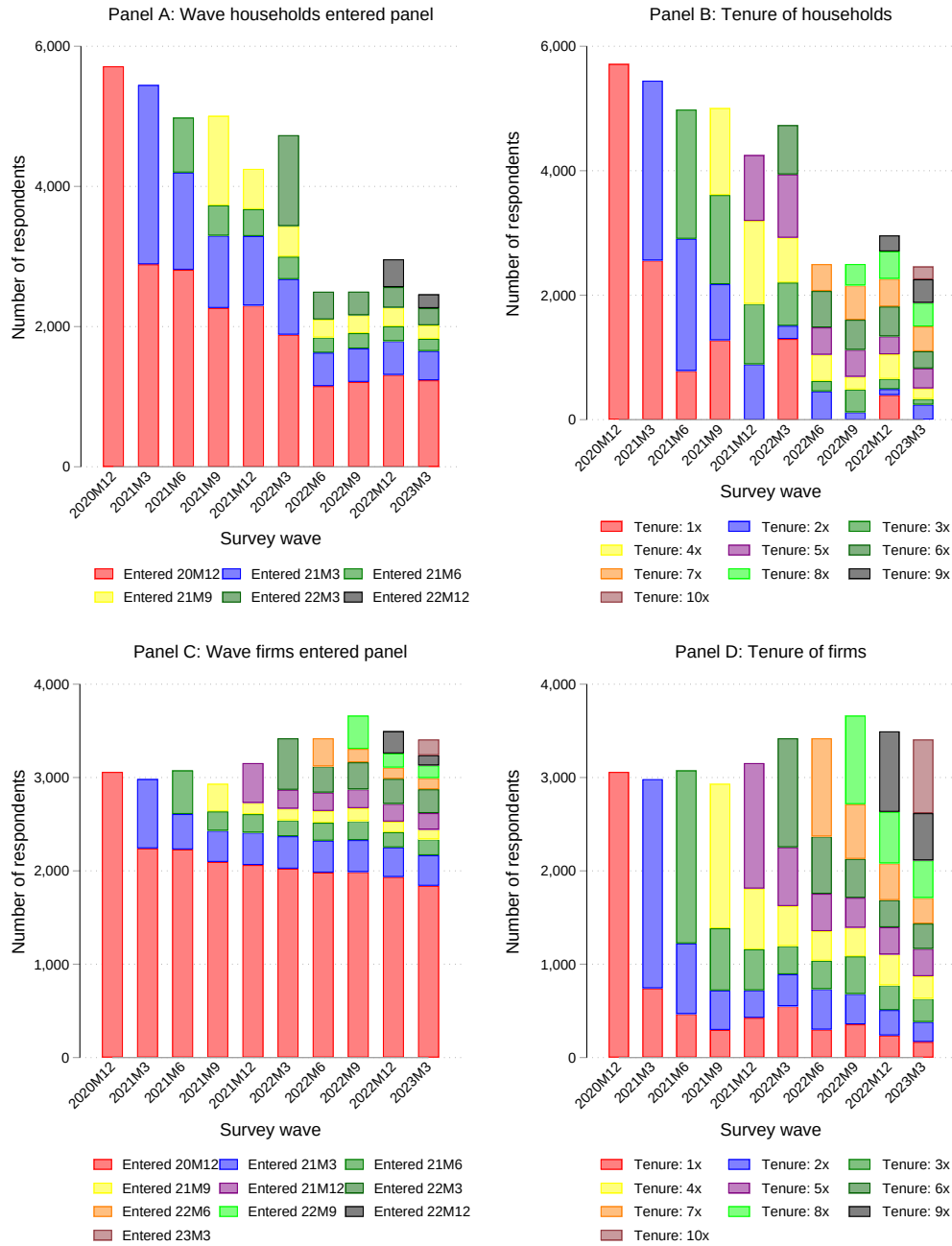
Notes: This figure displays the composition of the different survey waves in terms of the wave responding households and firms entered the panel (Panels A and C) and in terms of their tenure in the panel (Panels B and D).

Figure A.3: Distribution of topics in the open-ended data as classified using human coding and as classified using AI-coding
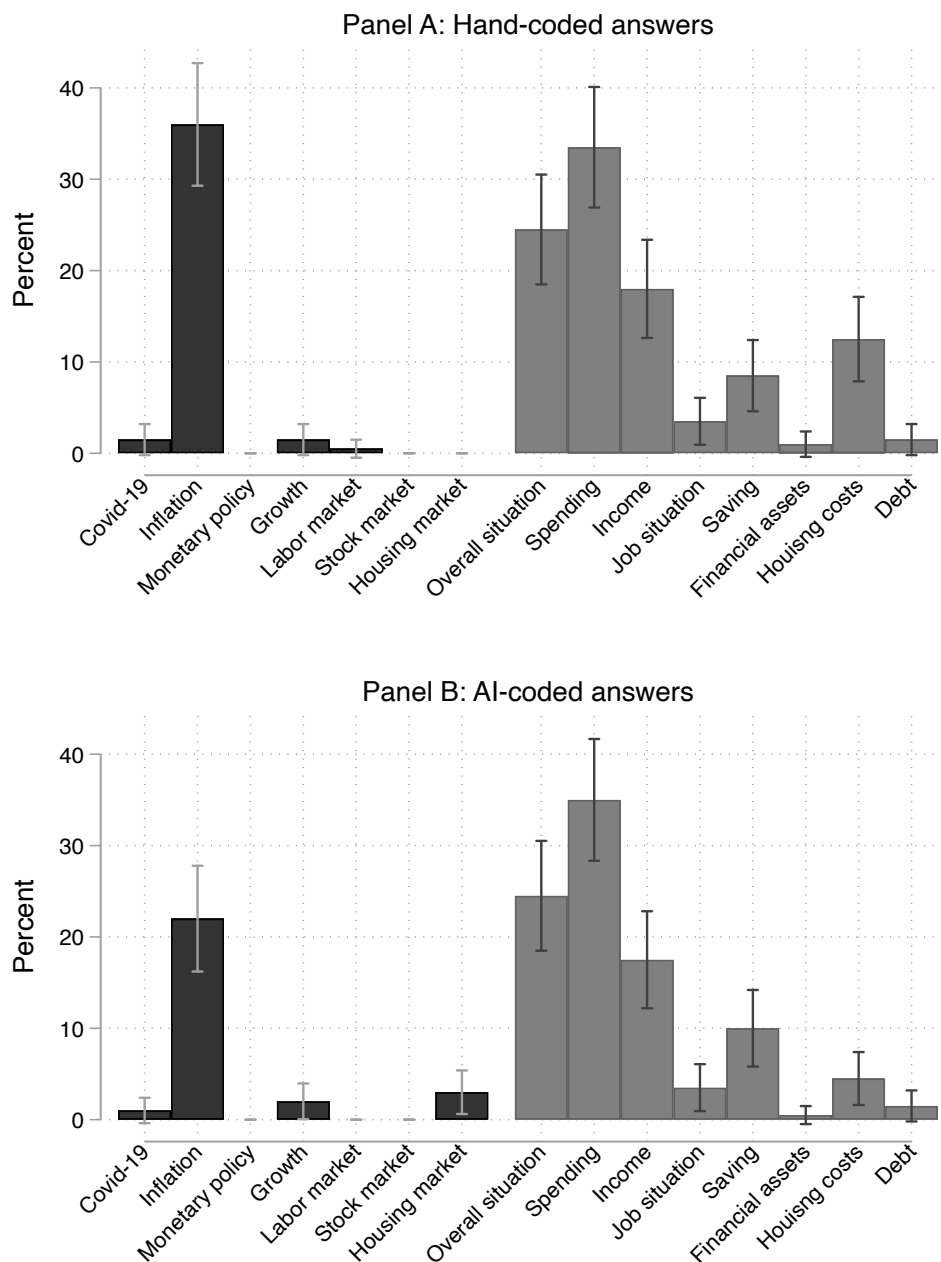
Panel A: Hand-coded answers

Panel B: AI-coded answers

Notes: This figure presents a validation exercise for the hand-coding of the open-ended data based on a sub-sample from the household survey wave in March 2023, which was both hand-coded and AI-coded using GPT-4. It shows the distribution of attention to different macroeconomic topics (black) and household-level topics (grey). The bars indicate the fractions of respondents paying attention to a given topic. The measure of attention is based on people's responses to our main open-ended question: "What topics come to mind when you think about the economic situation of your household?" Panel A shows results from the hand-coding. Panel B displays results from the AI-coding.

Figure A.4: Attention as measured in the open-ended question and news consumption

Panel A:
reports on inflation (HHs)

estimated coefficient: 0.725(0.031)***

Panel B:
Minutes spent on infl. news (HHs)

estimated coefficient: 0.251(0.017)***

Panel C:
reports on inflation (firms)

estimated coefficient: 0.647(0.042)***

Panel D:
Minutes spent on infl. news (firms)

estimated coefficient: 0.214(0.017)***
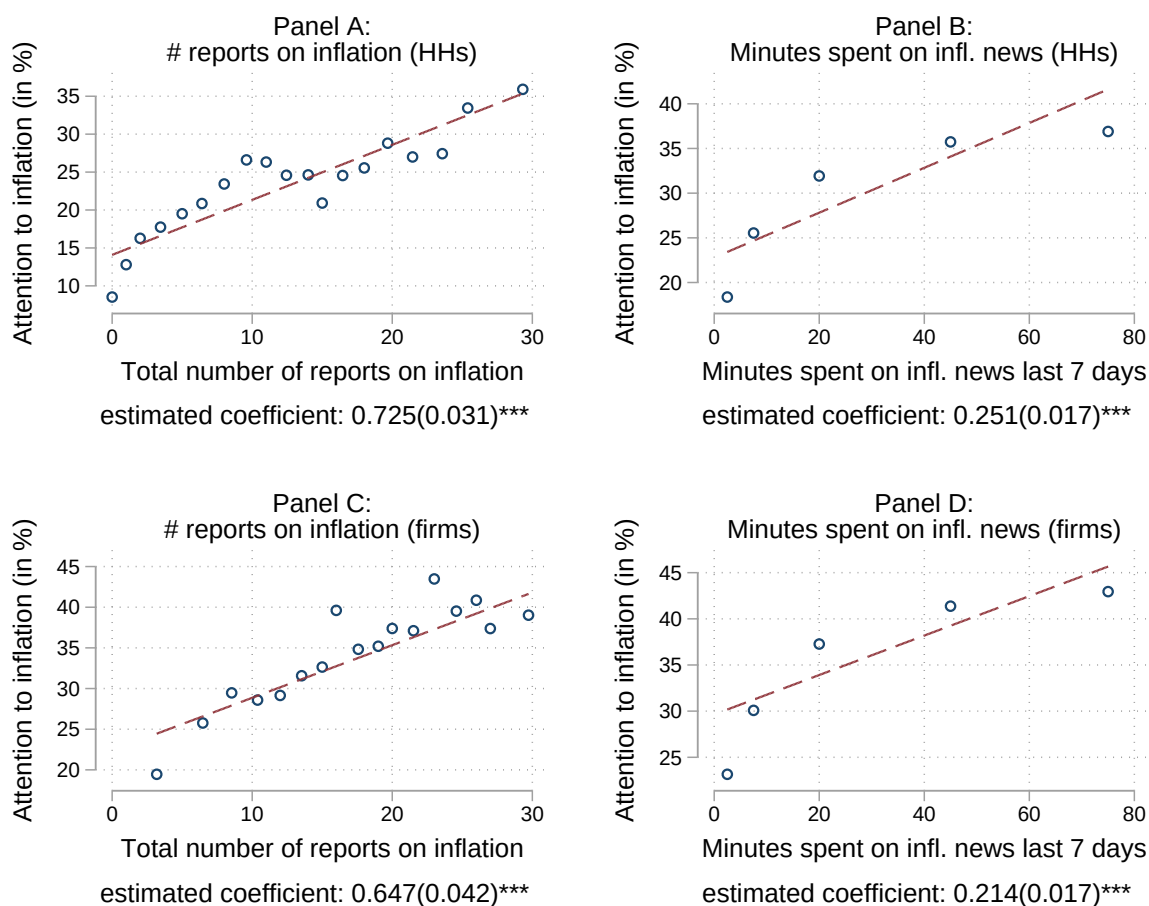
Notes: This figure displays binned scatter plots regressing attention to inflation – i.e., an indicator taking value one (expressed as 100% for expositional reasons) if inflation is mentioned in response to the open-ended survey question – on different measures of news consumption regarding inflation. Panels A and C regress attention on the total number of reports on inflation a respondent reports to have read in the news, to have seen on TV, or to have heard in the radio over the last three months. Panels B and D regress attention on the number of minutes a household or firm manager reports to have spent consuming news about inflation over the last week. Panels A and B focus on households, while Panels C and D focus on firms. Standard errors clustered at the household/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Figure A.5: Attention as measured in the open-ended and as measured in a structured survey question
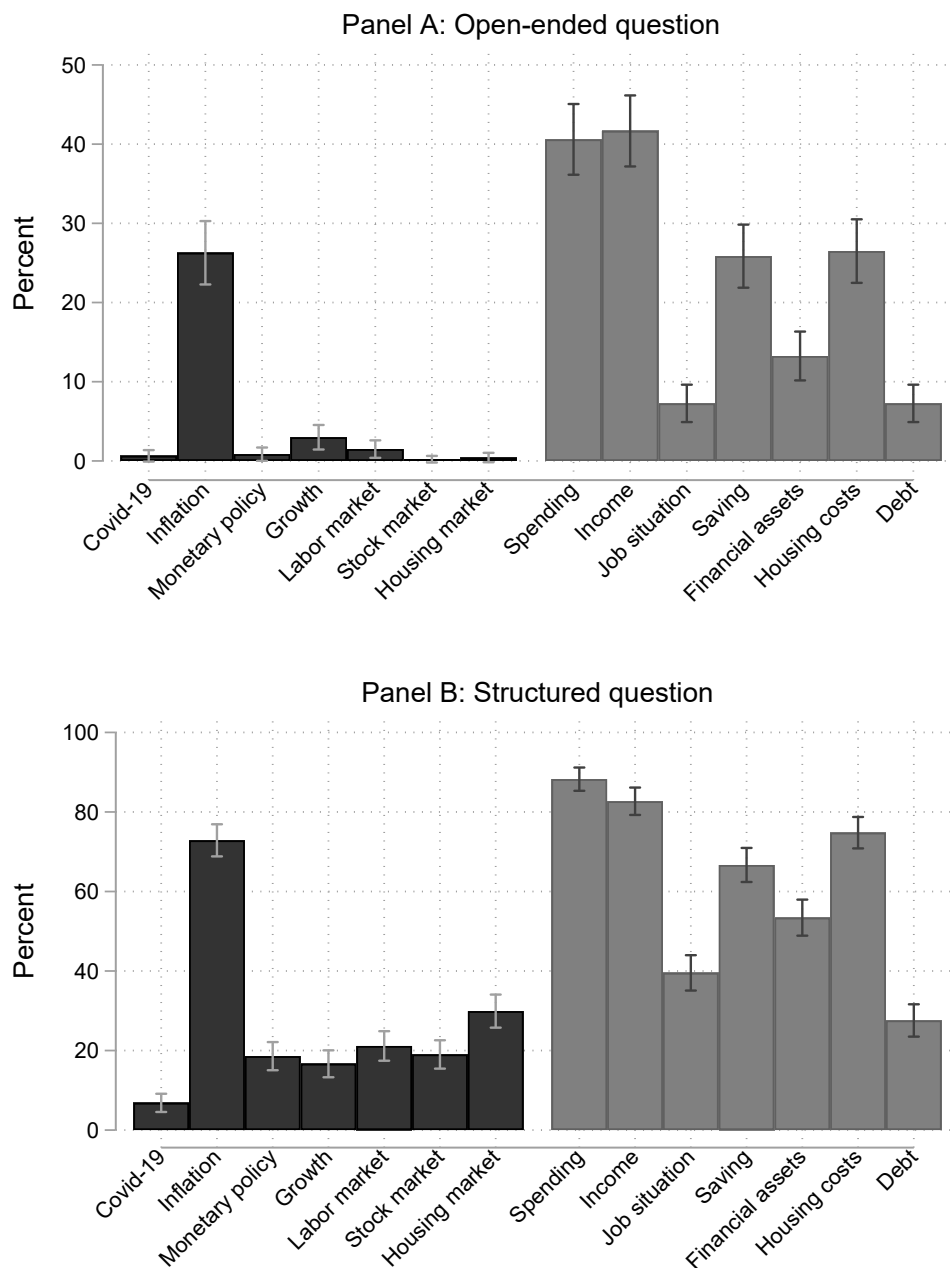
Panel A: Open-ended question

Panel B: Structured question

Notes: This figure presents a validation exercise of our hand-coded attention data based on an additional German household survey run with Prolific in September 2023. It shows the fractions of respondents paying attention to different topics according to the open-ended question (Panel A) and according to a structured question included later in the survey (Panel B), including error bands. Aggregate topics are displayed in black, while household-level topics are displayed in grey.

Figure A.6: Attention as measured in the open-ended question and Google Trends data
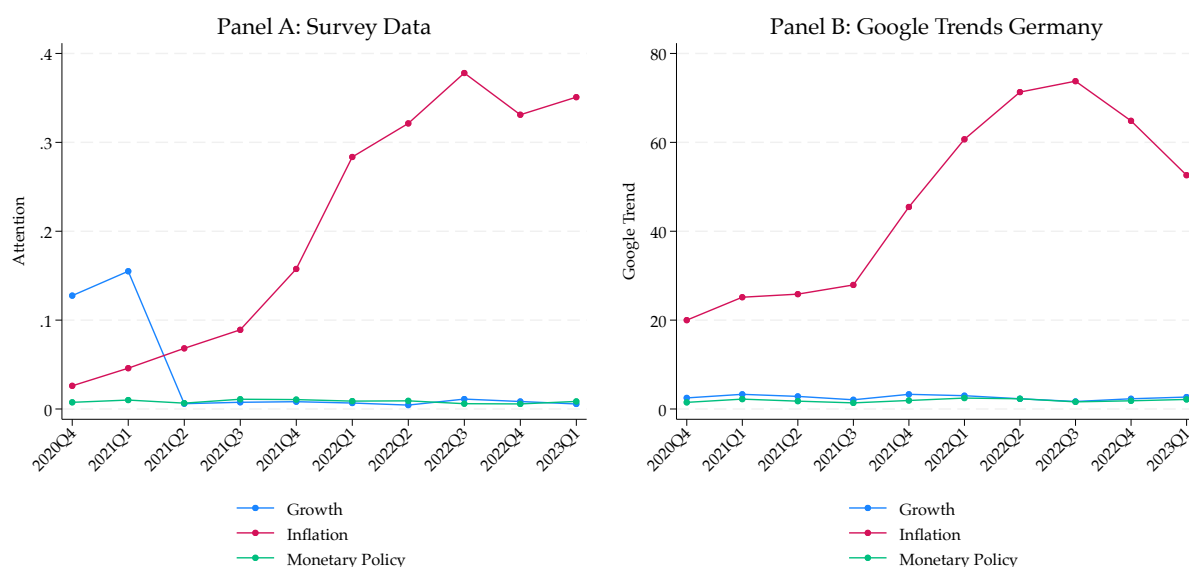
Notes: This figure displays the evolution of the fractions of household respondents that raise different topics in the open-ended survey question across survey waves (Panel A) and Google Trends data for Germany (Panel B). The lines refer to specific macroeconomic topics: inflation, monetary policy, and growth. Google Trends offers a platform to explore search data, delivering a search intensity metric for each query that ranges from 0 to 100. A score of 100 indicates the peak popularity of the terms queried within a specific area and period. We aggregate the respective topics quarterly (initially, weekly data) for comparability to the survey data. Note that due to the quarterly aggregation, the peak searches within our period (in our case, inflation) are below 100, as the peak refers to the weekly data.

Figure A.7: Attention: Correlations across topics

Panel A: Households

Panel B: Firms
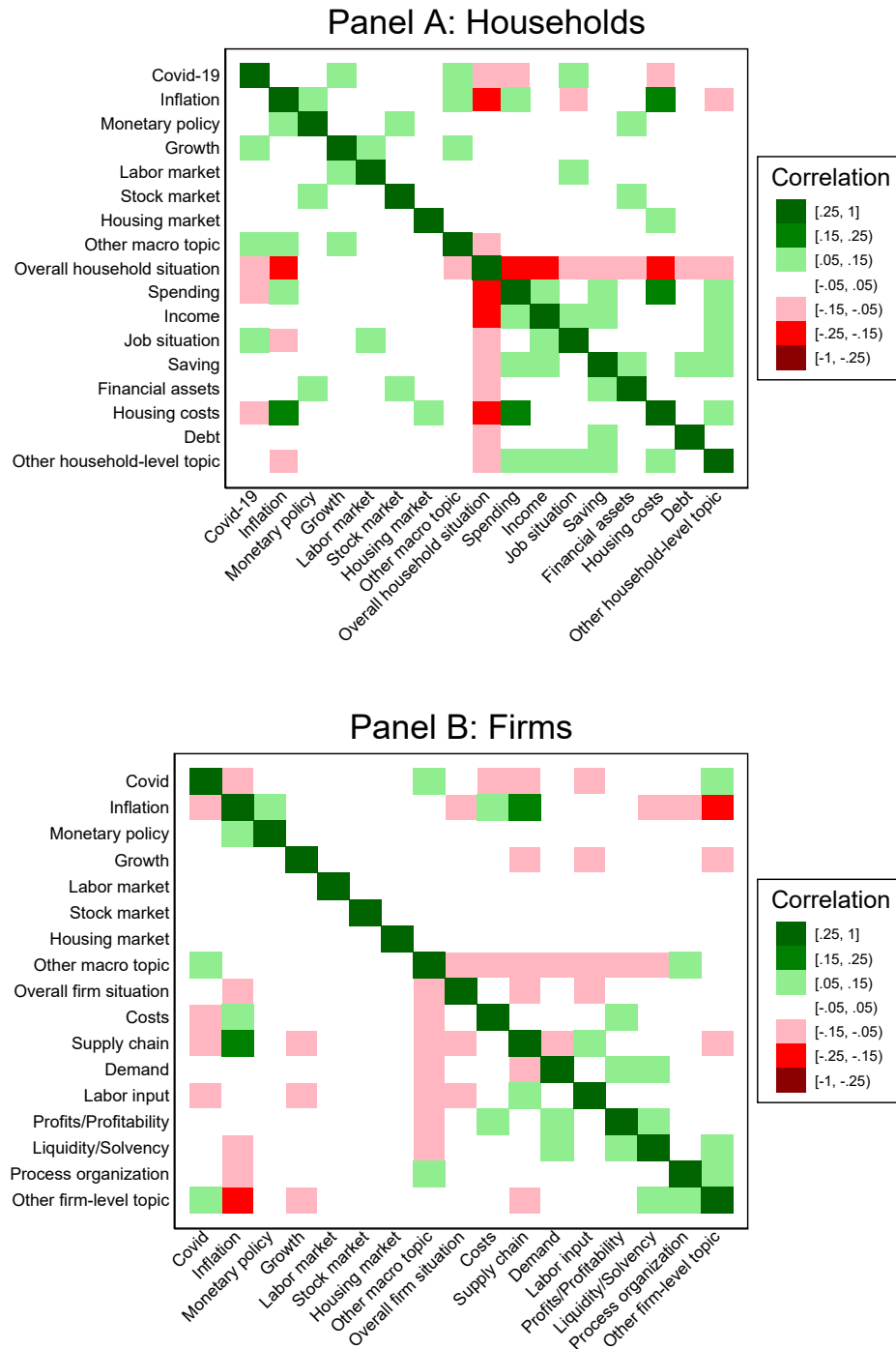
Notes: This figure presents correlation coefficients between attention to different topics as measured in the open-ended data. Positive correlation coefficients within specific ranges are presented in varying shades of green, while negative correlation coefficients are presented varying shades of red. Panel A focuses on households, while Panel B focuses on firms.

Figure A.8: Median inflation expectations in our surveys compared to Bundesbank surveys

Panel A: Households

Panel B: Firms
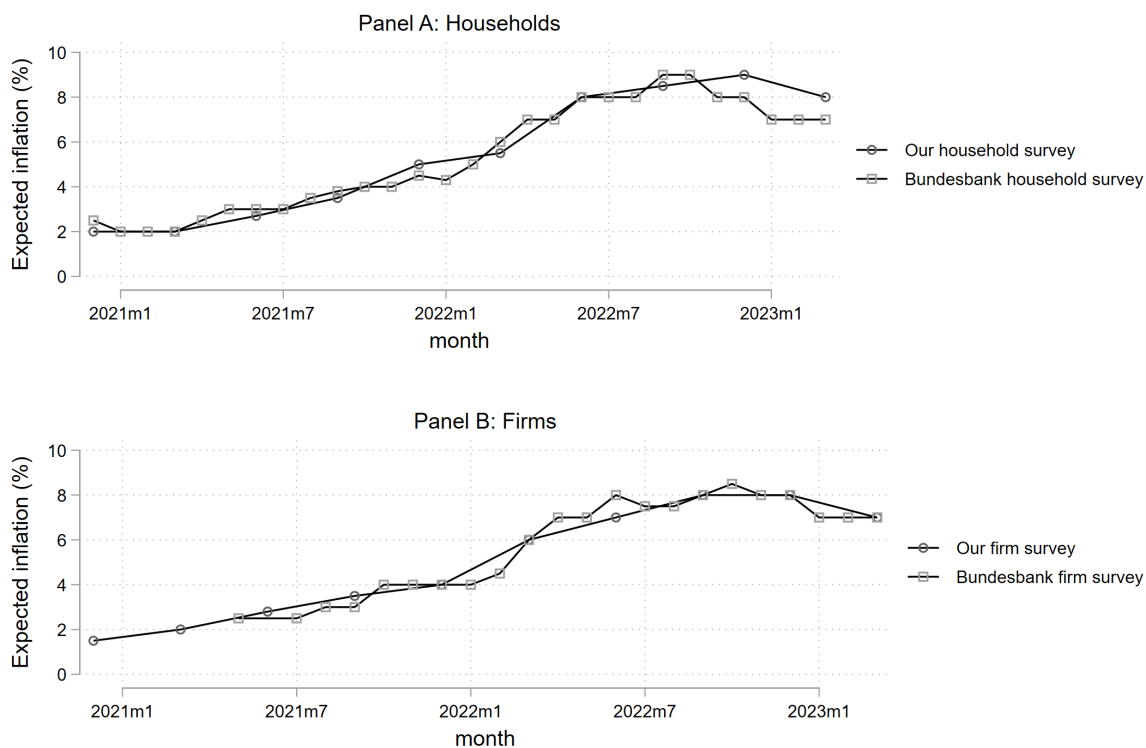
Notes: This figure compares the development of the median inflation expectations in our household and firm surveys over time to the development of median expectations in the Bundesbank Online Panels of Firms and of Households (BOP-HH and BOP-F, respectively), which aim to be representative of the underlying population of interest.

B   Additional tables

Table A.1: Relationship b/w hand-coded data and word count: Attention to inflation

	Hand-coded	Automated word count					Correl-ation
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
					Expen-sive	Joint word count	hand-coded vs. joint word count
		Inflation	Price	Cost			
Panel A: Households							
Wave 1: 2020m12	0.03	0.01	0.02	0.01	0.03	0.05	0.60
Wave 2: 2021m3	0.04	0.01	0.02	0.01	0.03	0.06	0.75
Wave 3: 2021m6	0.07	0.02	0.04	0.02	0.04	0.10	0.81
Wave 4: 2021m9	0.09	0.04	0.05	0.02	0.05	0.13	0.78
Wave 5: 2021m12	0.16	0.07	0.07	0.02	0.04	0.17	0.88
Wave 6: 2022m3	0.28	0.09	0.14	0.04	0.06	0.27	0.88
Wave 7: 2022m6	0.32	0.21	0.17	0.05	0.06	0.39	0.82
Wave 8: 2022m9	0.38	0.20	0.20	0.08	0.06	0.43	0.86
Wave 9: 2022m12	0.33	0.23	0.19	0.06	0.07	0.42	0.80
Wave 10: 2023m3	0.35	0.23	0.18	0.06	0.08	0.44	0.82
Total (Waves 1-10)	0.19	0.09	0.09	0.03	0.05	0.22	0.84
Panel B: Firms							
Wave 1: 2020m12	0.05	0.01	0.04	0.01	0.03	0.09	0.69
Wave 2: 2021m3	0.10	0.01	0.07	0.01	0.04	0.14	0.79
Wave 3: 2021m6	0.19	0.02	0.15	0.03	0.03	0.23	0.87
Wave 4: 2021m9	0.19	0.03	0.14	0.04	0.06	0.28	0.78
Wave 5: 2021m12	0.25	0.07	0.16	0.04	0.02	0.28	0.89
Wave 6: 2022m3	0.33	0.09	0.24	0.07	0.02	0.39	0.76
Wave 7: 2022m6	0.43	0.19	0.24	0.07	0.03	0.48	0.82
Wave 8: 2022m9	0.42	0.19	0.28	0.10	0.02	0.52	0.75
Wave 9: 2022m12	0.40	0.20	0.22	0.09	0.02	0.46	0.76
Wave 10: 2023m3	0.35	0.20	0.16	0.06	0.02	0.41	0.79
Total (Waves 1-10)	0.28	0.11	0.17	0.06	0.03	0.34	0.81

Notes: Column 1 indicates the fraction of respondents mentioning inflation in response to the open-ended survey question based on manual coding by RAs. Columns 2-5 show the fractions of respondents mentioning specific words based on automated counts of the following words "inflation" (Column 2), "preis" (Column 3), "koste" (Column 4) + at least one out of the following: "steig", "stieg", "erhöh", "anheb", or "hoch"; "teuer" or "teurer" (Column 5). Column 6 shows the fraction of respondents for which at least one of the words and word combinations from Columns 2-5 is mentioned. Column 7 depicts the correlation coefficient between hand-coded data (Column 1) and automated word count (Column 6). Panel A focuses on households, while Panel B focuses on firms.

Table A.2: Correlation between hand-coded and AI-coded open-ended data on attention

| | Hand-coded | | | | |
| | (1) | (2) | (3) | (4) | (5) |
	Covid-19	Inflation	Growth	Any macro	Any personal
AI-coded: Covid-19	0.997***	-0.079	-0.004		
	(0.004)	(0.070)	(0.007)		
AI-coded: Inflation	-0.006	0.808***	0.015		
	(0.006)	(0.032)	(0.013)		
AI-coded: Growth	-0.003	0.421**	0.746***		
	(0.004)	(0.205)	(0.219)		
AI-coded: Any macro topic				0.727***	0.014
				(0.051)	(0.045)
AI-coded: Any household-level topic				0.004	0.680***
				(0.050)	(0.058)
Mean dep. var.	0.01	0.36	0.01	0.45	0.72
Observations	200	200	200	200	200
R-squared	0.66	0.52	0.75	0.53	0.52

Notes: This table presents a validation exercise for the hand-coding of the open-ended data based on a subsample from the household survey wave in March 2023, which was both hand-coded and AI-coded using GPT-4. It regresses dummy variables indicating whether a respondent pays attention to a given topic according to the AI-coding on dummy variables indicating whether a respondent pays attention to a given topic according to the hand-coding. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.3: Correlation between attention as measured in open-ended and as measured in structured survey question

| | Open-ended | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
	Covid-19	Inflation	Monetary policy	Growth	Any macro topic	Any house-hold-level topic
Structured: Covid-19	0.098*	-0.032	-0.012*	0.012		
	(0.053)	(0.086)	(0.007)	(0.040)		
Structured: Inflation	0.008*	0.159***	0.008*	0.002		
	(0.005)	(0.041)	(0.004)	(0.014)		
Structured: Monetary policy	-0.008	0.040	0.032	0.039*		
	(0.005)	(0.059)	(0.024)	(0.023)		
Structured: Growth	-0.018*	0.089	-0.006	0.072**		
	(0.010)	(0.062)	(0.020)	(0.029)		
Structured: Any macro topic					0.151***	-0.032
					(0.049)	(0.050)
Structured: Any household-level topic					-0.072	0.469**
					(0.203)	(0.192)
Observations	468	468	468	468	468	468
R-squared	0.10	0.04	0.02	0.04	0.01	0.02
Mean dep. var.	0.01	0.26	0.01	0.03	0.29	0.79

Notes: This table presents a validation exercise of our hand-coded attention data based on an additional German household survey run with Prolific in September 2023. It regresses dummy variables indicating whether a respondent pays attention to a given topic according to the open-ended data on dummy variables indicating whether a respondent pays attention to a given topic according to a structured survey question included later in the survey. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.4: Attention: New vs. recontacted respondents

	Attention to					
	(1)	(2)	(3)	(4)	(5)	(6)
			Monetary		Any macro	Any household- or firm-level
	Covid-19	Inflation	policy	Growth	topic	topic
Panel A: Households						
Recontact	-0.003	0.008	-0.001	-0.002	-0.015	0.002
	(0.006)	(0.008)	(0.002)	(0.002)	(0.010)	(0.009)
Distinct respondents	10,758	10,758	10,758	10,758	10,758	10,758
Observations	34,980	34,980	34,980	34,980	34,980	34,980
R-squared	0.03	0.11	0.00	0.00	0.07	0.02
Mean dep. var.	0.06	0.19	0.01	0.01	0.30	0.75
SD dep. var.	0.24	0.39	0.09	0.09	0.46	0.43
Panel B: Firms						
Recontact	-0.000	-0.015	0.002	-0.007	-0.024*	-0.017*
	(0.010)	(0.011)	(0.004)	(0.007)	(0.012)	(0.010)
Distinct respondents	6,283	6,283	6,283	6,283	6,283	6,283
Observations	28,885	28,885	28,885	28,885	28,885	28,885
R-squared	0.13	0.10	0.01	0.01	0.02	0.02
Mean dep. var.	0.18	0.28	0.03	0.08	0.67	0.80
SD dep. var.	0.38	0.45	0.17	0.26	0.47	0.40
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual/Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table displays regressions of a household's (Panel A) or firm's (Panel B) attention to a given topic (indicated at the top) as measured in the open-ended data on a dummy taking value zero for respondents that participate in the panel for the first time and one for those being recontacted in a later wave. All regressions control for survey wave fixed effects as well as household or firm fixed effects. Standard errors clustered at the household/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

	Attention				
	(1)	(2)	(3)	(4)	(5)
	Inflation	Monetary policy	Growth	Any macro topic	Any house-hold-level topic
Self-reported exposure (z)	0.050***	0.003***	0.004***	0.064***	0.019***
	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
Information acquisition costs (z)	-0.015***	-0.001	0.001	-0.019***	-0.013***
	(0.003)	(0.001)	(0.001)	(0.004)	(0.004)
Female	0.005	-0.003***	-0.003**	0.003	0.054***
	(0.005)	(0.001)	(0.001)	(0.007)	(0.007)
Age	0.002***	0.000***	-0.000	0.002***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
At least high school	0.004	0.005***	0.001	0.039***	0.049***
	(0.005)	(0.001)	(0.001)	(0.007)	(0.007)
Employed	-0.001	-0.000	0.002	-0.004	-0.029***
	(0.006)	(0.001)	(0.002)	(0.008)	(0.009)
Log(Income)	0.000	0.000	0.000	-0.011*	0.018***
	(0.004)	(0.001)	(0.001)	(0.006)	(0.006)
Home owner	-0.008	0.003**	-0.001	-0.013	-0.021***
	(0.006)	(0.001)	(0.001)	(0.008)	(0.008)
Stock owner	-0.008	0.003**	0.002	-0.014	0.018**
	(0.006)	(0.001)	(0.001)	(0.008)	(0.008)
Observations	10,758	10,758	10,758	10,758	10,758
R-squared	0.06	0.01	0.01	0.05	0.04

Notes: This table displays regressions of a household's average attention to a given topic (indicated at the top) as measured in the open-ended data after purging for survey wave fixed effects on a set of covariates. "Self-reported exposure" indicates the average of the respondents' reports on whether the respective variable is relevant for the economic situation of the household (again purged for survey wave fixed effects), which is elicited on a categorical five-point scale ranging from "not important" to "very important". For macro topics (Column 4), this variable is defined as the respondent's mean exposure across inflation, monetary policy, and growth, and for household-level topics, it refers to a respondent's mean exposure across occupation-level labor market developments and local costs of living. "Information acquisition costs" capture a household's perceived difficulty of finding relevant information about the development of the economy on a categorical five-point scale. The exposure and information acquisition costs measures are standardized using the mean and standard deviation in the sample. We further control for a respondent's gender, age, education, employment status, household income, homeownership, and stock ownership. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.6: Correlates of fixed effects in attention: Firms

	Attention				
	(1)	(2) Monetary policy	(3)	(4) Any macro topic	(5) Any firm-level topic
	Inflation		Growth		
Self-reported exposure (z)	0.050***	0.020***	0.014***	0.045***	
	(0.004)	(0.002)	(0.002)	(0.004)	
High influence	-0.029**	-0.001	-0.006	0.003	0.050***
on decisions in firm	(0.012)	(0.005)	(0.007)	(0.014)	(0.012)
Log(Employees)	0.006**	0.002*	0.004**	0.014***	0.012***
	(0.003)	(0.001)	(0.002)	(0.003)	(0.002)
Export share	-0.037*	-0.008	0.033**	0.030	-0.055**
	(0.022)	(0.007)	(0.015)	(0.027)	(0.022)
Services firm	-0.120***	0.026***	-0.002	-0.007	-0.040***
	(0.010)	(0.004)	(0.006)	(0.012)	(0.010)
Construction firm	-0.003	0.056***	0.004	-0.005	-0.037**
	(0.017)	(0.009)	(0.010)	(0.018)	(0.015)
Retail/Wholesale firm	-0.053***	0.018***	-0.014**	0.002	-0.015
	(0.012)	(0.004)	(0.007)	(0.013)	(0.011)
Observations	6,283	6,283	6,283	6,283	6,283
R-squared	0.08	0.05	0.01	0.03	0.02

Notes: This table displays regressions of a firm's average attention to a given topic (indicated at the top) as measured in the open-ended data after purging for survey wave fixed effects on a set of covariates. "Self-reported exposure" indicates the average of the respondents' reports on whether the respective variable is relevant for the economic situation of the firm (again purged for survey wave fixed effects), which is elicited on a categorical five-point scale ranging from "not important" to "very important". For macro topics (Column 4), this variable is defined as the respondent firm's mean exposure across inflation, monetary policy, and growth. We did not elicit a firm's exposure to local topics, which is why this variable is not included in the specification in Column 5. The exposure measure is standardized using the mean and standard deviation in the sample. We further control for the respondent's influence on decisions in the firm, the firm's number of employees (in logs) and export share, as well as dummies for four broad industry groups. Robust standard errors are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.7: Co-movement of attention to different topics: Robustness

	Attention to any macro topic (baseline)		Attention to any macro topic excl. Covid-19	
	(1)	(2)	(3)	(4)
Panel A: Households				
Attention to any household-level topic	-0.191***	-0.279***	-0.164***	-0.245***
	(0.007)	(0.008)	(0.007)	(0.007)
Distinct respondents	10,758	10,758	10,758	10,758
Observations	34,980	34,980	34,980	34,980
R-squared	0.07	0.11	0.10	0.13
Panel B: Firms				
Attention to any firm-level topic	-0.301***	-0.281***	-0.275***	-0.266***
	(0.007)	(0.008)	(0.008)	(0.008)
Distinct respondents	6,283	6,283	6,283	6,283
Observations	28,885	28,885	28,885	28,885
R-squared	0.07	0.06	0.08	0.08
Controls	Yes	No	Yes	No
Time FE	Yes	Yes	Yes	Yes
Individual FE	No	Yes	No	Yes

Notes: This table displays regressions of dummy variables indicating households' (Panel A) and firms' (Panel B) attention to macroeconomic topics – i.e., an indicator taking value one if any macroeconomic topic is mentioned in response to the open-ended survey question – on dummy variables indicating attention to household-level or firm-level topics, respectively. Columns 1 and 2 replicate the baseline results displayed in Columns 7 and 8 of Table 4. In Columns 3 and 4 Covid-19 is dropped from the macroeconomic topics (and also not coded as a household- or firm-level topic). Columns 1 and 3 control for the individual's gender, age, education, employment status, household income, homeownership, and stock ownership, and the respondent's influence on decisions in the firm, the firm's number of employees (in logs) and export share, as well as dummies for four broad industry groups, respectively. Columns 2 and 4 instead control for household and firm fixed effects, respectively. All specifications control for survey wave fixed effects. Standard errors clustered at the household/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.8: Attention and beliefs: Within-individual patterns

	Absolute change in expectation $\geq$ 0.5 p.p.	Confidence (z)	Expected inflation	Absolute deviation from expert forecast	Perceived current inflation	Absolute deviation from current level
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Households						
Attention to inflation	0.014	0.022*	0.430***	0.406***	0.114*	0.013
	(0.009)	(0.013)	(0.071)	(0.070)	(0.068)	(0.057)
Distinct respondents	6,716	10,758	10,758	10,758	8,330	8,330
Observations	20,983	34,980	34,980	34,980	24,407	24,407
R-squared	0.01	0.02	0.21	0.07	0.22	0.01
Mean dep. var.	0.79	0.04	7.08	4.88	6.32	2.67
SD dep. var.	0.41	0.99	6.49	6.17	5.26	4.26
Panel B: Firms						
Attention to inflation	0.005	0.023*	0.168***	0.163***		
	(0.008)	(0.013)	(0.033)	(0.032)		
Distinct respondents	4,402	6,193	6,235	6,235		
Observations	18,426	27,126	28,112	28,112		
R-squared	0.02	0.02	0.59	0.30		
Mean dep. var.	0.80	0.04	5.47	3.00		
SD dep. var.	0.40	1.02	3.44	2.72		
Controls	No	No	No	No	No	No
Time FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table displays regressions of households' (Panel A) and firms' (Panel B) beliefs on attention to inflation – i.e., an indicator taking value one if inflation is mentioned in response to the open-ended survey question. The dependent variables are an indicator that is one if the respondent changed 12-month ahead inflation expectations by at least 0.5 p.p. between the previous and the current survey wave (Column 1), a respondent's confidence in their own inflation forecast (z-scored, Column 2), expected inflation over the next twelve months (Column 3), the absolute deviation of expected inflation from the mean professional forecast from FocusEconomics (Column 4), a respondent's perception of the current inflation rate over the last 12 months (Column 5), and the absolute deviation of this perception from the actually realized current inflation rate (Column 6). Besides survey wave fixed effects, all regressions control for household or firm fixed effects. For a version without fixed effects, see Table 5. Standard errors clustered at the household/firm level are in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.9: Attention and disagreement about the current inflation rate

	Households		
	(1) SD	(2) IQR	(3) p90-p10
Full Sample: Sep 2021 - Mar 2023			
(A) Attentive to inflation	4.06	2.67	5.16
(IA) Inattentive to inflation	5.25	2.80	6.82
p-value: (A)=(IA)	0.00		
Period 2: Sep 2021 - Dec 2021			
(A) Attentive to inflation	3.19	2.00	3.90
(IA) Inattentive to inflation	5.21	2.50	5.13
p-value: (A)=(IA)	0.00		
Period 3: Mar 2022 - Sep 2022			
(A) Attentive to inflation	4.36	2.85	5.41
(IA) Inattentive to inflation	5.54	3.15	7.51
p-value: (A)=(IA)	0.00		
Period 4: Dec 2022 - Mar 2023			
(A) Attentive to inflation	4.00	2.34	6.00
(IA) Inattentive to inflation	4.76	3.00	7.84
p-value: (A)=(IA)	0.00		

Notes: This table displays the standard deviation, the interquartile range, and the range between the 90th and 10th percentile of the perceived inflation rate over the 12 months before the survey separately for respondents in the household panel that pay attention to inflation according to our text-based measure and those who do not. Before calculating the dispersion measures, the data are purged of survey wave fixed effects. The displayed p-values refer to Levene's tests of the equality of standard deviations between respondents that are attentive (A) and respondents that are inattentive (IA) to inflation according to the open-ended measure.

Table A.10: Experiences and attention: Robustness

	Attention to inflation									Attention to macro without inflation or mon. pol.		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Cohorts that experienced oil crises												
× 1(t ∈ {21m9, 21m12})	0.037***	0.039***	0.038***							0.013		
	(0.009)	(0.009)	(0.009)							(0.011)		
× 1(t ∈ {22m3, 22m6, 22m9})	0.030**	0.026*	0.025*							0.021*		
	(0.013)	(0.013)	(0.013)							(0.011)		
× 1(t ∈ {22m12, 23m3})	0.003	0.006	0.005							0.009		
	(0.016)	(0.017)	(0.017)							(0.012)		
Infl. experience: Income loss												
× 1(t ∈ {21m9, 21m12})				0.025***	0.025***	0.019**					-0.011	
				(0.010)	(0.010)	(0.010)					(0.012)	
× 1(t ∈ {22m3, 22m6, 22m9})				0.050***	0.050***	0.036**					-0.014	
				(0.014)	(0.014)	(0.014)					(0.013)	
× 1(t ∈ {22m12, 23m3})				0.050***	0.050***	0.040**					-0.019	
				(0.018)	(0.018)	(0.018)					(0.014)	
Infl. experience: Wealth loss												
× 1(t ∈ {21m9, 21m12})							0.025**	0.027**	0.019			-0.003
							(0.012)	(0.012)	(0.012)			(0.015)
× 1(t ∈ {22m3, 22m6, 22m9})							0.046***	0.044**	0.030*			-0.015
							(0.018)	(0.018)	(0.018)			(0.017)
× 1(t ∈ {22m12, 23m3})							0.017	0.018	0.005			-0.015
							(0.023)	(0.023)	(0.023)			(0.017)
High news consumption on inflation (pre-shock)												
× 1(t ∈ {21m9, 21m12})		0.002			-0.004			-0.007				
		(0.009)			(0.009)			(0.010)				
× 1(t ∈ {22m3, 22m6, 22m9})		0.015			0.012			0.008				
		(0.013)			(0.014)			(0.014)				
× 1(t ∈ {22m12, 23m3})		0.000			-0.004			-0.005				
		(0.017)			(0.018)			(0.018)				
High self-reported exposure to infl. (pre-shock)												
× 1(t ∈ {21m9, 21m12})			0.038***			0.035***			0.036***			
			(0.009)			(0.009)			(0.009)			
× 1(t ∈ {22m3, 22m6, 22m9})			0.099***			0.092***			0.095***			
			(0.013)			(0.014)			(0.014)			
× 1(t ∈ {22m12, 23m3})			0.075***			0.060***			0.066***			
			(0.017)			(0.018)			(0.018)			
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distinct respondents	10,758	7,789	7,789	5,754	5,754	5,754	5,754	5,754	5,754	10,758	5,754	5,754
Observations	34,980	28,559	28,559	24,661	24,661	24,661	24,661	24,661	24,661	34,980	24,661	24,661
R-squared	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.01	0.01	0.01

Notes: The dependent variables are a household's attention to inflation (Columns 1-9) and a household's attention to macroeconomic topics excluding inflation and monetary policy as measured in the open-ended data (Columns 10-12). The first experience measure is an indicator for cohorts aged 55+ at the time of the survey, i.e., those who were at least teenagers during the oil crises of the 1970s. The second and third measure use information on whether the respondent has ever experienced a real income loss or a real wealth loss due to inflation elicited in the pre-shock period (March and June 2021) and assign this value to all waves. We use the first observation for those that responded to the question in multiple waves. The interaction terms interact dummies for time periods with the respective experience measure, i.e., they estimate a differential effect relative to the base period (December 2020-June 2021). All specifications include individual fixed effects and survey wave fixed effects. "High news consumption on inflation" is a dummy variable taking value one for respondents with an above-median average consumption of inflation news during the pre-shock period, as measured on a categorical eleven-point scale. "High self-reported exposure to inflation" is a dummy variable taking value one for respondents with an above-median average exposure to inflation in the pre-shock period, as measured on a categorical five-point scale. Standard errors are clustered at the household level. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.11: Experiences and beliefs: Robustness

	Expected inflation next 12 months								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cohorts that experienced oil crises									
× 1(t ∈ {21m9, 21m12})	0.559***	0.611***	0.605***						
	(0.130)	(0.129)	(0.129)						
× 1(t ∈ {22m3, 22m6, 22m9})	1.019***	0.992***	0.988***						
	(0.161)	(0.165)	(0.165)						
× 1(t ∈ {22m12, 23m3})	1.020***	0.949***	0.935***						
	(0.187)	(0.194)	(0.193)						
Infl. experience: Income loss									
× 1(t ∈ {21m9, 21m12})				0.175	0.176	0.103			
				(0.137)	(0.137)	(0.141)			
× 1(t ∈ {22m3, 22m6, 22m9})				0.681***	0.682***	0.570***			
				(0.176)	(0.176)	(0.179)			
× 1(t ∈ {22m12, 23m3})				0.606***	0.615***	0.446**			
				(0.209)	(0.209)	(0.211)			
Infl. experience: Wealth loss									
× 1(t ∈ {21m9, 21m12})							0.030	0.038	-0.050
							(0.176)	(0.177)	(0.177)
× 1(t ∈ {22m3, 22m6, 22m9})							0.582**	0.599**	0.456*
							(0.232)	(0.234)	(0.233)
× 1(t ∈ {22m12, 23m3})							0.635**	0.695***	0.449*
							(0.258)	(0.258)	(0.260)
High news consumption on inflation (pre-shock)									
× 1(t ∈ {21m9, 21m12})		0.004			-0.047			-0.043	
		(0.129)			(0.136)			(0.137)	
× 1(t ∈ {22m3, 22m6, 22m9})		-0.033			-0.042			-0.092	
		(0.166)			(0.175)			(0.177)	
× 1(t ∈ {22m12, 23m3})		-0.313			-0.294			-0.355*	
		(0.194)			(0.207)			(0.207)	
High self-reported exposure to infl. (pre-shock)									
× 1(t ∈ {21m9, 21m12})			0.496***			0.476***			0.495***
			(0.129)			(0.140)			(0.138)
× 1(t ∈ {22m3, 22m6, 22m9})			0.845***			0.701***			0.738***
			(0.165)			(0.178)			(0.177)
× 1(t ∈ {22m12, 23m3})			1.074***			1.055***			1.069***
			(0.193)			(0.209)			(0.209)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distinct respondents	12,026	9,057	9,057	5,984	5,984	5,984	5,984	5,984	5,984
Observations	40,552	34,130	34,130	28,493	28,493	28,493	28,493	28,493	28,493
R-squared	0.19	0.20	0.21	0.21	0.21	0.21	0.21	0.21	0.21

Notes: The dependent variable is a household's expected inflation over the next 12 months. The first experience measure is an indicator for cohorts aged 55+ at the time of the survey, i.e., those who were at least teenagers during the oil crises of the 1970s. The second and third measure use information on whether the respondent has ever experienced a real income loss or a real wealth loss due to inflation elicited in the pre-shock period (March and June 2021) and assign this value to all waves. We use the first observation for those that responded to the question in multiple waves. The interaction terms interact dummies for time periods with the respective experience measure, i.e., they estimate a differential effect relative to the base period (December 2020-June 2021). All specifications include individual fixed effects and survey wave fixed effects. "News consumption on inflation" is a dummy variable taking value one for respondents who, on average during the pre-shock period, informed themselves at least five times about inflation in the three months preceding the survey on average during the pre-shock period. "Self-reported exposure to inflation" is a dummy variable taking value one for respondents who, on average during the pre-shock period, rated the relevance of inflation for their households' economic situation equal to 4 or higher on a categorical five-point scale ranging from "[1] not important" to "[5] very important". Standard errors are clustered at the household level. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.12: Summary statistics: Survey of Consumer Expectations

	SCE sample					
	(1) Mean	(2) p25	(3) Median	(4) p75	(5) SD	(6) N
Female	0.49	0.00	0.00	1.00	0.50	39,626
Age	49.94	37.00	49.00	63.00	15.48	39,635
Census region: Midwest	0.25	0.00	0.00	1.00	0.43	39,633
Census region: Northeast	0.19	0.00	0.00	0.00	0.39	39,633
Census region: South	0.35	0.00	0.00	1.00	0.48	39,633
Census region: West	0.21	0.00	0.00	0.00	0.41	39,633
Log(HH gross income)	11.12	10.71	11.12	11.74	0.83	39,289
At least highschool	0.58	0.00	1.00	1.00	0.49	39,625
Employed	0.68	0.00	1.00	1.00	0.47	39,635
Homeowner	0.72	0.00	1.00	1.00	0.45	39,634

Notes: This table provides summary statistics for our sample from the New York's Fed Survey of Consumer Expectations (SCE). The sample includes observations from between May 2020 and November 2022.

C Full list of codes in our scheme

Table A.13: Coding of macroeconomic topics

Macro topic	Explanation
Corona	Covid, corona, pandemic, lockdown, incidence/infection rates, masks, infection prevention policies
Inflation	Inflation, purchasing power, increasing/rising prices, price level
Labor market	Unemployment rate, unions, tariff policy, Short-time work (in general), employment, labor market, strikes
Growth	Economic growth, GDP, general economic situation, business cycle, upswing, downswing, insolvencies, company bankruptcies, industrial production, economic crisis, recession
Monetary policy	Interest rates, policy rate, central bank, ECB, banking system, negative interest rates, zero lower bound
Fiscal policy	Tax policy, general generosity of welfare system, government debt/overall financial situation of the government, public deficit/debt/"black zero", governmental budget, value added tax (reduction), carbon taxation,wealth tax
Regulation	Minimum wage, subsidies¸ environmental requirements, bureaucracy, licensing procedures, climate/energy policy, infection control act, emissions trading, rent cap, driving bans, plastic product bans, regulation in general
Structural transformation	Digitization (in general), 5G/broadband/fiber optic infrastructure, "dilapidated infrastructure", energy turnaround/decarbonization, mobility transition/e-mobility, structural changes, public infrastructure investments, general shifts in consumption pattern (e.g., online shopping, nutritional change)

Continuation of Table A.13: Coding of macroeconomic topics

Macro topic	Explanation
Trade	Imports, exports, outsourcing/nearshoring, foreign countries (e.g., "US elections", "Brexit"), globalization, international competition (e.g., China), (punitive) tariffs, trade barriers, sanctions, embargoes, global value chains, protectionism, decoupling
Pension system	Pension system, aging society, old-age poverty, retirement benefits/age
Health system	Health/care system, shortage of nurses, health insurance, drug supply, health authorities, (compulsory) vaccination
Education	Schooling/education system, vocational training, universities, research/science, education policy, shortage of teachers
Inequality	Income/wealth distribution/inequality, poverty, social equality, redistribution, welfare state, social security, injustice, gender inequality
Migration	(Im-)migration, asylum seekers, refugees
Environment/ Climate change	Climate change/crisis, pollution, emissions, (extreme) weather, animal wellbeing
Stock market	Stock market, shares, DAX (or other stock market indices)
Housing market	Real estate prices, rent, housing construction subsidies, housing market, properties
Uncertainty	Uncertainty about overall economic development/society, stability, security, reference to the future
Sustainability	Sustainability, decarbonization/energy transition
Demographic change	Ageing society, generational change (referring to overall society)
Exchange rate	Euro, exchange rate, foreign currencies
War in Ukraine	Russian invasion of Ukraine, Crimea, foreign policy security, special funds for the German military (*Bundeswehr*)
Energy supply	Energy crisis, gas shortage, gas storage, pipelines, LNG, electricity, security of energy supply
Other	Any other macroeconomic topic

Table A.14: Coding of household-level topics

Household-level topic	Explanation
Income	Income, liquidity, lack of money, financial bottlenecks/problems, minimum wage, social welfare (recepient), financial problems, poverty line, sick pay, family allowances)
Spending	Expenditure, consumption, cost of living, everyday expenses, groceries, shopping behavior
Saving	Asset/capital accumulation/formation, retirement provision, old-age security, building up reserves, saving, wealth
Financial assets	Shares, bonds, real estate, other financial assets, investment decisions
Debt	Loans, principal payments, interest payments on existing debt, insolvency, credit rating, mortgage, filing for bankruptcy, debt restructuring, construction financing
Job situation	Job loss, job security, job search, short-time work, training, studies, vocational training, self-employment, work-from-home, unable to work, collective agreement
Housing costs	Rental costs, real estate prices, heating/energy costs, renovations, house construction, house purchase, home ownership, energy costs
Health issues	Health risks/issues, medical costs, healthy nutrition, health insurance, care in old age, vaccination
Uncertainty	Uncertainty about the financial and economic future of the household and individually, fear of existence, fear of the future)
Insurance	Insurance, protection, provision, pension insurance
Overall situation	General financial and economic situation of the household (good/bad, satisfaction, finances, financial and societal status maintenance, livelihood)
Other	Residual Category: Any other household-level topic

Table A.15: Coding of firm-level topics

Firm-level topic	Explanation
Overall situation	Overall situation of firm, opportunities and risks, corporate management
Process organization	Digitization, Work-from-home, 4-day work week, restructuring, automatization, process optimization, controlling (all if related to firm, only)
Government aid programs	KfW loans (Investment Bank of German Government), financial aid and governmental crisis response programs (e.g., in response to Covid crisis and war in Ukraine) (all if related to firm, only)
R&D	Innovation, investment in quality improvement, product development, disruption, technological transformation
Regulation	Approval processes/authorization procedures, bureaucracy/relation to public/tax authorities, public tender offers, taxation system/tax burden, environmental requirements (all if related to firm, only)
Costs	Input costs, material costs, wage costs, freight charges
Supply chain	Supply bottlenecks (w.r.t. intermediate products/raw material), logistics, transportation, shipping, inventory, delivery times, supply chain law, space in the warehouse
Demand	Demand, sales, market share, cust, purchasing behavior/power of customers/clients, orders (situation/backlog), competition, customers' willingness to buy/invest
Profits/ Profitability	profit margin, EBIT/EBITDA, profits and losses, contribution margin, annual financial statements, return, profitability
Liquidity/ Solvency	Bankruptcy, liquidity, (in)solvency, reserves, equity, cash flow, debt outstanding, balance sheet
Financing	Debt, credit rating, consolidation, financing conditions, lending, indebtedness, creditworthiness, banks (if company-specific)

Continuation of Table A.15: Coding of firm-level topics

Category	Explanation
Labor input	Shortage of (skilled) labor, recruitment, aging personnel, skills shortages, vacancies, layoffs, redundancies, personnel development, training, job stability, employee qualifications/know-how, employee motivation/satisfaction
Short time work	Employees put to short-time work, short-time work displayed
Capacity utilization	Utilization of production capacities, overtime, performance, production, operational readiness, production stoppages
Rent and housing costs	Rents, housing costs
Investment	Investment, expansion, (business) restructuring, land purchases, modernization, relocation, investment in buildings
Uncertainty	Uncertainty regarding future development of firm, e.g., Planning (un)security due to unclear policy/Covid measures, market volatility, instability, firm survival
Productivity	Productivity, optimization, efficiency, rationalization, speed of production
Health issues	Mental health, sick leave, health management (if referring to firm)
Product	Product portfolio, diversification of products, sustainable products, product life cycle
Other	Any other firm-level topic

D Instructions of panel surveys

This Appendix provides an overview of the translated and original survey instructions of the key questions in the household and firm surveys. We provide an overview of the main questions (asked in all waves) as well as additional questions only asked in subsets of the waves. In principle, the survey is identical for the household and firm panels. However, some questions are only asked in the household panel due to space constraints in the firm survey. Moreover, the wording of some questions is slightly tailored to better fit the respective situation of households and firms. Section D.1 provides instructions translated to English, while Section D.2 provides the original instructions in German.

D.1 English translation

D.1.1 Core instructions included in all waves

Attention What topics come to mind when you think about the economic situation of your company/household?
_____

Inflation expectations What do you think, what will the inflation rate (measured by the consumer price index) likely be in Germany over the next 12 months (i.e., until XXX)?
__%

How certain are you about your previous estimate?
very uncertain ☐ ☐ ☐ ☐ ☐ very certain

D.1.2 Additional instructions included in subsets of the waves

Inflation perceptions What do you think was the inflation rate in Germany over the last 12 months (i.e., from XXX to XXX)?
__%

How certain are you about your previous estimate?
very uncertain ☐ ☐ ☐ ☐ ☐ very certain

Experiences Has your household income ever increased significantly less than the general price level?
☐ Yes ☐ No

Has your wealth ever lost significant value due to inflation?
☐ Yes ☐ No

News consumption   How much time in the last 7 days do you estimate you have spent consuming news about inflation in various media (television, newspaper, news websites, radio, etc.)?
☐ Less than 5 minutes ☐ Between 5 minutes and 10 minutes ☐ Between 10 minutes and 30 minutes ☐ Between 30 minutes and 60 minutes ☐ More than 60 minutes

How many reports on inflation in Germany do you estimate you have seen or heard in the last 3 months in the following media?

- Television
  none ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 or more

- Newspapers/News websites
  none ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 or more

- Radio
  none ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 or more

What do you think: How frequently did you gather information about each of the following topics in the last 3 months before taking this survey?

- Development of inflation in Germany
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of monetary policy of the ECB (e.g., interest rate policy)
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of economic growth in Germany
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of the unemployment rate in Germany
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of the labor market in my industry/in my occupation
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of costs in my industry/living costs in my area
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

- Development of demand for products in my industry
  0 times ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ 10 times or more

Information acquisition costs   Imagine that you wanted to inform yourself about the development of the economy (e.g., inflation) in Germany. How difficult would it be for you to find relevant information about the development of the economy?
very easy □ □ □ □ □ very difficult

Perceived importance for own situation   To what extent do you agree with the following statements?

- Inflation in Germany is important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- Monetary policy of the ECB (e.g., interest rate policy) is important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- Economic growth in Germany is important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- The unemployment rate in Germany is important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- The labor market conditions in our industry/my occupation are important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- The production costs in our industry/costs of living in our location are important for the economic situation of my firm/household.
  strongly disagree □ □ □ □ □ strongly agree

- The demand for products of our industry is important for the economic situation of my firm
  strongly disagree □ □ □ □ □ strongly agree

D.2 Original instructions in German

D.2.1 Core instructions included in all waves

Attention Welche Themen kommen Ihnen in den Sinn, wenn Sie an die wirtschaftliche Situation Ihres Unternehmens/Haushalts denken?

_____

Inflation expectations Was denken Sie, wie hoch wird die Inflationsrate (gemessen am Verbraucherpreisindex) über die nächsten 12 Monate (also bis zum XXX) in Deutschland wahrscheinlich sein?
__%

Wie sicher sind Sie sich bei dieser Einschätzung?
sehr unsicher ☐ ☐ ☐ ☐ ☐ sehr sicher

D.2.2 Additional instructions included in subsets of the waves

Inflation perceptions Was denken Sie, wie hoch war die Inflationsrate in Deutschland über die letzten 12 Monate (also über den Zeitraum von XXX bis XXX)? (Angaben mit einer Nachkommastelle möglich)
__%

Wie sicher sind Sie sich bei dieser Einschätzung?
sehr unsicher ☐ ☐ ☐ ☐ ☐ sehr sicher

Experiences Ist Ihr Haushaltseinkommen schon einmal deutlich weniger stark gestiegen als das allgemeine Preisniveau?
☐ Ja ☐ Nein

Hat Ihr Vermögen schon einmal aufgrund von Inflation stark an Wert verloren?
☐ Ja ☐ Nein

News consumption Was schätzen Sie, wieviel Zeit haben Sie in den letzten 7 Tagen insgesamt damit verbracht, Nachrichten zur Inflation in verschiedenen Medien (Fernsehen, Zeitung, Nachrichten-Websites, Radio, etc.) zu konsumieren?
☐ Weniger als 5 Minuten ☐ Zwischen 5 Minuten und 10 Minuten ☐ Zwischen 10 Minuten und 30 Minuten ☐ Zwischen 30 Minuten und 60 Minuten ☐ Mehr als 60 Minuten

Was schätzen Sie, wie viele Berichte zur Inflation in Deutschland haben Sie in den letzten 3 Monaten in den folgenden Medien gesehen bzw. gehört?

- Fernsehen
  keine ☐☐☐☐☐☐☐☐☐☐ 10 und mehr

- Zeitungen/Nachrichten-websites
  keine ☐☐☐☐☐☐☐☐☐☐ 10 und mehr

- Radio
  keine ☐☐☐☐☐☐☐☐☐☐ 10 und mehr

Was schätzen Sie, wie oft haben Sie sich in den letzten 3 Monaten zu den folgenden Themen informiert?

- Entwicklung der Inflation in Deutschland
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung der Geldpolitik der EZB (z.B. Zinspolitik)
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung des Wirtschaftswachstums in Deutschland
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung der Arbeitslosenquote in Deutschland
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung des Arbeitsmarktes in Ihrem Wirtschaftszweig/für Ihre Berufsgruppe
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung der Produktionskosten (HA: Einkaufspreise, DL: Kosten der Dienstleistungserbringung) in Ihrem Wirtschafszweig/Lebenshaltungskosten in Ihrer Wohngegend
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

- Entwicklung der Nachfrage nach Produkten (HA: Waren DL: Dienstleistungen, Bau: Bauleistungen) Ihres Wirtschaftszweigs
  gar nicht ☐☐☐☐☐☐☐☐☐☐ 10 mal und öfter

Information acquisition costs   Stellen Sie sich vor, Sie wollen sich über die Entwicklung der Wirtschaft (wie z.B. der Inflation) in Deutschland informieren. Wie schwierig wäre es für Sie, relevante Informationen über die Entwicklung der Wirtschaft zu finden?
sehr leicht ☐☐☐☐☐ sehr schwierig

Perceived importance for own situation   Inwiefern stimmen Sie den folgenden Aussagen zu?

- Die Inflation in Deutschland ist wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
  stimme nicht zu ☐☐☐☐☐ stimme voll zu

- Die Geldpolitik der EZB (z.B. Zinspolitik) ist wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu

- Das Wirtschaftswachstum in Deutschland ist wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu

- Die Arbeitslosenquote in Deutschland ist wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu

- Der Arbeitsmarkt in unserem Wirtschaftszweig/für meine Berufsgruppe ist wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu

- Die Produktionskosten in unserem Wirtschaftszweig/Lebenshaltungskosten in meiner Wohngegend sind wichtig für die wirtschaftliche Situation unseres Unternehmens/meines Haushalts.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu

- Die Nachfrage nach Produkten unseres Wirtschaftszweigs ist wichtig für die wirtschaftliche Situation unseres Unternehmens.
stimme nicht zu ☐ ☐ ☐ ☐ ☐ stimme voll zu