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The Role of Inflation Perceptions in Consumer Inflation Expectations: Evidence from the Euro Area*

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Abstract

Using data on euro-area household inflation forecasts from the European Commission Consumer Survey, we show that households' perceptions of recent price changes play a key role in the formation of their inflation expectations. Such a relationship remains robust when we account for specific inflation components, household characteristics, and macroeconomic conditions, even though the perceptions–expectations relationship is heterogeneous across countries. These results highlight the importance of perceptions about inflation for the conduct of monetary policy.

JEL classification: E31, E58, E62

Keywords: inflation expectations, inflation perceptions, surveys, consumers, central banks, monetary policy communication, euro area

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1 Introduction

Price stability is a key objective for central banks. In assessing how close realized inflation is to central banks' targets, monetary policy makers continuously gauge expected inflation and assess whether inflation expectations deviate from their objective significantly or whether they remain relatively close to it, or "anchored". For example, the Federal Reserve Chair Jerome Powell stated: "Our obligation is to keep longer-term inflation expectations well anchored to make certain that a one-time increase in the price level does not become an ongoing inflation problem." (Powell, 2025). Many policymakers around the world and specifically in the euro area (EA) explicitly acknowledged the importance of gauging the evolution of inflation expectations, for example, Coeuré (2019), Lagarde (2022), Lagarde (2023), Lane (2023), and Williams (2023). Accordingly, this issue has also been an active focus of study among academic researchers (see, for example, Bernanke and Mishkin, 1997; Orphanides and Williams, 2004; Beechey et al., 2011; Kumar et al., 2015; Grishchenko et al., 2019; Coibion et al., 2022; Boeckx et al., 2025, among many others). Kiley and Mishkin (2025) provide a comprehensive review of monetary policy strategies in the context of various inflation–targeting rules.

Various methods are used to analyze inflation expectations, such as estimating time–series models (for example, Stock and Watson, 2007), analyzing financial market–based data (for example, Beechey et al., 2011; D'Amico et al., 2018; Boeckx et al., 2025), analyzing inflation expectations implied by the surveys of professional forecasters (for example, Ang et al., 2007; Coibion and Gorodnichenko, 2012, 2015; Grishchenko et al., 2019; Aruoba, 2020), the combination of both time–series and surveys (Burban et al., 2024), or assessing inflation expectations implied by the household surveys (for example, Weber et al., 2022; D'Acunto et al., 2022; Gautier and Montornès, 2022; Coibion et al., 2023; Andrade et al., 2025, among many others). While the literature on measuring inflation expectations using surveys of professional forecasters is abundant, there are fewer studies focusing on the surveys of households. Reis (2023) argues that, while professional forecasters' surveys often provide the best forecasting performance, households, despite their expectations being biased upward, should also be considered, as they contribute to demand and can therefore influence inflation through their consumption behavior. Indeed, the "main street" consumers are important agents in the economy because they shop, observe prices, and bargain for wages, so they have first-hand experience with observing price changes in the economy. Jonung (1981) was the first study that examined households perceptions in Sweden and found strong positive correlation between inflation perceptions and expectations.

Our paper examines the role that consumers' perceptions of recent behavior of inflation play in the formation of their inflation expectations about the near future. To that end, we do the following:

First, we use the rich structure of the European Commission Consumer Survey (ECCS) dataset to document that median households base their projections to a large extent on their perceptions in addition to past realized inflation, which is consistent with evidence from Weber et al. (2022) and Huber et al. (2023). This dataset was first used in the context of inflation perceptions and expectations across European countries by Arioli et al. (2017) who provided key stylized facts. Our paper extends this dataset to 2024 and presents formal econometric analysis.

Second, we document that rationality in household inflation expectations is widely rejected, meaning that survey respondents do not efficiently use the information available to them to make their forecasts, as in (Mankiw et al., 2004).

Third, we further examine the perceptions-expectations link by looking at the Harmonized Index of Consumer Prices (HICP) subcomponents, by analyzing how this relationship varies based on consumers' income, education, age, and other characteristics, and by analyzing the effect of significant macroeconomic events on this link. With respect to the sub components of the HICP, perceptions still emerge as a dominant predictor of household inflation expectations vis-à-vis core, food, and energy realized inflation. We find a strong and almost pervasive predictive power of perceived inflation for explaining household expected inflation but we find that the predictive power of realized inflation varies across household characteristics. Finally, we find that the perceptions-expectations relationship is robust when we control for major macroeconomic events.

The rest of the paper is organized as follows. Section 2 discusses the details and provides key stylized facts of the ECCS. Section 3 discusses the formation of inflation expectations and its relationship to consumer perceptions, and explores the rationality of inflation expectations. Section 4 provides further exploration of the perceptions-expectations relationship by looking at the effect of specific prices, specific consumer categories, and specific macroeconomic events. Finally, section 5 concludes.

2 Data

In this section, we describe the ECCS data. The survey respondents provide their perceptions and expectations of price changes in consumer goods. The ECCS is a monthly survey conducted by the national statistical institutes in each of the 27 European Union countries. Statistical agencies that conduct this survey follow a common methodology that mostly consists of using the same harmonized questionnaire and a common timetable to conduct the national surveys and to report the results to the European Commission (EC). In this paper, we focus on the eight largest countries in the EA, namely, Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece

— which, overall, represent roughly 85 percent of the EA gross domestic product (GDP). Partner institutes in each country ensure that a number of representative participants exist and are related to the population size of each country so that reliable data are reported for the ECCS survey. As explained by the EC, "The survey samples are derived from a frame, which is supposed to register all the units of the whole population under question. The frame can be created from official or statistical registers, or from membership lists of business associations and chambers of commerce. Good coverage of the frame is indeed very important to secure the quality of the surveys."[1] Every month, consumers are randomly selected to participate in the survey. Depending on the country, respondents could be either a rotating panel or a new panel each month.

The ECCS collects forecasts from households in the EA countries of several macroeconomic variables. In particular, consumers are asked 18 qualitative and quantitative questions about their financial situation, general economic situation, savings, and intentions with regard to major purchases. Appendix A lists all survey questions. Even though the ECCS is conducted by the European Commission since 1972, the quantitative responses are available only from 2004, which defines the start of our sample. Moreover, in addition to providing information regarding forecast of consumer price changes in the following 12 months, the ECCS is unique and different from other surveys by providing information regarding consumers' perception of price changes in the past 12 months.

In this study, we focus on questions related to consumers' inflation perceptions and expectations for which the survey contains a qualitative and a quantitative part. Table 1 summarizes these questions. The questions are designed following a two-stage approach. Consumers must first have answered the qualitative part of perception and expectation questions (questions Q5 and Q6, respectively), in order to be prompted to answer respective quantitative parts of these questions (questions Q5.1 and Q6.1, respectively). For the qualitative perception question the six options for responses are: "Risen a lot", "Risen moderately", "Risen slightly", "Stayed about the same", "Fallen", or "Don't know". For the qualitative expectation question the six options for the responses are: "Increase more rapidly", "Increase at the same time", "Increase at a slower rate", "Stay about the same", "Fall", or "Don't know". Respondents are asked to provide their perceptions and expectations in comparison with the preceding 12 months to when the question is answered. In particular, if respondents answered "Don't know" or "Stay(ed) about the same", they are not prompted to the quantitative part of the questions. In addition, the survey methodology assigns a zero value to the answers to the Q5.1 and Q6.1 quantitative questions for those

[1]For further details, please see the Joint Harmonized EU Programme of Business and Consumer Surveys methodological user guide.

who responded "Stay(ed) about the same". For our analysis, we use responses to quantitative questions Q5.1 and Q6.1.

We focus specifically on eight EA countries, namely, Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. We excluded other countries' responses in our study because (1) available time series for these excluded countries are limited; (2) there are issues of data quality due to changes of survey providers; (3) the size of those countries' economies is relatively small for the inflation there to materially affect the forecasts. The eight countries in our study represent about 85 percent of the EA GDP. Appendix B describes in detail the ECCS dataset and our choice of countries.

Table 2 reports the country-specific percentages of qualitative perceptions and expectations responses in panels A and B, respectively, in the filtered dataset. The table shows substantial heterogeneity in qualitative responses both across respondents in each country and across countries. For example, panel A shows that in Germany, Austria, and Finland, the modal perception price changes in the previous 12 months corresponds to the "Risen slightly" answer (representing 29, 33, and 50 percent, respectively). In France, Belgium, and Greece, the modal response corresponds to the "Risen a lot" (representing 33, 38, and 46 percent, respectively). In Italy, the modal respondent felt that prices "stayed about the same" which corresponds to 33 percent of responses in the cross-section of respondents in Italy. Lastly, in Spain the modal respondent felt that the prices increased moderately that corresponded to the 31 percent of responses in the cross-section of respondents in Spain. Therefore, overall, in our sample, households perceived that consumer prices increased relative to 12 months ago. Indeed, only 1.78 percent of all respondents felt that the prices fell in the previous 12 months (column 1 in panel A).

Turning to the summary statistics of the qualitative inflation expectations responses presented in panel B, we observe that in Germany, France, Belgium, Austria, Finland, and Greece, the modal respondent expects prices to increase at the same rate as before (column 4 in panel B) in the next 12 months. The modal responses in these countries vary from 34 to 49 percent of country-specific responses. In Italy and Spain, the modal respondent expects the consumer prices to stay about the same (column 2 in panel B) - a view that represents 56 and 33 percent of respondents in these respective countries. Therefore, overall, in our sample, respondents either expect the consumer prices to increase at the same rate or to stay about the same as in the last 12 months. Only 2.31 percent of respondents in all countries expect prices to fall (column 1). Overall, respondents seem to expect similar price changes in the future compared to those in the last 12 months.

Once we collected survey responses of these eight countries, we proceeded to exclude respondents who did not answer either Q5.1 or Q6.1 quantitative questions about inflation perceptions and expectations. Throughout the subsequent analysis, we use responses only in this filtered dataset.

Figure 1 shows the monthly average number of respondents in the original dataset (shown in dashed lines) in the filtered dataset (shown in solid colored blocks). Monthly average respondents vary greatly per country. When the filter is imposed, Germany, on average, has the highest monthly number of respondents (1608) and France, on average, has the lowest monthly number of respondents (916).[2]

Next, we turn to country-specific distributions of inflation perceptions and expectations implied by the aggregated answers to questions Q5.1 and Q6.1. Figures 2 and 3 show the distribution of the quantitative inflation perception and expectation responses, respectively. We aggregated responses in eight bins that correspond to responses of less than 0 percent, [0,1) percent, [1,2) percent, [2,3) percent, [3,4) percent, [4,5) percent, [5,6) percent, and greater or equal to 6 percent. We observe notable differences in cross-country distributions of responses across different past (in case of perceptions) or future (in case of expectations) inflation realizations.

Figure 2 shows that northern countries (Germany, France, Belgium, Austria, Finland) share similar distributions of perceived inflation and that this distribution appears to be bi-modal. The remaining responses are distributed relatively evenly across other mid-bins. Finland is the only country in which respondents mostly perceive prices to have been between 0 and 1 percent. In contrast, southern countries (Italy, Spain, and Greece) display materially fat-tailed distributions skewed to the right. In particular, 50 to 60 percent of respondents perceive that inflation was extremely high, while only about 10 percent of respondents provide their responses in the mid-range bins. The share of negative inflation perception responses is relatively low in all countries. Overall, the respondents view inflation in the last 12 months either between 0 and 1 percent or higher than 6 percent.

Figure 3 displays similar patterns for price increases going forward, though households generally anticipate prices to increase at a lower rate than they perceived in the past. In the most northern countries, the most frequent responses fall in the range between 0 and 1 percent. The fraction of such responses is between 35 to 40 percent. The fraction of responses in our next bin, between 1 and 2 percent is negligible. As in the case of perceptions, Finland has a relatively uniform distribution. Inflation expectations of the southern countries are highly bi-modal, with only 10 to 15 percent responses in the mid-range bins. For example, in Italy, 60 percent of respondents expect inflation to be between 0 and 1 percent. In contrast, in Spain and Greece there are only about 35 percent respondents who expect inflation to be between 0 and 1 percent. At the same time, 30 to 50 percent of respondents in Italy, Spain, and Greece foresee inflation above 6 percent.

[2]Table B2 in Appendix B provides information on the number of observations for which respondents answer only one or both quantitative questions.

In all countries, there is only a marginal number of respondents who expect prices to fall.

For the rest of our analysis, we compute monthly cross-sectional median responses (median consumer) aggregated at a country-level in our filtered dataset. In this section and in section 3, we focus on the cross-sectional median responses, instead of the mean responses, to prevent the results being affected by extreme values or particular thresholds for removing outliers.[3]

Table 3 presents descriptive statistics of the country-level cross-sectional median quantitative responses to questions Q5.1 (perceptions, panel A) and Q6.1 (expectations, panel B) for the filtered dataset and the HICP inflation series over the comparable horizon to compare with perceived and expected inflation.[4] The minimum value reported for both inflation perception and expectation is zero for nearly all countries with a few exceptions. Maximum values are more unreasonable: maximum inflation perception varies between 12 percent (for Finland) and 30 percent (for Italy and Greece), and maximum inflation expectation between 10 percent (for five out of eight countries) and 20 percent (for Greece). Within each country, the median inflation perception is always equal to or higher than the median inflation expectation. However, there is notable heterogeneity across countries in both the average and the median responses. According to panel A, the average inflation perception response varies from 2.89 percent for Finland to 11.57 percent for Greece, and the median inflation perception response varies from 2 percent for Finland to 10 percent for Greece. Additionally, according to panel B, the average expected inflation varies from 1.03 percent for Italy to 7.75 percent for Greece, and the median expected inflation varies from 2 percent in France and Finland to 10 percent in Greece. Again, we find that Finland and Greece are on the opposite sides of the spectrum of responses. At the same time, average realized inflation (shown in panel A) varies much less across countries, from 1.87 percent for Finland to 2.57 percent for Austria, and from 1.86 percent for France to 2.65 percent for Austria in panel B. In addition, the average and the median values of inflation perceptions and expectations responses are higher than the average country-specific HICP inflation rates. An exception is Italy in which the average (1.03 percent) and the median (zero percent) values of inflation expectations are smaller than the average HICP inflation rate (2.03 percent).

[3]Several studies argue that household surveys provide biased information because of unreasonable values reported in them (see, e.g., Bryan and Venkatu, 2001; Ehrmann et al., 2017; Arioli et al., 2017; Andrade et al., 2023). However, the median is also known to generally track official estimates of realized inflation (see references in Bruine de Bruin et al., 2011). We have also conducted our analysis using the mean survey responses after we excluded some unreasonably extreme values from the dataset. The results are available upon request.

[4]In panel A, an HICP realized inflation is defined as inflation between months $t-12$ and t to be comparable with survey perceptions series defined over that horizon. In panel B, an HICP realized inflation is defined as inflation between months t to $t+12$, to be comparable with survey expectations series defined over that horizon. Therefore, HICP summary statistics is a bit different in the two panels.

Table 3 also reports the average and standard deviation of the perception and forecast biases in columns 8 and 9 in panels A and B, respectively. The biases are defined in Eqs. (1) ((a) and (b), respectively) as the difference between the median respondent's perception/expectation and HICP inflation at the comparable horizon:

$$Bias^{\mathbb{P}}_{c,t-12,t} = \mathbb{P}_t \pi_{c,t-12,t} - \pi_{c,t-12,t} \quad \text{(a)} \qquad Bias^{\mathbb{E}}_{c,t,t+12} = \mathbb{E}_t \pi_{c,t,t+12} - \pi_{c,t,t+12} \quad \text{(b)} \quad (1)$$

For all countries, the average and the median values of inflation perceptions and expectations responses are higher than the average country-specific HICP inflation rates, leading to a positive (perception or expectation) bias (in average and in median), which means that a median respondent is upward-biased in her responses. An exception is Italy in which the average and the median values of inflation expectations (1.03 and zero percent, respectively) are smaller than the average HICP inflation rate (2.03 percent). The forecast bias (in average and in median) is therefore positive, which means that a median respondent is downward-biased in her responses of inflation expectations in Italy. This bias differs across countries: In the case of the perception bias, it ranges from 1.02 percent for Finland to 9.57 percent for Greece, and in the case of the forecast bias — from -1.01 percent points for Italy to 5.77 percent for Greece.

To summarize, a general feature of the ECCS survey is that consumers view prices as more likely to increase rather than to decrease. Yet, the extent to which prices are expected to increase is heterogeneous across countries. The ECCS survey appears to indicate that respondents in the southern countries, namely, in Italy, Spain, and Greece, appear to have more polarized views than respondents in other countries of our sample, particularly compared to respondents in Finland, who seem to provide more reasonable responses on inflation perception and expectation. For the rest of our analysis, we use the monthly cross-sectional median responses aggregated at a country-level in our filtered dataset when we analyze formation of consumers' inflation expectations in the next section.

3 The formation of consumer inflation expectations

In this section, we examine the formation of consumer inflation expectations. First, we focus on the relationship between consumer inflation perceptions, consumer inflation expectations and realized inflation in the countries in the sample. Then, we assess the rationality of consumer inflation expectations across countries. Finally, we present a set of robustness tests.

3.1 The role of inflation perceptions: A subjective view of prices

We start by defining the measures of inflation perceptions and expectations on a country level. The median inflation perception of a country c between months $t-12$ and t is given by $\mathbb{P}_t\pi_{c,t-12,t}$. The median inflation expectation of a country c between months t and $t+12$ is given by $\mathbb{E}_t\pi_{c,t,t+12}$. The country-specific HICP inflation rate for all items (also called the realized or the headline inflation rate) between months $t-12$ and t is denoted as $\pi_{c,t-12,t}$.

For each country, figure 4 shows the median respondent's inflation perceptions (the orange lines), the median respondent's inflation expectations (the blue lines), and a country-specific HICP realized inflation monthly series (the black lines) from January 2004 through December 2024. For each month t in the figure (the time of a survey round), we plot the inflation perception series between t and $t+12$, the inflation expectation series between t and $t+12$, and the annualized realized inflation series of month $t+12$. As the figure shows, perceived and expected inflation closely co-move with realized inflation. However, in most countries, perceived inflation seems to be often higher than expected inflation and both perceptions and expectations are higher than realized inflation (the red and blue lines are most often above the black line in the charts), suggesting that consumers have a systematic upward bias in nowcasting or forecasting inflation. Finland and Germany are exceptions. In Finland and, to a lesser extent, Germany, perceptions and expectations series remain close to realized inflation. This pattern is confirmed in table 3, where the median perceived and expected values align with average realized inflation in the 2004–24 sample period. In Italy, expectations often fall below realized inflation, which was around 2 percent in our sample, frequently to levels between zero and 1 percent: Indeed, figure 3 shows that about 60 percent of respondents expect inflation in the next 12 months not to exceed 1 percent. In addition, 56 percent of respondents in Italy felt that prices stayed about the same (see column 2 in table 2).

Nevertheless, in late 2020, coinciding with the onset of rising inflation, expectations fell below realized inflation because consumers could not foresee the extent to which the COVID-19 pandemic would affect consumer prices. They remained below realized inflation until the latter moderated because of the normalization of the EA monetary policy, which was intended to bring inflation down. Meanwhile, perceptions increased markedly in line with realized inflation dynamics and remained relatively high afterwards. Although the dynamics followed by perceived, expected, and realized inflation seem to be similar in all countries, figure 4 and table 3 indicate that the magnitude of inflation perceptions and expectations differed between countries (it was higher for Southern countries), while the country-specific realized inflation over the period does not vary significantly between them.

Figure 4 only provides a descriptive picture of how perceived and expected inflation relate to realized inflation across countries. In the next step, we assess the relationship between the three

time series for each country more formally. We therefore first turn to our estimation results that quantify the link between realized inflation and consumers perceptions and expectations. Table 4 reports the correlation between perceived, expected, and realized inflation in each country. Due to unit roots in the series of perceived, expected and realized inflation, we transform these series into first differences (Δ) to conduct the regression analysis (Fuhrer, 2011; Stock and Watson, 2007; Benati, 2008). We also add month-fixed effects to control for seasonality in these series (λ_m).

To that end, we first regress the changes in country-specific median respondent's perceived inflation $\Delta\mathbb{P}_t\pi_{c,t-12,t}$ on the changes in lagged country-specific HICP inflation $\Delta\pi_{c,t-13,t-1}$:[5]

$$\Delta\mathbb{P}_t\pi_{c,t-12,t} = \alpha + \beta\Delta\pi_{c,t-13,t-1} + \lambda_m + \epsilon_{c,t} \tag{2}$$

We report the results in panel A. For all countries β is positive, and this relationship is statistically significant in France, Spain, and Finland. This result corroborates our previous informal observations in, for example, figure 4. These findings suggest that consumers in these three countries rely strongly on realized inflation when they report their inflation perception over the last 12 months. In the other countries, the coefficients are also positive albeit not significant. In addition, in conjunction with figure 4, these results offer preliminary evidence on the non-rationality of consumers' expectations. In particular, graphical and econometric analyses both reveal that inflation perceptions diverge from realized inflation, with coefficients consistently differing from one across countries (see also, Jonung and Laidler, 1988). We discuss this issue more formally in the next section 3.2 where we present a number of rationality tests.

Then, we look at the relationship between expected and realized inflation by regressing changes in country-specific median respondent's expected inflation $\Delta\mathbb{E}_t\pi_{c,t,t+12}$ on changes in 12-month lagged realized country-specific HICP inflation $\Delta\pi_{c,t-13,t-1}$:

$$\Delta\mathbb{E}_t\pi_{c,t,t+12} = \alpha + \beta\Delta\pi_{c,t-13,t-1} + \lambda_m + \epsilon_{c,t} \tag{3}$$

Panel B of table 4 reports a strong and positive correlation between expected inflation and past realized inflation in most countries. Monthly changes in expected inflation strongly co-move with changes in past realized inflation, mirroring the dynamics observed for perceptions in panel A. This result suggests that consumers rely strongly on changes in past inflation when forming their expectations. This relationship is stronger than that observed in panel A: coefficient β is statistically significant at the 5- and 1-percent level for all countries except France and Italy (compared with three countries in panel A). Coefficients are broadly similar across countries, from

[5]We lagged realized inflation by one month to make sure that the information is already available to respondents when they are surveyed.

0.24 (for Germany and Belgium) to 0.58 (for Greece). In contrast, France and Italy display no significant relationship, whereas France showed significance in panel A.

Next, we regress changes in expected inflation $\Delta\mathbb{E}_t\pi_{c,t,t+12}$ on changes in perceived inflation $\Delta\mathbb{P}_t\pi_{c,t-12,t}$ to assess the link between the two inflation questions in the survey:

$$\Delta\mathbb{E}_t\pi_{c,t,t+12} = \alpha + \beta\Delta\mathbb{P}_t\pi_{c,t-12,t} + \lambda_m + \epsilon_{c,t} \tag{4}$$

Panel C reveals a significant positive relationship between changes in perceived and expected inflation across all countries except Finland. Coefficients range from 0.14 in Austria to 0.38 in France, indicating that expectations tend to rise together with perceptions over time.

Finally, we include changes in both inflation perception and realized inflation in the regression to assess their relative predictive power in explaining changes in expected inflation:

$$\Delta\mathbb{E}_t\pi_{c,t,t+12} = \alpha + \beta\Delta\mathbb{P}_t\pi_{c,t-12,t} + \gamma\Delta\pi_{c,t-13,t-1} + \lambda_m + \epsilon_{c,t} \tag{5}$$

The results for regression (5) are reported in table 4, panel D. In explaining movements in households' inflation expectations, changes in inflation perceptions continue to demonstrate strong predictive power across countries at a 1-percent level of significance for all countries except Finland and Italy. In contrast, changes in realized inflation seem slightly less robust, as only five γ coefficients for out of eight (respectively, Germany, Belgium, Austria, Finland, and Greece) were significant either at a 1- or 5-percent level in explaining movements in expected inflation. Overall, changes in perceived inflation are strongly and positively correlated with changes in inflation expectations in all countries except Italy and Finland, consistent with reported findings in other panels. These results indicate that consumers rely on their subjective view of past inflation to form their forecasts.

Our results in table 4 suggest notable heterogeneity across countries. For example, in France and Spain respondents appear to rely only on perceptions in forming their inflation forecasts (as shown by results in univariate regressions in panel C and in joint regressions in panel D). In contrast, Germany, Belgium, Austria, and Greece, both perceived and realized inflation are significant for predicting inflation expectations in presence of realized inflation (panel D).[6] In addition, survey respondents in Finland appear to place substantial weight on realized inflation when forming their

[6]Yet, the relative weight of the two factors differs across countries. For example, in Greece, the link between expected inflation and realized inflation is stronger than the link with perceptions ($\gamma = 0.49$ vs. $\beta = 0.27$, column 8). A similar relationship holds for Austria, where realized inflation is twice as important in forming expectations than perceptions ($\gamma = 0.26$ vs. $\beta = 0.13$, column 6). In contrast, German respondents place greater emphasis on perceptions ($\beta = 0.29$ vs. $\gamma = 0.18$, column 1) in forming their inflation forecasts. In Belgium, both channels appear equally important, with nearly identical coefficients (0.21 and 0.20).

expectations (column 7). Finally, in Italy, neither headline inflation nor perceptions appear to be statistically linked to consumers' inflation forecasts.

In summary, while headline inflation contributes to shaping consumers' inflation expectations in some countries, consumers' inflation perceptions also appear to be a strong determining factor in all of them except Italy and Finland. This result is consistent with Weber et al. (2022), who document that perceived and realized inflation individually explain U.S. consumers' expectations during the pandemic; however, expectations are more strongly linked to perceived rather than realized inflation.

3.2 Tests for rationality in consumer inflation expectations

Many studies that analyze inflation expectations explore whether forecasts are consistent with rational expectations. The rational expectations hypothesis assumes that agents in the economy have complete and accurate knowledge of past inflation, that such information is uniformly available, and that perceived inflation coincides with realized inflation. Under this framework, all agents should produce identical, unbiased forecasts for future inflation (Muth, 1961; Lucas, 1972, 1973, 1975; Jonung, 1981). However, we showed in the previous section that consumer expectations seem to deviate from rationality because (1) perceptions and expectations are biased and (2) consumers form their expectations based significantly on their subjective perceptions that are shaped by the information available to them. More formally, the rational expectations hypothesis implies that expectations are (statistically) efficient in forecasting inflation, which means that the forecast errors are not predictable. To answer this question, we run several rationality tests (Mankiw et al., 2004). The results of these tests are reported in table 5.

We start with the first test of rationality—namely, whether inflation expectations are centered at the right value—by regressing country-specific forecast errors based on respondents' median forecasts of the one-year-ahead inflation, $\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12}$, on a constant:

$$\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12} = \alpha + \epsilon_{c,t+12} \tag{6}$$

Panel A reports the estimation results. The estimated α is positive and highly significant in all countries except Italy, whose coefficient is significantly negative. Each coefficient represents the average forecast bias of a given country over the sample period—from -1.01 percentage points in Italy to 5.77 percentage points in Greece. Consistent with the stylized facts presented in table 3 (column 8 of panel B) and figure 4, a median survey respondent is characterized by an upward forecast bias over the 2004–24 period, except in Italy.

Next, we test for persistence in survey respondents' forecast errors by regressing the forecast errors on various lags:

$$\mathbb{E}_t \pi_{c,t,t+12} - \pi_{c,t,t+12} = \alpha + \beta(\mathbb{E}_{t-\delta} \pi_{c,t-\delta,t-\delta+12} - \pi_{c,t-\delta,t}) + \epsilon_{c,t+12} \tag{7}$$

where $\delta = 1, \ldots, 12$.

Panel B reports the results for three lags and indicates strong persistence in forecast errors (all coefficients are statistically significant at the 1-percent level) for all countries. Figure 5 reports regression results for all horizons $\delta = 1, \ldots, 12$. Overall, we observe that persistence in the forecast errors diminishes with the horizon, as β coefficients decline to close to zero in about three to four quarters and their confidence bounds widen, and R^2's decline as well. The exceptions are Spain and Greece, whose forecast errors are strongly autocorrelated even at the longest horizon, $\delta = 12$. This persistence, or autocorrelation, in the forecast errors is a common feature of imperfect information models (see, for example, Coibion and Gorodnichenko, 2012, 2015).

Next, we test whether information contained in inflation expectations is useful in predicting forecast errors, so, we regress the errors on a constant and the expected inflation $\mathbb{E}_t \pi_{c,t,t+12}$:

$$\mathbb{E}_t \pi_{c,t,t+12} - \pi_{c,t,t+12} = \alpha + \beta \mathbb{E}_t \pi_{c,t,t+12} + \epsilon_{c,t+12} \tag{8}$$

Panel C reports significant and positive coefficients in all countries with different magnitudes: from negative 0.46 percentage point in Austria to negative 0.88 percentage point in Spain. This indicates that an increase in the expectations is significantly associated with an increase in the forecast bias. The latter therefore appears to be predictable based on the information of consumer expectations, which leads to the conclusion of the irrationality of consumer inflation expectations. We formally test the hypothesis of the predictive power of expectations using an $F-$test. Under the null hypothesis, the regressions should not have predictive power: the $F-$test for forecast efficiency (rationality) is not rejected if $\alpha = \beta = 0$. In our survey and sample, p-values are zero, so, according to our results, the rationality of consumers is rejected for all countries.

Finally, we test whether survey respondents efficiently use available macroeconomic information in forming their inflation expectations. If they do, then forecast errors should be independent of the macroeconomic information available to respondents. To test this hypothesis, we regress the forecast errors in a set of major macroeconomic variables lagged one month—namely, the country-specific HICP-based annualized inflation $\pi_{c,t-13,t-1}$, the three-month overnight index swap (OIS) rate i_{t-1}, and the country-specific unemployment rate $U_{c,t-1}$:[7] These data are most likely to be

[7]The OIS rate is linked to the Euro Interbank Offered Rate until December 31, 2021, and to the Euro Short-Term Rate thereafter — these two rates differ by 8.5 basis points — while the unemployment rate series contain missing

available to consumers at the time of providing their responses to the survey. We also control for consumers' forecast itself thereby nesting a specification of the previous rationality test (8):

$$\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12} = \alpha + \beta\mathbb{E}_t\pi_{c,t,t+12} + \gamma\pi_{c,t-13,t-1} + \kappa i_{t-1} + \delta U_{c,t-1} + \lambda_m + \epsilon_{c,t+12} \qquad (9)$$

Panel D reports the results of this rationality test.[8] Overall, there is a considerable heterogeneity among countries in the degree to which macroeconomic information matters for survey respondents. Realized inflation explains respondents' forecast errors in Belgium and Greece; the OIS rate – in Germany, Italy, and Greece, and France; and the unemployment rate – in France, Italy, Spain, and Greece. These results suggest that macroeconomic information is only partially used by the agents across countries in forming their expectations. Further, as in panel C, we run the $F-$test to analyze the rationality of consumer expectations under macroeconomic data information: The $F-$test is not rejected if $\gamma = \kappa = \delta = 0$. The test confirms previous findings by concluding that the rationality of consumer expectations is rejected in all countries. In summary, these results indicate that surveyed consumers are not using the full information available to them to form their expectations of future inflation. This conclusion applies not only to consumers but also to professional forecasters. For example, the conclusions of Mankiw et al. (2004) are broadly similar when they run a similar rationality test using expected inflation in the U.S. provided by the Michigan Survey of Consumer Expectations, by the Livingston Survey, and by the Survey of Professional Forecasters published by the Federal Reserve Bank of Philadelphia.

Overall, these tests indicate that consumers in the eight EA countries do not appear to form inflation expectations in a fully rational manner, as they do not efficiently rely on available objective information. This result is consistent with the previous section, which highlighted both systematic bias and a predominant role of the subjective perceptions of inflation – which are also generally not significantly correlated with objective headline inflation – in shaping expectations across most countries.

In the next section, we explore how macroeconomic conditions can be relevant in explaining the relationship between expected, perceived, and headline inflation.

observations for Germany, where data begin only in 2007.

[8] λ_m stands for month fixed effects that adjust for seasonality.

4 Further extensions

In this section, we extend our analysis of the formation of consumer inflation perceptions and expectations in three directions. First, in section 4.1 we examine the effect of specific HICP categories; second, in section 4.2 we look at the effect of idiosyncratic characteristics; third, in section 4.3 we re-examine the formation of consumer perceptions and expectations in the context of major macroeconomic events.

4.1 The influence of specific prices

The role of perceptions in shaping expectations can reveal the fact that consumers focus on specific prices. D'Acunto et al. (2021) and Huber et al. (2023) find that the aggregate inflation expectations of consumers are based on the price changes they face in their daily lives, which means that consumers can concentrate on specific goods, for example, the cost of food and energy, and therefore base their perceptions and expectations on these specific prices (see Figures C1 and C2 in Appendix C). Building on this idea, we re-estimate our baseline equations (2)—(5), using three subsets of HICP: core inflation (that excludes unprocessed food and energy prices) rate, food inflation rate, and energy inflation rate. We present results in Appendix C tables C1, C2, and C3, respectively.[9]

Table C1 reports results using the core realized inflation rate. There are two main findings in this table. First, the univariate regression results differ somewhat across countries, when we regress either the ECCS perceptions or expectations on the core HICP inflation rate (panels A and B, respectively). These results are somewhat weaker than the ones based on the headline HICP inflation rate (results in panels A and B of table 4). This finding suggests that variations in perceptions and expectations are likely to be associated with realized inflation via food and/or energy items rather some core good prices. Second, the results in panel D, when we jointly control for perceptions and core inflation rate, indicate that changes in inflation perceptions emerge as the only strong significant predictor of changes in expectations for most of the countries in our sample.[10] Overall, this finding that core inflation is less important for households, motivates us to examine the effect of food and energy prices on household perceptions and expectations, the results that we present in tables C2, and C3 below.

Tables C2 reports results using food inflation. Panel A shows that changes in food inflation

[9]Results in panels C across these tables are identical to the results in panel C of Table 4 as they are based on the ECCS perceptions and expectations.
[10]The exception is Italy and Finland.

are strongly and positively correlated to changes in inflation perceptions in almost all countries (except in Greece), in contrast to the near absence of significance of food inflation for explaining household expectations (except Germany, panel B). Instead, as panels C and D report, perceptions are strongly linked to expectations either in univariate regressions (Panel C) or in multivariate regressions when the food inflation rate is included as well (Panel D). Overall, food price dynamics appear to be a major determinant of inflation perceptions but not of inflation expectations.

Table C3 reports results using energy inflation. Energy inflation appears to have a bit weaker link for explaining perceptions (panel A) and a bit stronger link for explaining expectations (panel B) than food inflation. However, when both perceptions and energy inflation are included in regressions, perceptions remain important for explaining consumer expectations (panel D) across most of the countries.

Table C4 summarizes the results obtained from panels A, B, and D of Tables 4 (headline inflation), C1 (core inflation), C2 (food inflation), and C3 (energy inflation). We find that specific price components appear to have shaped inflation perceptions and expectations differently. In particular, food inflation appears to be a strong driver while energy inflation is only marginally important for explaining variations in consumer inflation perceptions. In contrast, energy inflation appears to drive more inflation expectations, than perceptions in our sample. That said, perceptions appear the dominant driver of inflation expectations, regardless of the type of the realized inflation that we control for. Indeed, according to the results in Panels D, inflation perceptions (stars in black) are most often significant compared to realized inflation (stars in blue). This further underscores the central role of perceptions, namely the role of subjective view of price changes, as a transmission channel through which real price developments influence expectations.

4.2 Analysis of the ECCS consumer characteristics

The ECCS database reports survey respondents' income, age, education, and gender, alongside their country of residence. Regarding the income characteristics, the survey provides information as to whether a respondent corresponds to the first quartile of income (the lowest), second quartile, third quartile or fourth quartile of income (the highest).[11] Regarding the age characteristics, respondents are grouped into four age groups: between 16 and 29 years old, between 30 and 49 years old, between 50 and 64 years old, and between 65 years old and older. Regarding the education categories, respondents grouped into three education groups: primary, secondary, and post-secondary. Finally, respondents are identified as male or female. Therefore, the survey

[11] Unfortunately, the survey does not indicate the thresholds for the income quartiles.

provides for four income groups, four age groups, three education groups, and two gender groups, a total of 13 groups.

We first construct a pseudo panel based on these characteristics and compute the country-group-level aggregate point forecasts for inflation perceptions and expectations, respectively:

$$\mathbb{P}_t \pi_{g,c,t-12,t} = \frac{1}{N_m} \Sigma_{m=1}^{N_m} \mathbb{P}_t \pi_{g,c,t-12,t}^{(m)} \tag{10}$$

$$\mathbb{E}_t \pi_{g,c,t,t+12} = \frac{1}{N_m} \Sigma_{m=1}^{N_m} \mathbb{E}_t \pi_{g,c,t,t+12}^{(m)} \tag{11}$$

where $c = 1, \ldots, 8$ is a country and, $g = 1, \ldots, 13$ defines the group as previously discussed.

Figures D1 and D2 in Appendix D show the box plot charts of consumer inflation perceptions and expectations, respectively, which provide the interquartile range (the rectangle), the median (the middle bar) and the mean (the red x). Each figure has four subpanels, organized vertically, for income, age, education, and age characteristics. Each panel has eight country-specific box plot charts. In general, these figures indicate substantial heterogeneity in perceptions levels in different groups. Overall, poorer (Q1, the first income quartile), less educated (the "primary" education quartile), youngest (the first age group), and female consumers tend to have higher inflation perceptions and expectations.[12] This ECCS evidence corroborates evidence in the existing literature (see, *e.g.*, Jonung, 1981; Bruine de Bruin et al., 2010; Ehrmann et al., 2017; Weber et al., 2022; D'Acunto et al., 2023) that also documents a higher average perceived and expected inflation for poorer, younger, less educated, and female consumers in different surveys and datasets. This heterogeneity could be explained by differences in the financial knowledge among consumers. Indeed, Eurobarometer, a public opinion survey conducted by the European Commission, shows heterogeneity in financial knowledge identified by different population groups. Men, more educated people, and respondents aged 25-39 years old are the ones, which are more likely to describe their overall financial knowledge as "very high" or "quite high". Some extant literature finds that individuals with higher levels of education and income tend to be better informed about the economic outlook and have greater access to news and media (Bruine de Bruin et al., 2008; Armantier et al., 2016). As a result, they are generally more attentive to inflation (Bracha and Tang, 2025).[13] Huber et al. (2023), who report responses to the main drivers of inflation perceptions among Ger-

[12] There are more differences in average rather than median inflation perceptions because means are more sensitive to outliers. There are some exceptions in these findings. In Greece, higher perceptions feature the richest and the oldest consumers; in Finland, consumers appear to be relatively more homogeneous in their levels of perceptions than in other countries.

[13] The European Commission's 2023 Eurobarometer shows that highly educated respondents report higher financial knowledge (44 percent) and perform better on financial knowledge questions (36 percent) than medium- (27 percent and 23 percent) and low-education groups (19 percent and 17 percent). Data by income are not available.

man consumers, show that "media about inflation" and "discussions with people" represent only a small proportion of the factors considered as "very important" by households. Moreover, many studies show that individuals often fail to collect or effectively process the information available to them, even when it could improve their decisions (*e.g.*, Dräger, 2015; Coibion et al., 2023).

Based on this broad literature, we assess, for each characteristic and country, how perceived, expected and realized inflation correlate with each other and re-estimate equations (2) to (5). The results are provided in figures D3 to D6 in Appendix D. The heterogeneity in inflation perceptions and expectations is also reflected in the way consumers from different groups form their expectations. Indeed, the predictive power of realized inflation varies among groups and countries, with the notable example of women who significantly rely on realized inflation in France and Finland while men do not significantly rely on it when forming their expectations. Panels D in four figures, which report the results of equation (3), show a varying predictive power of realized inflation across four characteristics. Yet, inflation perceptions again emerge as a strong and almost pervasive predictor across four characteristics and countries (the red dots, associated with the estimated coefficient β for perceptions, are almost everywhere positive and significant on these charts).

4.3 The effect of macroeconomic events

Various macroeconomic and geopolitical events in the 2004–2024 sample can shed light on the strength of the perceptions–expectations relationship, which could potentially be time varying. Indeed, since 2004 (the starting point of this study), the EA faced several critical periods such as the EA subprime crisis, the sovereign debt crisis (between 2008 and 2014), the COVID-19 pandemic (between 2020 and 2022), and the conflict in Ukraine (since 2022). In addition, Europe experienced a long period of low interest rates and low inflation, also known as the effective lower bound (ELB) period (between July 2012 and August 2022) – a period marked by the use of unconventional monetary policy tools by the ECB.

Households' perceptions of inflation as well as their expectations are likely to be influenced by these events. To test this hypothesis, we re-estimate baseline regressions (3) to (5) by adding dummy variables and interaction terms for different macroeconomic periods. This allows us to assess, for each country, whether diverse events have a differential impact on perceived, expected, and realized inflation compared to calmer periods outside the aforementioned macroeconomic periods.

We begin by regressing changes in perceived inflation $\Delta\mathbb{P}_t\pi_{c,t-12,t}$ on changes in lagged country-specific HICP inflation $\Delta\pi_{c,t-13,t-1}$, including the relevant interaction terms:

$$\Delta \mathbb{P}_t \pi_{c,t-12,t} = \alpha + \beta_1 \Delta \pi_{c,t-13,t-1} + \beta_2 (\Delta \pi_{c,t-13,t-1} * Macro_t) + \beta_3 Macro_t + \lambda_m + \epsilon_{c,t} \quad (12)$$

where $Macro_t$ is a set of dummy variables that aim to represent the period most impacted by each event. The dummy variables are defined as follows: the *Subprime* dummy is equal to 1 between January 2008 and December 2009, the *Sovereign debt crisis* dummy equals 1 between January 2010 and December 2012, the *Covid* dummy equals 1 between January and December 2020, the *Ukrainian conflict* dummy is equal to 1 between March and December 2022, and the *ELB* dummy is equal to 1 between July 2012 and August 2022, and λ_m corresponds to the month-fixed effect.

Table E1 reports the results of regression (12). Recall that perceived inflation loads significantly on realized inflation in France, Spain, and Finland (see panel A of table 4). However, when we account for event-specific effects, this relationship weakens, as it remains significant only at the 10 percent level and only in Finland but it is no longer significant in France and Spain outside of the specific periods we considered. The results indicate that macroeconomic events materially shape the link between perceived and realized inflation. For example, during the subprime crisis, respondents in Spain, Austria, and, to some extent, Italy relied heavily on realized inflation in forming their perceptions, with overall effects of 1.13 percentage points (calculated as the sum of the estimated β_1 and β_3 coefficients, $1.30 - 0.17$), 0.95 percentage points, and 1.82 percentage points, respectively. Similarly, the ELB period amplified the correlation in Germany by 0.28 percentage point, in Italy by 0.89 percentage point and in Austria by 0.57 percentage point. The conflict in Ukraine further strengthened the link in Germany, with a marginal effect of 1.03 percentage points, implying an overall correlation of 0.94 percentage point. The sovereign debt crisis also reinforced the association, with positive and significant marginal effects in Austria (0.91 percentage points and significant at the 5 percent level), in Belgium (0.79 percentage point and significant at the 5 percent level), and in Spain (1.03 percentage points and significant at the 10 percent level). In contrast, the COVID-19 pandemic markedly weakened the relationship: Marginal effects were significantly negative in Germany (-0.95 percentage point), France (-1.35 percentage points), and Spain (-1.39 percentage points). Based on a German household survey, Huber et al. (2023) show that events such as COVID-19 pandemic and the conflict in Ukraine are reported as "very important" factors in shaping perceptions among German consumers. Our subperiod analysis confirms this evidence for Germany. Yet, the ECCS respondents in the other EA countries react heterogeneously to macroeconomic periods.

Overall, these results underscore that the sensitivity of consumers' inflation perceptions to realized inflation is not stable over time, and shifts considerably in response to the changing macroeco-

nomic environment. These results further suggest a notable heterogeneity in inflation perceptions over time and across countries. In fact, different events dominate in the different countries: the subprime crisis dominates in Spain and Austria, the ELB period – in Germany and Italy, the COVID-19 pandemic – in Germany and France, the conflict in Ukraine – in Germany, and the sovereign debt crisis – in Austria.

Turning to the effect of the macroeconomic events on the formation of inflation expectations by households in the economy, we regress respondents' changes in expectations $\Delta\mathbb{E}_t\pi_{c,t,t+12}$ on the corresponding changes in inflation perceptions $\Delta\mathbb{P}_t\pi_{c,t-12,t}$ and in the lagged country-specific HICP inflation $\Delta\pi_{c,t-13,t-1}$, and we add the relevant interaction terms with different subsample periods:

$$\begin{aligned}\Delta\mathbb{E}_t\pi_{c,t,t+12} = \alpha + \beta_1\Delta\mathbb{P}_t\pi_{c,t-12,t} + \beta_2(\Delta\mathbb{P}_t\pi_{c,t-12,t} * Macro_t) + \\ \beta_3\Delta\pi_{c,t-13,t-1} + \beta_4(\Delta\pi_{c,t-13,t-1} * Macro_t) + \beta_5 Macro_t + \lambda_m + \epsilon_{c,t}\end{aligned} \tag{13}$$

Table E2 reports the results of the regression (13). Recall that in the baseline regression model (whose results are reported in panel D of table 4), perceptions were strongly predictive of inflation expectations in all countries except Italy and Finland, and that realized inflation was significant in explaining the variation in expectations in five countries: Germany, Belgium, Austria, Finland, and Greece. Overall, this relationship weakened across countries as we accounted for various subperiods in our sample. Indeed, during calmer periods, inflation perceptions remained strongly predictive of inflation expectations in only four countries (in contrast with five countries in the baseline model (5)) — in Germany, Belgium, and Greece (and at the 10 percent level in France) — and realized inflation remained important for explaining the variation in expected inflation only for three countries: Spain, Belgium, and Austria. Notably, in Spain, realized inflation drove out perceived inflation in this subsample analysis. This finding suggests that consumers in Spain relied on their perceptions during specific events and on realized inflation outside of these events. In contrast, in Germany and Greece, respondents' perceptions drove out realized inflation when we controlled for various macroeconomic events. Finally, in Finland, the significant relationship between expected inflation and realized inflation also disappeared relative to the baseline model; and in Italy, neither perceived inflation nor realized inflation appears to be significant, as is the case in the baseline model.

Table E2 reports the incremental effects of perceptions on expected inflation during specific macro periods defined above. The results vary across countries and across different events that we consider. Among considered events, that we contoled for in our regressions, the ELB period appeared the only period during which we found consistent incremental effects across countries: The ELB period significantly strengthened the sensitivity of changes in expected inflation to changes in perceived inflation in Germany (by 37 basis points to the total of 64 basis points, as

seen in column 1), in France (by 50 basis points to the total of 66 basis points, as seen in column 2), in Italy (by 24 basis points from zero, as seen in column 3), and in Finland (by 55 basis points from zero, as seen in column 7). The results related to different (overlapping) events were somewhat mixed.

Overall, we found that different events appeared to have different effect on the sensitivity of changes in expected inflation with respect to changes in perceptions, when the sensitivity sometimes moved sideways in different countries, and only the ELB period produced a somewhat consistent effect across countries. In contrast, we found that these events had essentially no effect on the sensitivity of changes in expected inflation with respect to changes in realized inflation.[14] These results show that the relationship between households' perceptions, realized inflation, and expectations is not stable over time and depends strongly on different periods and macroeconomic conditions that households live through. The effects vary across countries and events, and these results highlight that households adjust the way they form expectations depending on the economic environment—in which the roles of perceptions and realized inflation tend to shift in time and across countries.

5 Conclusion

In this paper, we used information about EA consumer inflation forecasts and analyzed the formation of consumer inflation expectations for eight EA countries.

We made three contributions to the literature. First, based on the rich ECCS dataset, we found that households in the EA predominantly base their projections on perceptions rather than realized inflation, a finding that is broadly consistent with results in Weber et al. (2022) and Huber et al. (2023). Second, we rejected rationality in the EA household inflation expectations, a finding that corroborates the results in the U.S. (Mankiw et al., 2004). Third, we conducted a set of robustness checks where we used specific inflation components and consumer characteristics to corroborate our main result.

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[14] Spain and Italy were the exceptions, where periods like a subprime crisis and the conflict in Ukraine reversed the realized-expected relationship from positive to negative.

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Table 1: ECCS questions about inflation

Variables	Type	Questions	Answers
Inflation perception	**Qualitative**	Q5: "How do you think that **consumer prices have developed over the last 12 months**? They have..."	1. "Risen a lot" (++), 2. "Risen moderately" (+), 3. "Risen slightly" (=), 4. "Stayed about the same" (-), 5. "Fallen" (- -), 6. "Don't know".
	Quantitative	Q5.1: "If question 5 was answered by 1, 2, 3 or 5: By how many **per cent** do you think that **consumer prices have gone up/down over the past 12 months**?"	Consumer prices have increased by X% / decreased by X%.
Inflation expectation	**Qualitative**	Q6: "By comparison with the past 12 months, how do you expect that **consumer prices will develop in the next 12 months** ? They will..."	1. "Increase more rapidly" (++), 2. "Increase at the same rate" (+), 3. "Increase at a slower rate" (=), 4. "Stay about the same" (-), 5. "Fall" (- -), 6. "Don't know".
	Quantitative	Q6.1: "If question 6 was answered by 1, 2, 3 or 5: By how many per cent do you expect **consumer prices to go up/down change in the next 12 months**?"	Consumer prices will increase by X% / decrease by X%.

Note: This table reports the European Commission Consumers Survey (ECCS) inflation-related questions. In this study, we particularly use the quantitative questions (Q5.1 and Q6.1).
Source: European Commission.

Table 2: Number of observations in the ECCS by qualitative answers

	Panel A: Perceptions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fallen (- -), %	Stayed about the same (-), %	Risen slightly (=), %	Risen moderately (+), %	Risen a lot (++), %	Don't know, %	All, %	All
Germany	1.33	17.47	29.03	27.14	25.03	0	100	398876
France	0.70	18.94	24.24	23.21	32.92	0	100	227273
Italy	1.95	32.67	15.85	30.80	18.73	0	100	334852
Spain	2.43	19.10	23.99	31.18	23.30	0	100	339325
Belgium	0.88	12.70	12.83	36.04	37.55	0	100	279705
Austria	1.27	10.20	33.02	25.42	30.09	0	100	352427
Finland	3.34	23.22	50.25	15.14	8.05	0	100	278982
Greece	2.36	20.89	12.55	18.34	45.86	0	100	262569
All, %	1.78	19.32	25.50	26.30	27.10	0	100	
All	44133	478015	630754	650729	670374	4		2474009
	Panel B: Expectations							
	Fall (- -), %	Stay about the same (-), %	Increase at a slower rate (=), %	Increase at the same rate (+), %	Increase more rapidly (++), %	Don't know, %	All, %	All
Germany	0.93	26.23	16.27	40.44	16.13	0	100	398876
France	1.24	33.35	15.04	40.71	9.67	0	100	227273
Italy	2.67	56.30	10.23	19.29	11.51	0	100	334852
Spain	4.60	33.01	19.31	31.69	11.39	0	100	339325
Belgium	1.83	29.28	20.29	34.33	14.27	0	100	279705
Austria	1.57	18.99	14.06	48.55	16.82	0	100	352427
Finland	2.39	21.64	18.60	44.92	12.45	0	100	278982
Greece	3.37	32.15	11.35	34.42	18.71	0	100	262569
All, %	2.31	31.31	15.64	36.73	14.01	0	100	
All	57273	774533	386822	908791	346583	7		2474009

Note: This table reports the percentage and the number of responses to the qualitative inflation perceptions and inflation expectations questions set forth in the European Commission Consumer Survey (ECCS). Panel A reports the percentage of responses to different response options in the filtered dataset to the qualitative inflation perceptions question (question Q5.1 in the survey, columns 1 to 7). Panel B reports the percentage of responses to different response options in the filtered dataset to the qualitative inflation expectations question (question Q6.1 in the survey, columns 1 to 7). Column 8 in both panels reports the total number of responses to each of the questions in the filtered dataset. The responses are provided for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission and authors' calculations.

Table 3: ECCS filtered data set

	2004-2024								
Panel A	**Perceptions - Question Q5.1**					**HICP**		**Bias**	
	Min	Mean	Median	Max	SD	Mean	SD	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Germany	0	3.94	3	13	2.79	2.18	2.08	1.76	1.20
France	0.05	4.49	4	15	3.11	1.92	1.60	2.57	2.00
Italy	0	7.62	5	30	7.44	2.06	2.28	5.56	3.60
Spain	0	8.60	5	20	6.83	2.21	2.19	6.4	4.60
Belgium	1.5	6.09	5	15.4	3.02	2.47	2.32	3.62	3.00
Austria	2	5.33	5	15	2.82	2.57	2.14	2.75	2.45
Finland	0	2.89	2	12	2.68	1.87	1.83	1.02	0.70
Greece	0	11.57	10	30	8.11	2.01	2.67	9.57	8.80
Panel B	**Expectations - Question Q6.1**					**HICP**		**Bias**	
	Min	Mean	Median	Max	SD	Mean	SD	Mean	Median
Germany	0	3.15	3	10	2.11	2.20	2.09	0.98	0.80
France	0	2.61	2	10	2.10	1.86	1.61	0.76	0.60
Italy	0	1.03	0	15	2.52	2.03	2.29	-1.01	-1.10
Spain	0	4.19	3	15	3.91	2.19	2.19	2.01	1.90
Belgium	0	3.23	3	10	1.70	2.53	2.32	0.70	0.60
Austria	2	3.81	3	10	1.68	2.65	2.15	1.16	1.30
Finland	0	2.45	2	10	1.67	1.95	1.79	0.49	0.40
Greece	0	7.75	10	20	6.58	2.00	2.68	5.77	5.70

Note: The table reports the summary statistics of the monthly cross-sectional median responses of consumer inflation perceptions and expectations aggregated at a country-level in the European Commission Consumers Survey (ECCS) filtered data set. Columns 1 through 5 report minimum, mean, median, maximum, and standard deviation of the aggregated ECCS median consumer time series of inflation perceptions and inflation expectations in Panels A and Panel B, respectively. Columns 6 and 7 report the average and standard deviation of the country-specific Harmonized Index of Consumer Prices (HICP). Columns 8 and 9 report the average and the median bias, of the perception and the forecast in Panels A and B, respectively. The bias is computed as the difference between the cross-sectional median responses (of perception or expectation) aggregated at a country-level and the HICP inflation rate over the comparable horizon ($t-12$ to t for the perceptions and t to $t+12$ for the expectations relative to month t). The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission, Eurostat, and authors' calculations.

Table 4: Comparative predictive power of inflation measures

	Germany	France	Italy	Spain	Belgium	Austria	Finland	Greece
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: $\Delta\mathbb{P}_t\pi_{c,t-12,t}$								
Intercept	-0.08	0.07	0.40	-0.69	-0.34 **	-0.23 *	-0.15	-0.78
	(0.07)	(0.17)	(0.30)	(0.55)	(0.15)	(0.13)	(0.09)	(0.69)
$\Delta\pi_{c,t-13,t-1}$	0.18	0.45 **	0.21	0.48 **	0.13	0.15	0.30 ***	0.32
	(0.14)	(0.18)	(0.17)	(0.22)	(0.09)	(0.17)	(0.09)	(0.26)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.080	0.111	0.075	0.103	0.077	0.059	0.122	0.062
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.21 *	-0.19	0.25	-0.07	-0.12	-0.20	-0.20 *	-0.46
	(0.12)	(0.19)	(0.25)	(0.31)	(0.11)	(0.15)	(0.11)	(0.73)
$\Delta\pi_{c,t-13,t-1}$	0.24 **	0.34	-0.16	0.39 **	0.24 ***	0.28 ***	0.27 ***	0.58 **
	(0.09)	(0.22)	(0.31)	(0.17)	(0.08)	(0.10)	(0.10)	(0.24)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.137	0.035	0.063	0.071	0.118	0.124	0.112	0.050
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.07	-0.04	-0.17	-0.19	-0.26
	(0.14)	(0.19)	(0.24)	(0.26)	(0.13)	(0.15)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.32 ***	0.38 ***	0.08	0.21 ***	0.22 ***	0.14 ***	0.08	0.28 ***
	(0.08)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.230	0.136	0.070	0.129	0.127	0.118	0.056	0.102
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.19	-0.22	0.22	0.07	-0.05	-0.17	-0.20 *	-0.25
	(0.12)	(0.18)	(0.24)	(0.25)	(0.12)	(0.15)	(0.12)	(0.59)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.29 ***	0.37 ***	0.08	0.20 ***	0.20 ***	0.13 ***	0.00	0.27 ***
	(0.06)	(0.11)	(0.06)	(0.07)	(0.06)	(0.04)	(0.10)	(0.10)
$\Delta\pi_{c,t-13,t-1}$	0.18 **	0.17	-0.17	0.30	0.21 ***	0.26 ***	0.27 **	0.49 **
	(0.08)	(0.20)	(0.30)	(0.20)	(0.07)	(0.10)	(0.11)	(0.23)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.266	0.140	0.076	0.143	0.160	0.162	0.112	0.113
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports regression results based on the median consumer of the European Commission Consumer Survey (ECCS). Panels A and B report the regression results of the change in the ECCS inflation perceptions or expectations, respectively, on the change in the annualized rate of the country-specific Harmonized Index of Consumer Prices (HICP) inflation in the previous month; Panel C reports the results of the change in the ECCS inflation expectations on the change in the ECCS inflation perceptions; and Panel D - results of the change in the ECCS expectations on the changes in both the ECCS inflation perceptions and the annualized rate of the country-specific HICP inflation in the previous month. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The sample period is from January 2004 to December 2024. The frequency is monthly.

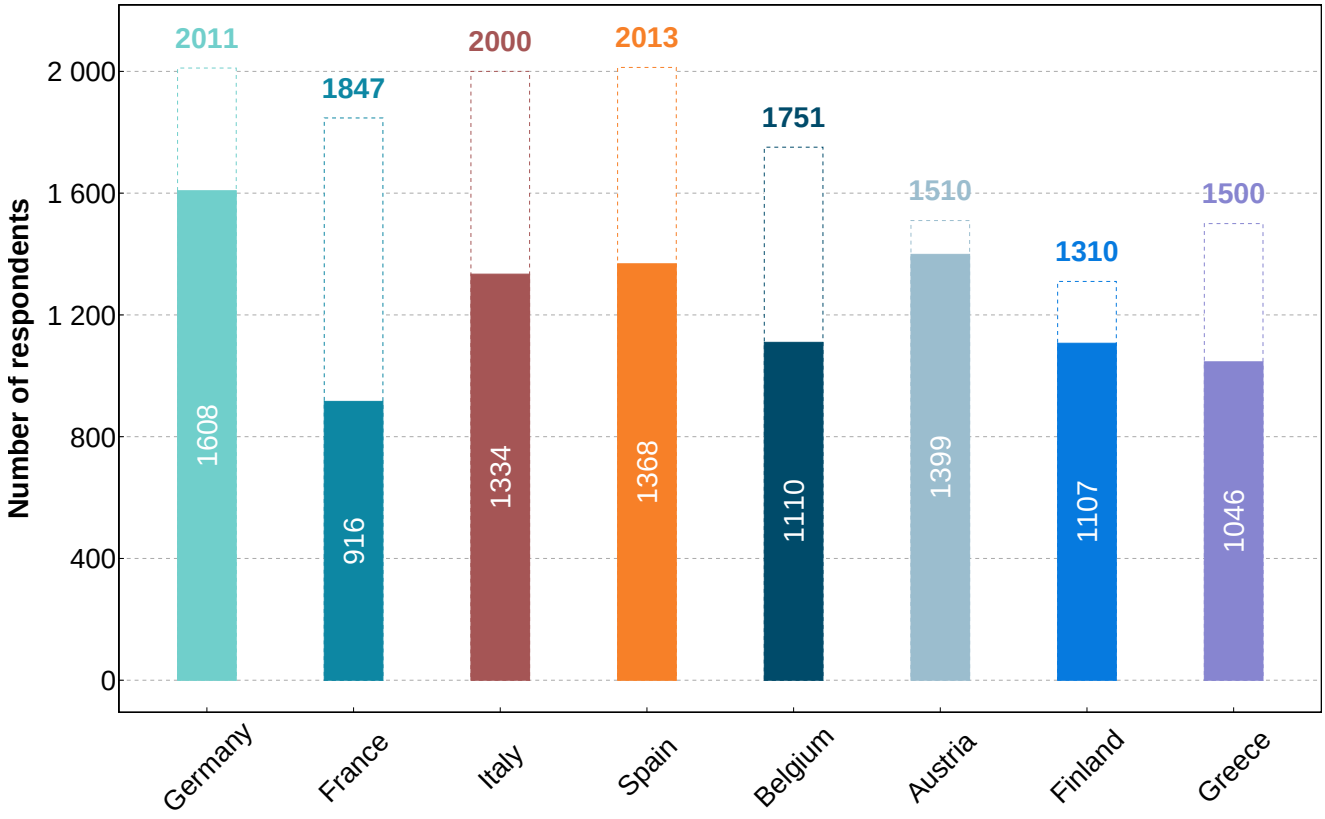
Source: European Commission, Eurostat and authors' calculations.

Table 5: Rationality tests

	Germany	France	Italy	Spain	Belgium	Austria	Finland	Greece
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Testing for bias ($\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12}$)								
Intercept	0.98 ***	0.76 **	-1.01 **	2.01 **	0.70 **	1.16 ***	0.49 *	5.77 ***
	(0.28)	(0.38)	(0.42)	(0.95)	(0.29)	(0.30)	(0.27)	(1.51)
Num.Obs.	247	247	250	248	251	251	251	250
R2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Panel B: Testing for persistence of forecast bias ($\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12}$)								
Intercept	0.17	0.19	-0.34 *	0.38	0.20	0.21	0.09	1.27 *
	(0.22)	(0.16)	(0.20)	(0.33)	(0.27)	(0.27)	(0.20)	(0.66)
$\mathbb{E}_t\pi_{c,t-3,t+9} - \pi_{c,t-3,t+9}$	0.80 ***	0.75 ***	0.65 ***	0.77 ***	0.74 ***	0.82 ***	0.83 ***	0.79 ***
	(0.07)	(0.07)	(0.13)	(0.08)	(0.08)	(0.11)	(0.07)	(0.08)
Num.Obs.	240	240	246	244	248	248	248	246
R2	0.651	0.552	0.422	0.610	0.543	0.665	0.679	0.599
Panel C: Testing for full information ($\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12}$)								
Intercept	-0.90 ***	-0.96 ***	-1.61 ***	-1.70 **	-1.93 ***	-0.60	-1.23 **	-0.87
	(0.30)	(0.29)	(0.38)	(0.75)	(0.50)	(0.36)	(0.57)	(0.98)
$\mathbb{E}_t\pi_{c,t,t+12}$	0.60 ***	0.66 ***	0.59 ***	0.88 ***	0.82 ***	0.46 ***	0.71 ***	0.86 ***
	(0.14)	(0.11)	(0.15)	(0.10)	(0.12)	(0.14)	(0.14)	(0.06)
Num.Obs.	247	247	250	248	251	251	251	250
R2	0.310	0.476	0.347	0.720	0.266	0.137	0.321	0.838
$F-$test: $\alpha = \beta = 0$	88.73	145.11	96.31	423.39	56.59	63.84	69.17	1310.59
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Rationality rejected?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: Testing for macro data information ($\mathbb{E}_t\pi_{c,t,t+12} - \pi_{c,t,t+12}$)								
Intercept	-0.06	-8.73 **	-10.17 ***	-6.52 ***	-4.72	3.07	-4.69	-9.09 ***
	(0.99)	(3.37)	(2.29)	(1.50)	(3.49)	(2.37)	(3.37)	(1.96)
$\mathbb{E}_t\pi_{c,t,t+12}$	0.31	0.76 ***	0.64 ***	1.14 ***	0.59 *	0.15	0.62 ***	0.85 ***
	(0.34)	(0.14)	(0.09)	(0.11)	(0.32)	(0.48)	(0.12)	(0.10)
$\pi_{c,t-13,t-1}$	0.07	0.06	0.08	-0.20	0.33 **	0.08	0.15	0.38 **
	(0.27)	(0.16)	(0.07)	(0.12)	(0.14)	(0.29)	(0.15)	(0.16)
i_{t-1}	0.65 **	0.42 *	0.88 ***	0.30	-0.02	0.33	0.23	0.94 **
	(0.29)	(0.24)	(0.29)	(0.21)	(0.18)	(0.24)	(0.26)	(0.38)
$U_{c,t-1}$	-0.14	0.76 **	0.80 ***	0.24 ***	0.36	-0.61	0.42	0.41 ***
	(0.17)	(0.33)	(0.17)	(0.05)	(0.41)	(0.38)	(0.38)	(0.08)
Num.Obs.	210	246	249	247	250	250	250	249
R2	0.422	0.589	0.520	0.766	0.321	0.247	0.364	0.908
$F-$test: $\gamma = \kappa = \delta = 0$	12.93	20.96	27.74	15.73	6.25	11.16	4.92	58.34
p-value	0.0000	0.0000	0.0000	0.0000	0.0004	0.0000	0.0025	0.0000
Rationality rejected?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

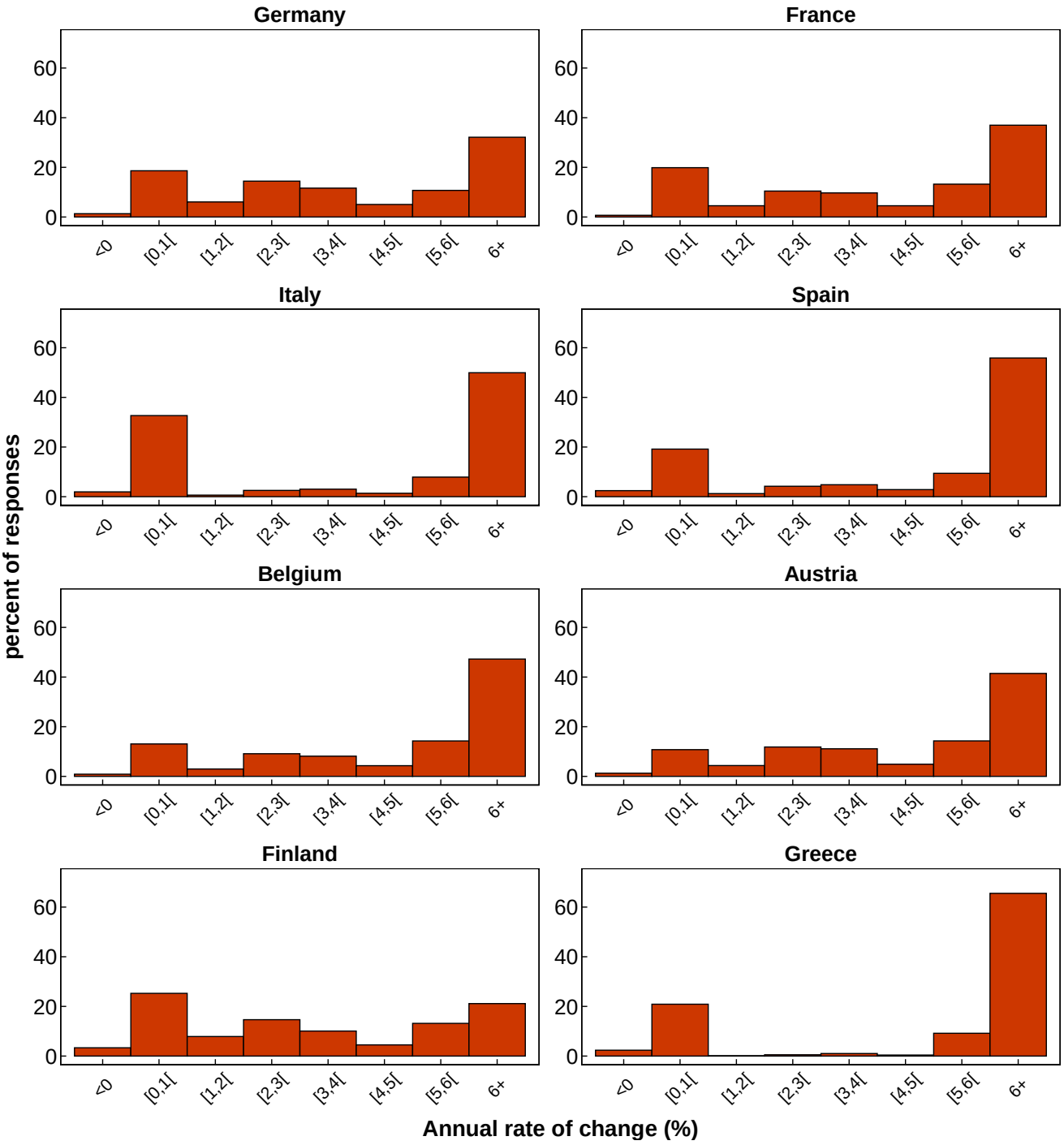
Note: This table reports forecast rationality tests results based on median consumers of the European Commission Consumer Survey (ECCS). Panel A tests for bias and reports regression results of the forecast error on a constant. Panel B tests for persistence in the forecast error and reports results of the forecast error on its third lag. Panel C tests for full information and reports results of the forecast error on a constant and expectations. Panel D tests for macroeconomic data information and reports results of the forecast error on inflation expectations, the annualized rate of the country-specific HICP inflation in the previous month, the three-month overnight index swap (OIS) rate in the previous month and the unemployment rate in the previous month. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The sample period is from January 2004 to December 2024 and the frequency is monthly.
Source: European Commission, Eurostat and authors' calculations.

Figure 1: The ECCS respondents per country



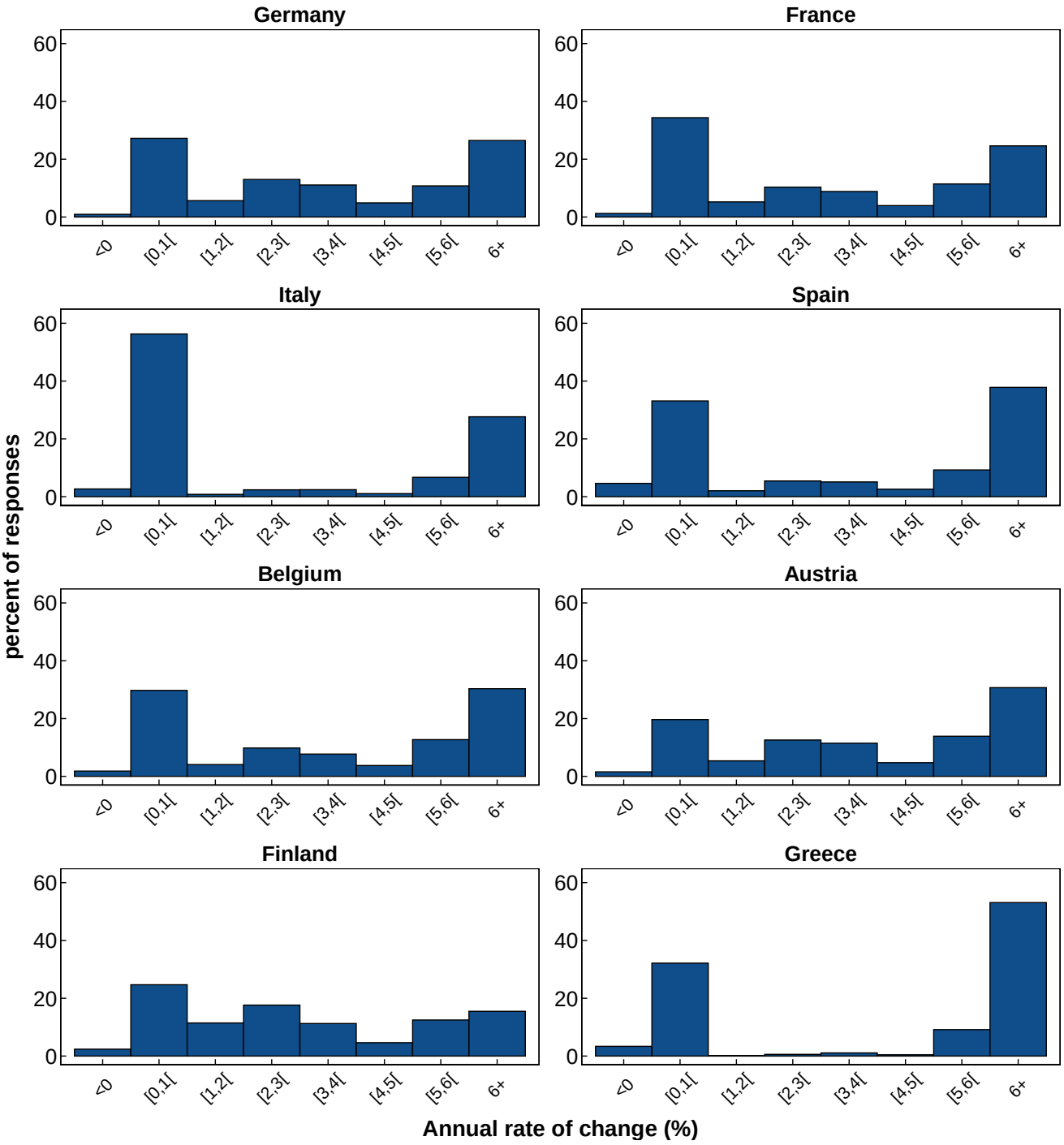
Note: This figure shows the monthly average number of respondents in the European Commission Consumers Survey (ECCS) in the unfiltered dataset (dashed lines) and in filtered dataset (solid lines) where consumers answered both inflation-related questions (Q5.1 and Q6.1). The figure shows results for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission and authors' calculations.

Figure 2: The ECCS distribution of inflation perception responses



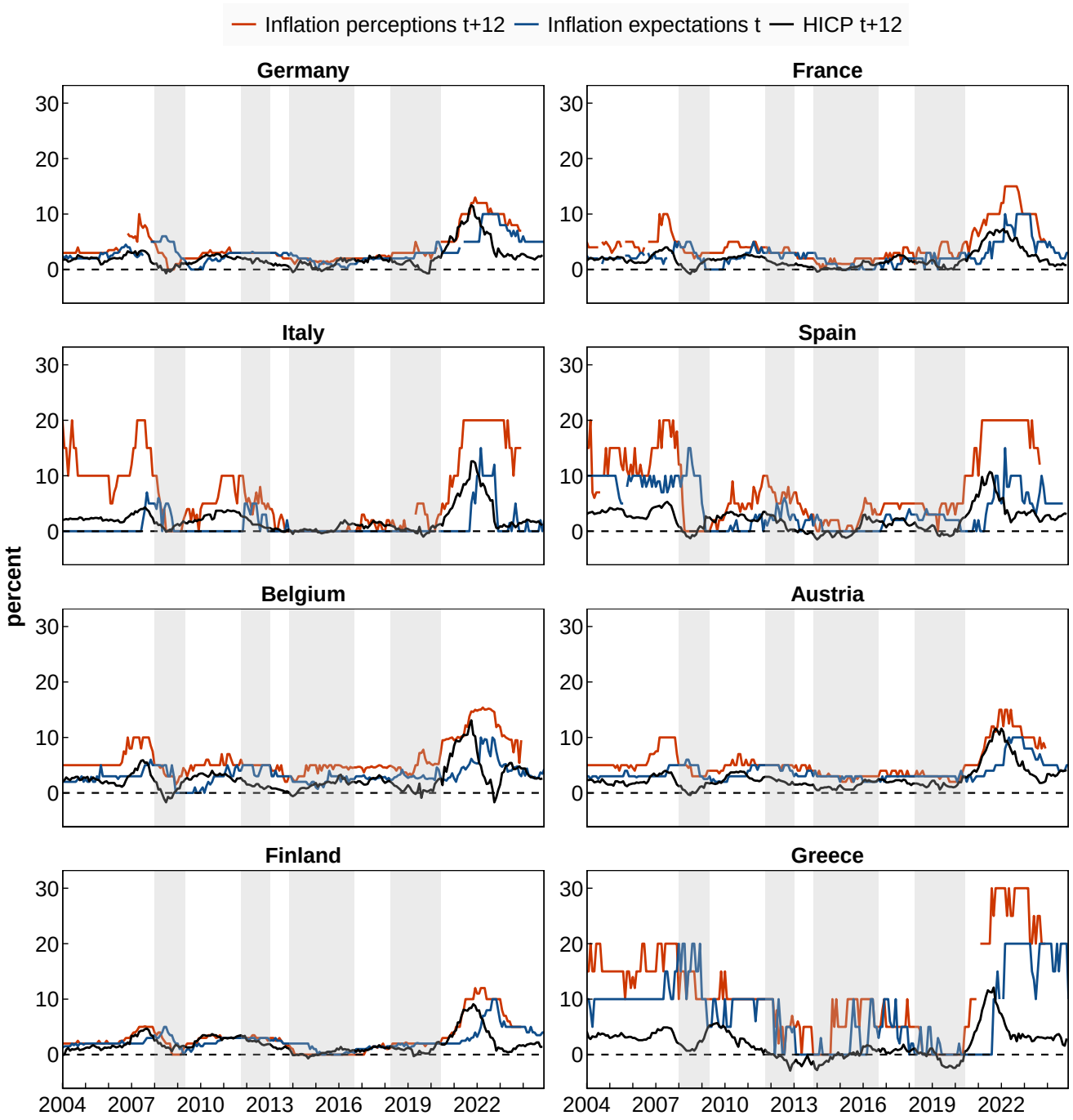
Note: This figure shows the histogram of the ECCS inflation perception responses. The histogram shows percentage of the responses in the filtered dataset for <0, [0,1[, [1,2[, [2,3[, [3,4[, [4,5[, [5,6[, and 6+ annual perceived inflation rate brackets (in percentage) in the 12 months before the response month. The "<0" bucket includes all negative responses, and the "*6+*" bucket combines responses that are larger or equal to 6 percent. The results are shown for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission and authors' calculations.

Figure 3: The ECCS distribution of one-year inflation expectation responses



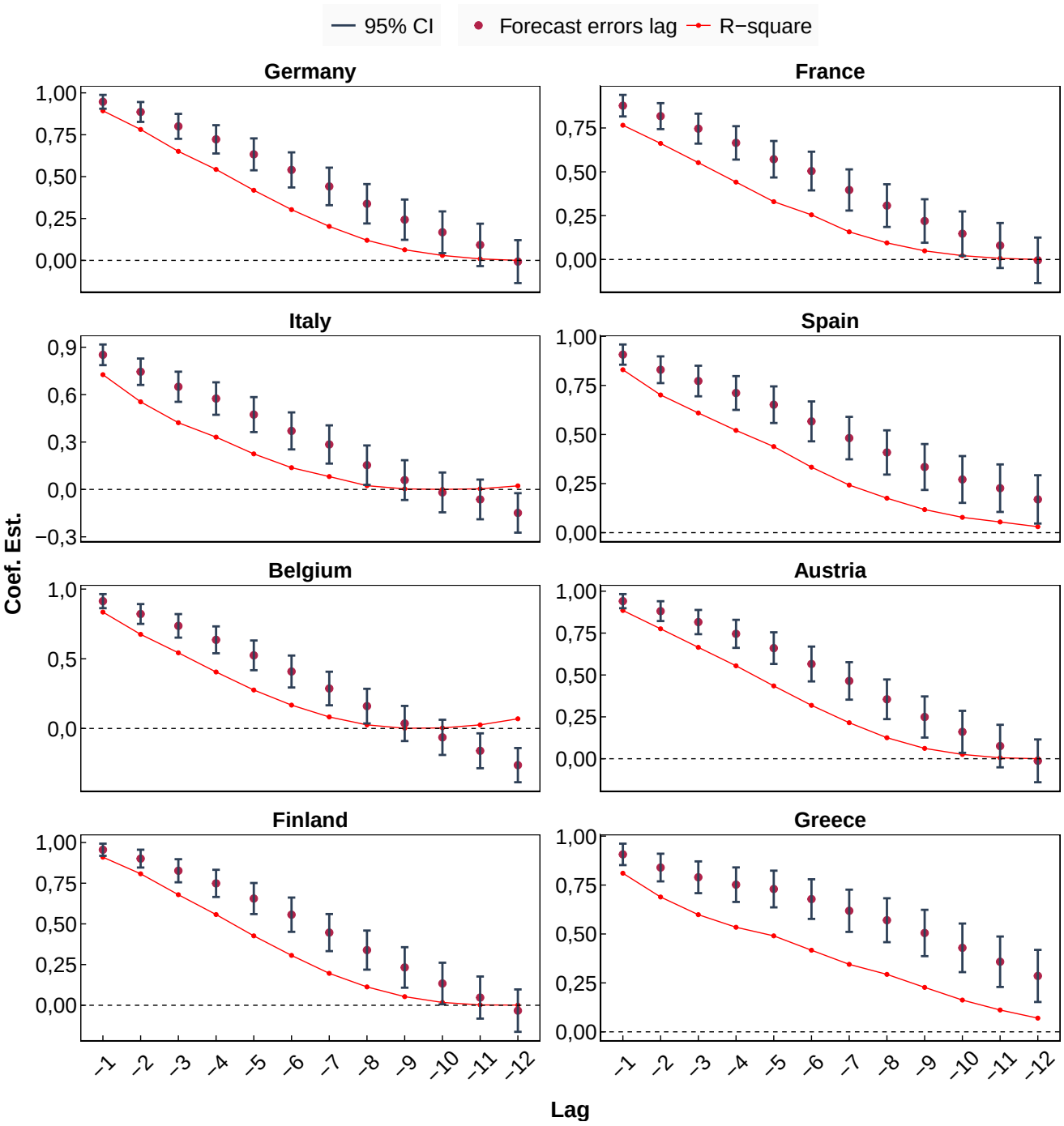
Note: This figure shows the histogram of the ECCS inflation expectations responses. The histogram shows percentage of the responses in the filtered dataset for <0, [0,1[, [1,2[, [2,3[, [3,4[, [4,5[, and 6+ annual perceived inflation rate brackets (in percentage). The "<0" bucket includes all negative responses, and the "*6+*" bucket combines responses that are larger or equal to 6 percent. The results are shown for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission and authors' calculations.

Figure 4: The median perceptions, expectations and realized inflation



Note: The figure shows the time series of the European Commission Consumer Survey (ECCS) inflation perceptions and expectations for median consumers for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. It also plots on each chart the country-specific HICP inflation series. Realized, perceived and expected inflation series are plotted by matching the twelve-month forecast horizon. The black dashed line represents zero percent. The sample period is from January 2004 to December 2024. The frequency is monthly. Shaded areas represent the Organization for Economic Co-operation and Development (OECD) recessions.
Source: European Commission, Eurostat, and authors' calculations.

Figure 5: Persistence of median forecast errors



Note: The figure shows results for Eq. (7) where the forecast errors of a median consumer are regressed on their lag $\delta = 1, \ldots, 12$. The purple dots indicate the estimated coefficient for a particular lag together with the 95-percent confidence interval. The red line indicates the R^2 coefficient of a regression that corresponds to a particular lag. The black dashed line represents zero percent. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat, and authors' calculations.

A Appendix: ECCS questionnaire

This appendix provides the questionnaire that the European Commission asks to report the participating countries. In our study, we use only questions 5.1 and 6.1.

3. THE JOINT HARMONISED EU CONSUMER SURVEY

3.1. Consumer survey - Questionnaire

Monthly questions

Q1 How has the financial situation of your household changed over the last 12 months? It has...

++	got a lot better
+	got a little better
=	stayed the same
–	got a little worse
– –	got a lot worse
N	don't know.

Q2 How do you expect the financial position of your household to change over the next 12 months? It will...

++	get a lot better
+	get a little better
=	stay the same
–	get a little worse
– –	get a lot worse
N	don't know.

Q21 The future financial position/situation of your household is currently

++	easy to predict
+	moderately easy to predict
-	moderately difficult to predict
– –	difficult to predict
N	don't know.

Q3 How do you think the general economic situation in the country has changed over the past 12 months? It has...

++	got a lot better
+	got a little better
=	stayed the same
–	got a little worse
– –	got a lot worse
N	don't know.

Q4 How do you expect the general economic situation in this country to develop over the next 12 months? It will...

++	get a lot better
+	get a little better
=	stay the same
–	get a little worse
– –	get a lot worse
N	don't know.

Q5 How do you think that consumer prices have developed over the last 12 months? They have…

++ risen a lot
+ risen moderately
= risen slightly
– stayed about the same
– – fallen
N don't know.

Q51 If question 5 was answered by 1, 2, 3 or 5:
By how many per cent do you think that consumer prices have gone up/down over the past 12 months? (Please give a single figure estimate).
Consumer prices have increased by □□□,□ % / decreased by □□□,□ %.

Q6 By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will…

++ increase more rapidly
+ increase at the same rate
= increase at a slower rate
– stay about the same
– – fall
N don't know.

Q61 If question 6 was answered by 1, 2, 3 or 5:
By how many per cent do you expect consumer prices to go up/down change in the next 12 months? (Please give a single figure estimate).
Consumer prices will increase by □□□,□ % / decrease by □□□,□ %.

Q7 How do you expect the number of people unemployed in this country to change over the next 12 months? The number will...

++ increase sharply
+ increase slightly
= remain the same
– fall slightly
– – fall sharply
N don't know.

Q8 In view of the general economic situation, do you think that now it is the right moment for people to make major purchases such as furniture, electrical/electronic devices, etc.?

++ yes, it is the right moment now
= it is neither the right moment nor the wrong moment
– – no, it is not the right moment now
N don't know.

Q9 Compared to the past 12 months, do you expect to spend more or less money on major purchases (furniture, electrical/electronic devices, etc.) over the next 12 months? I will spend…

++ much more
+ a little more
= about the same
– a little less
– – much less
N don't know.

Q10 In view of the general economic situation, do you think that now is...?

++ a very good moment to save
+ a fairly good moment to save
– not a good moment to save
– – a very bad moment to save
N don't know.

Q11 Over the next 12 months, how likely is it that you save any money?

++ very likely
+ fairly likely
– not likely
– – not at all likely
N don't know.

Q12 Which of these statements best describes the current financial situation of your household?

++ we are saving a lot
+ we are saving a little
= we are just managing to make ends meet on our income
– we are having to draw on our savings
– – we are running into debt
N don't know.

Quarterly questions (January, April, July and October)

Q13 How likely are you to buy a car over the next 12 months?

++ very likely
+ fairly likely
– not likely
– – not at all likely
N don't know.

Q14 Are you planning to buy or build a home over the next 12 months (to live in yourself, for a member of your family, as a holiday home, to let etc.)?

++ yes, definitely
+ possibly
– probably not
– – no
N don't know.

Q15 How likely are you to spend any large sums of money on home improvements or renovations over the next 12 months?

++ very likely
+ fairly likely
– not likely
– – not at all likely
N don't know.

B Appendix: Details of the ECCS data

The European Commission Consumer Survey (ECCS) is produced by national statistical institutes in each of the twenty-seven countries of the European Union (EU). This survey is based on a common methodology that implies a harmonization of the questionnaire used in each country. However, "harmonization does not mean uniformity". For instance, the fieldwork for monthly basis questions is done in the first two to three weeks of each month, but each partner institute is free to organize the fieldwork as desired. In most countries, the survey method is through Computer Assisted Telephone Interviewing (CATI) system, but, face-to-face interviews and/or online surveys are also conducted in some countries.[15]

We focus on eight countries whose information is available in the survey. First, we concentrate on euro area countries only because they are subject to the same monetary policy, in contrast to countries-members of the European Union, but not the euro-zone members. Second, we keep eight out of 20 euro area countries due to data quality and sample size issues for other countries, such as frequent data providers' changes and missing values for long periods. Table B1 reports the number of months per year and for each country in the euro area, in which respondents answered both the quantitative inflation perception and expectation questions. As this table shows, Cyprus, Estonia, Ireland, Latvia, Netherlands, and Portugal have relatively few periods in which survey responses were available. For this reason, we excluded these six countries from our analysis. In addition, we removed Croatia, Lithuania, Luxembourg, Malta, Slovakia and Slovenia from the analysis due to the size of their economies, which is relatively small for the inflation there to materially affect the forecasts, so we, at the moment, abstain from considering them. The eight remaining countries we focus on are Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece, which represent around 85 percent of the euro area GDP. Among these countries, the following observations are missing: for France - August 2004, 2005, 2006 and 2007; for Germany - from August to October 2007 and May 2021; for Greece - January 2022; for Italy - April 2020; and for Spain - September 2005 and from October to December 2024.

Table B2 reports the percentage of respondents who answered only one quantitative question (either Q5.1 or Q6.1 question) in the survey (column 1) and the percentage of those who answered both quantitative questions. In Austria, there is the least percentage of respondents among eight countries who answered only one question, about 7 percent, whereas in France, there is the highest percentage of respondents who answered only one question, about 50 percent. Overall, on average, about 70.84 percent of respondents answered both quantitative questions. There are 3,492,287

[15] Further information is available in the metadata of partner institutes and in the Joint Harmonized EU Program of Business and Consumer Surveys methodological user guide.

respondents Overall, in the sample of eight countries. Therefore, our main sample consists of $70.84\% \times 3,492,287 = 2,473,936$ respondents.

For each country, we also conducted our analysis based on a mean consumer instead of a median consumer. However, since some respondents provided justifiably "unreasonable" answers, we discarded such values by filtering the lower- and upper-fifth-percentiles in the country cross-sectional distributions of responses about inflation perceptions and inflation expectations so that the country's average inflation perception and expectation are not unreasonably impacted by these extreme values. The results based on the ECCS two-stage filtered data set (where we retained respondents who answered both quantitative questions and filtered out the fifth-percentiles on both sides of the cross-sectional distributions) are available upon request.

Table B1: Number of months per year and country

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Austria	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Belgium	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Croatia	0	0	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12	12	12	12
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	12	12
Estonia	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	6	9	12	12
Finland	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
France	11	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Germany	12	12	12	9	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12
Greece	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12
Italy	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	12	12	12	12
Latvia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	12	12	12
Lithuania	12	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Luxembourg	12	12	12	12	8	9	12	12	12	12	12	12	12	12	12	12	12	12	8	8	12
Malta	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Netherlands	12	4	0	0	0	0	0	7	12	12	12	12	12	12	12	12	12	12	12	12	12
Portugal	0	0	0	0	0	0	0	0	0	0	2	12	12	12	12	12	12	12	12	12	12
Slovak Republic	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Slovenia	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Spain	12	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9

Note: This table reports the number of months per year and country for which the European Commission Consumer Survey (ECCS) provides data. The sample period is from January 2004 to December 2024.

Source: European Commission and authors' calculations.

Table B2: Consumer responses to quantitative questions (Q5.1 or Q6.1)

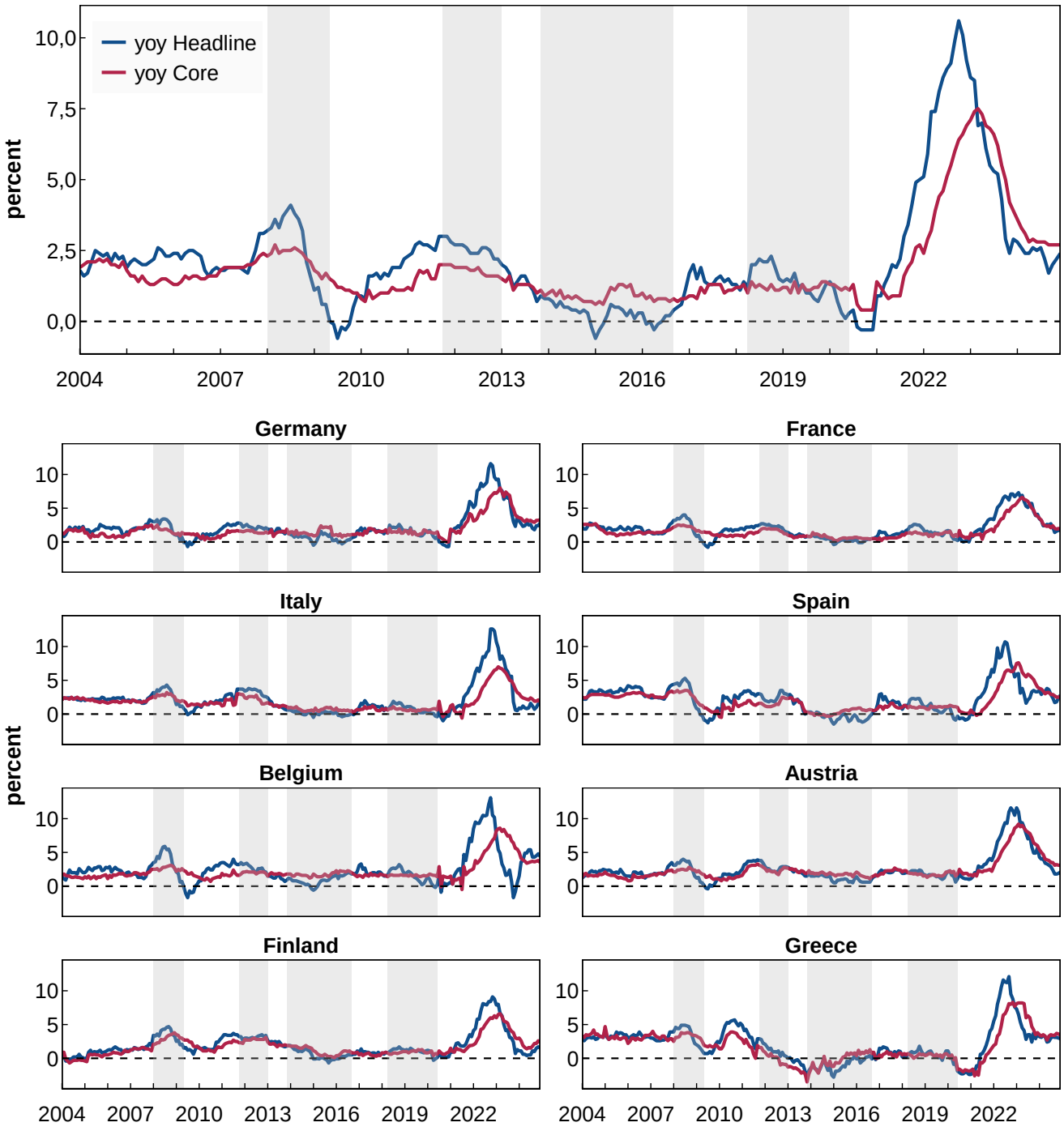
	One question answered, %	**Two questions answered,** %	**All** %	**All No.**
	(1)	(2)	(3)	(4)
Germany	20.98	79.02	100	504,768
France	50.38	49.62	100	458,060
Italy	33.28	66.72	100	501,905
Spain	32.04	67.96	100	499,325
Belgium	36.62	63.38	100	441,313
Austria	7.35	92.65	100	380,404
Finland	15.46	84.54	100	330,012
Greece	30.26	69.74	100	376,500
All	29.16	70.84	100	3,492,287

Note: This table shows the percentage of responses to the European Commission Consumer Survey (ECCS) dataset, where respondents answered only one quantitative question, either Q5.1 or Q6.1 question (column 1), or both quantitative questions (column 2). Columns 3 and 4 report the total percentage of and the number of observations. The sample period is from January 2004 to December 2024.

Source: European Commission and authors' calculations.

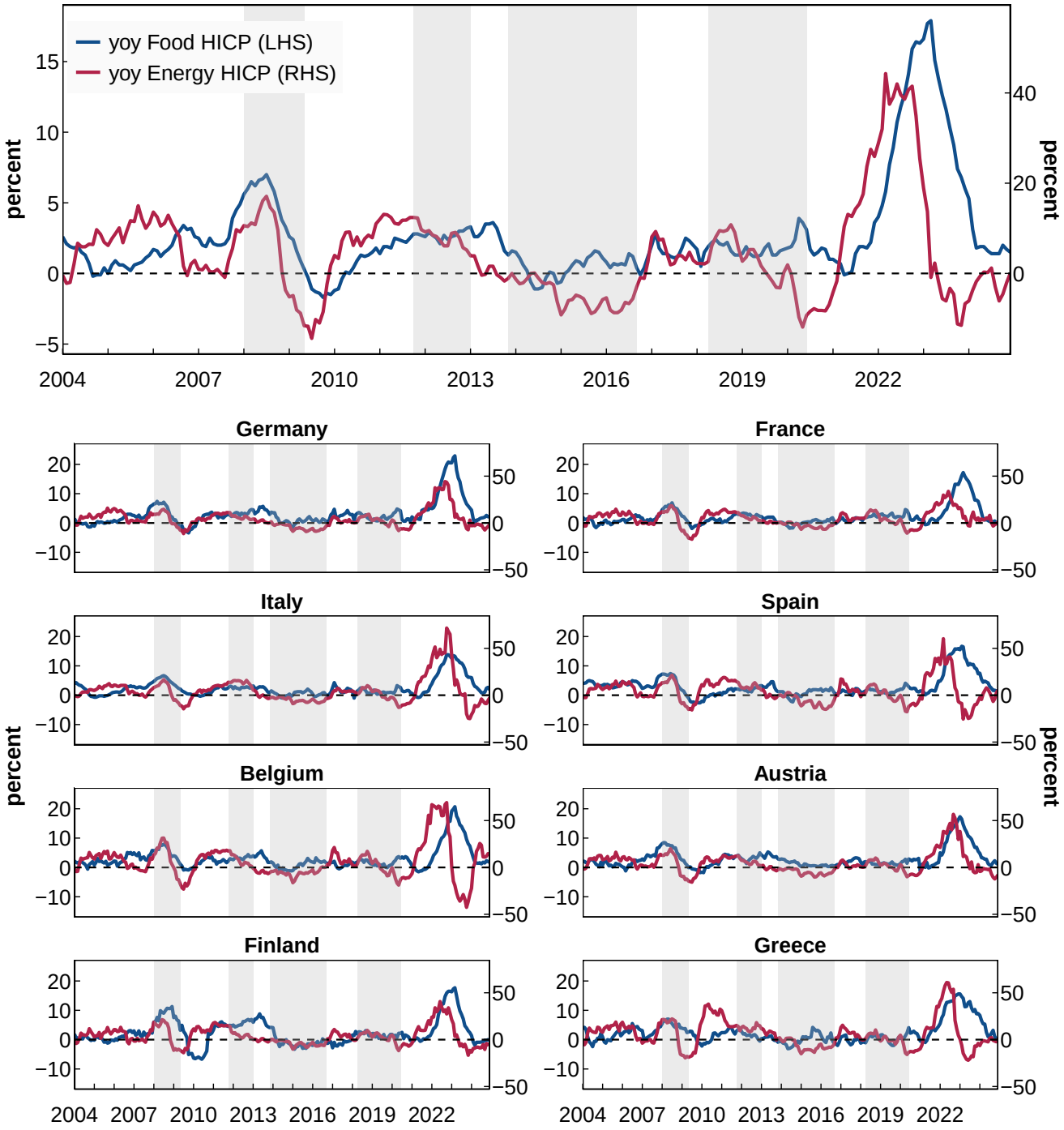
C Appendix: The influence of specific prices

Figure C1: Headline and core inflation rates



Notes: This figure shows the Harmonized Index of Consumer Prices (HICP) (headline and core) for the euro area from January 2004 to December 2024, and the country-specific HICPs for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece, from January 2004 to December 2024. The frequency is monthly. Shaded areas represent the Organisation for Economic Co-operation and Development (OECD) recessions. Source: Eurostat.

Figure C2: Energy and food inflation rates



Notes: This figure shows the Harmonized Index of Consumer Prices (HICP) for food and energy items for the euro area from January 2004 to December 2024, and the country-specific HICPs for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece, from January 2004 to December 2024. The frequency is monthly. Source: Eurostat.

Table C1: Comparative predictive power of inflation measures - Core inflation

	Germany	France	Italy	Spain	Belgium	Austria	Finland	Greece
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: $\Delta\mathbb{P}_t\pi_{c,t-12,t}$								
Intercept	-0.08	0.07	0.40	-0.71	-0.33 **	-0.24 *	-0.15	-0.79
	(0.08)	(0.16)	(0.30)	(0.55)	(0.16)	(0.14)	(0.10)	(0.71)
$\Delta\pi^{Core}_{c,t-13,t-1}$	0.06	0.52 *	0.25	0.88 **	0.04	0.45 **	0.28 **	0.07
	(0.15)	(0.30)	(0.31)	(0.34)	(0.11)	(0.19)	(0.12)	(0.24)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.059	0.100	0.073	0.103	0.067	0.076	0.075	0.057
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.22	-0.19	0.25	-0.09	-0.11	-0.20	-0.20 *	-0.46
	(0.14)	(0.19)	(0.25)	(0.32)	(0.12)	(0.16)	(0.12)	(0.76)
$\Delta\pi^{Core}_{c,t-13,t-1}$	0.03	0.76 *	-0.11	0.77 **	0.17	0.13	0.22 *	0.32
	(0.07)	(0.39)	(0.22)	(0.32)	(0.15)	(0.17)	(0.12)	(0.25)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.076	0.060	0.059	0.075	0.084	0.077	0.070	0.039
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.07	-0.04	-0.17	-0.19	-0.26
	(0.14)	(0.19)	(0.24)	(0.26)	(0.13)	(0.15)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.32 ***	0.38 ***	0.08	0.21 ***	0.22 ***	0.14 ***	0.08	0.28 ***
	(0.08)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.230	0.136	0.070	0.129	0.127	0.118	0.056	0.102
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.05	-0.04	-0.17	-0.20	-0.25
	(0.14)	(0.18)	(0.24)	(0.26)	(0.13)	(0.16)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.32 ***	0.36 ***	0.08	0.20 ***	0.22 ***	0.14 ***	0.05	0.28 ***
	(0.08)	(0.10)	(0.06)	(0.06)	(0.06)	(0.05)	(0.09)	(0.10)
$\Delta\pi^{Core}_{c,t-13,t-1}$	0.01	0.57	-0.13	0.60 **	0.16	0.07	0.21 *	0.30
	(0.06)	(0.38)	(0.23)	(0.28)	(0.15)	(0.17)	(0.12)	(0.25)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.230	0.159	0.072	0.146	0.135	0.119	0.073	0.106
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports regression results based on median consumers of the European Commission Consumer Survey (ECCS). Panels A and B report results of the change in ECCS inflation perceptions or expectations, respectively, on the change in the annualized rate of the country-specific Harmonized Index of Consumer Prices (HICP) core inflation in the previous month; Panel C - results of the change in ECCS inflation expectations on the change in ECCS inflation perceptions; and Panel D - results of the change in ECCS expectations on the changes in both ECCS inflation perceptions and the annualized rate of the country-specific HICP core inflation in the previous month. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The results are reported for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission and authors' calculations.

Table C2: Comparative predictive power of inflation measures - Food inflation

	Germany	France	Italy	Spain	Belgium	Austria	Finland	Greece
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: $\Delta\mathbb{P}_t\pi_{c,t-12,t}$								
Intercept	-0.09	0.06	0.40	-0.69	-0.34 **	-0.23 *	-0.14	-0.78
	(0.08)	(0.17)	(0.29)	(0.56)	(0.15)	(0.13)	(0.09)	(0.70)
$\Delta\pi^{Food}_{c,t-13,t-1}$	0.11 **	0.16 **	0.51 ***	0.32 **	0.12 *	0.14 **	0.08 **	0.08
	(0.04)	(0.08)	(0.15)	(0.16)	(0.07)	(0.07)	(0.03)	(0.21)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.086	0.096	0.099	0.098	0.081	0.075	0.085	0.058
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.22	-0.20	0.25	-0.07	-0.11	-0.20	-0.20 *	-0.46
	(0.14)	(0.20)	(0.25)	(0.32)	(0.12)	(0.16)	(0.12)	(0.75)
$\Delta\pi^{Food}_{c,t-13,t-1}$	0.09 ***	0.11	0.06	0.08	0.11	0.03	0.04	0.14
	(0.03)	(0.08)	(0.18)	(0.11)	(0.08)	(0.04)	(0.02)	(0.19)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.107	0.027	0.059	0.049	0.090	0.075	0.061	0.038
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.07	-0.04	-0.17	-0.19	-0.26
	(0.14)	(0.19)	(0.24)	(0.26)	(0.13)	(0.15)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.32 ***	0.38 ***	0.08	0.21 ***	0.22 ***	0.14 ***	0.08	0.28 ***
	(0.08)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.230	0.136	0.070	0.129	0.127	0.118	0.056	0.102
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.07	-0.04	-0.17	-0.19	-0.25
	(0.14)	(0.19)	(0.24)	(0.26)	(0.13)	(0.16)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.30 ***	0.38 ***	0.08	0.21 ***	0.21 ***	0.14 ***	0.06	0.28 ***
	(0.07)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
$\Delta\pi^{Food}_{c,t-13,t-1}$	0.06 **	0.06	0.02	0.02	0.09	0.01	0.03	0.11
	(0.02)	(0.07)	(0.18)	(0.11)	(0.08)	(0.04)	(0.02)	(0.21)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.243	0.138	0.070	0.129	0.136	0.118	0.064	0.104
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports regression results based on median consumers of the European Commission Consumer Survey (ECCS). Panels A and B report results of the change in ECCS inflation perceptions or expectations, respectively, on the change in the annualized rate of the country-specific Harmonized Index of Consumer Prices (HICP) inflation for food in the previous month; Panel C - results of the change in ECCS inflation expectations on the change in ECCS inflation perceptions; and Panel D - results of the change in ECCS expectations on the changes in both ECCS inflation perceptions and the annualized rate of the country-specific HICP inflation for food in the previous month. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The results are reported for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission and authors' calculations.

Table C3: Comparative predictive power of inflation measures - Energy inflation

	Germany	France	Italy	Spain	Belgium	Austria	Finland	Greece
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: $\Delta\mathbb{P}_t\pi_{c,t-12,t}$								
Intercept	-0.07	0.07	0.41	-0.70	-0.33 **	-0.22	-0.14 *	-0.80
	(0.07)	(0.16)	(0.30)	(0.55)	(0.15)	(0.14)	(0.08)	(0.68)
$\Delta\pi^{Energy}_{c,t-13,t-1}$	0.04	0.03 *	0.02	0.05 **	0.01	0.00	0.03 **	0.04
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)	(0.03)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.084	0.089	0.074	0.095	0.074	0.053	0.087	0.062
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20 *	-0.20	0.24	-0.07	-0.10	-0.19	-0.20 *	-0.49
	(0.11)	(0.20)	(0.25)	(0.31)	(0.11)	(0.14)	(0.11)	(0.71)
$\Delta\pi^{Energy}_{c,t-13,t-1}$	0.05 ***	0.00	-0.03	0.04	0.03 ***	0.04 ***	0.03 **	0.08 ***
	(0.02)	(0.02)	(0.04)	(0.02)	(0.01)	(0.01)	(0.01)	(0.03)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.162	0.019	0.064	0.060	0.104	0.143	0.092	0.052
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel C: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.20	-0.22	0.22	0.07	-0.04	-0.17	-0.19	-0.26
	(0.14)	(0.19)	(0.24)	(0.26)	(0.13)	(0.15)	(0.12)	(0.60)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.32 ***	0.38 ***	0.08	0.21 ***	0.22 ***	0.14 ***	0.08	0.28 ***
	(0.08)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.230	0.136	0.070	0.129	0.127	0.118	0.056	0.102
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel D: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$								
Intercept	-0.18	-0.22	0.21	0.07	-0.03	-0.15	-0.19 *	-0.27
	(0.11)	(0.19)	(0.24)	(0.25)	(0.12)	(0.14)	(0.11)	(0.57)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.29 ***	0.39 ***	0.08	0.20 ***	0.20 ***	0.14 ***	0.03	0.27 ***
	(0.05)	(0.11)	(0.06)	(0.07)	(0.06)	(0.05)	(0.10)	(0.10)
$\Delta\pi^{Energy}_{c,t-13,t-1}$	0.04 ***	-0.02	-0.03	0.03	0.02 ***	0.04 ***	0.03 **	0.07 **
	(0.01)	(0.02)	(0.04)	(0.03)	(0.01)	(0.01)	(0.01)	(0.03)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.283	0.139	0.078	0.136	0.149	0.188	0.093	0.114
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports regression results based on median consumers of the European Commission Consumer Survey (ECCS). Panels A and B report results of the change in ECCS inflation perceptions or expectations, respectively, on the change in the annualized rate of the country-specific Harmonized Index of Consumer Prices (HICP) inflation for energy in the previous month; Panel C - results of the change in ECCS inflation expectations on the change in ECCS inflation perceptions; and Panel D - results of the change in ECCS expectations on the changes in both ECCS inflation perceptions and the annualized rate of the country-specific HICP inflation for energy in the previous month. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The results are reported for Germany, France, Italy, Spain, Belgium, Austria, Finland, and Greece. The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission and authors' calculations.

Table C4: Summary of regression results

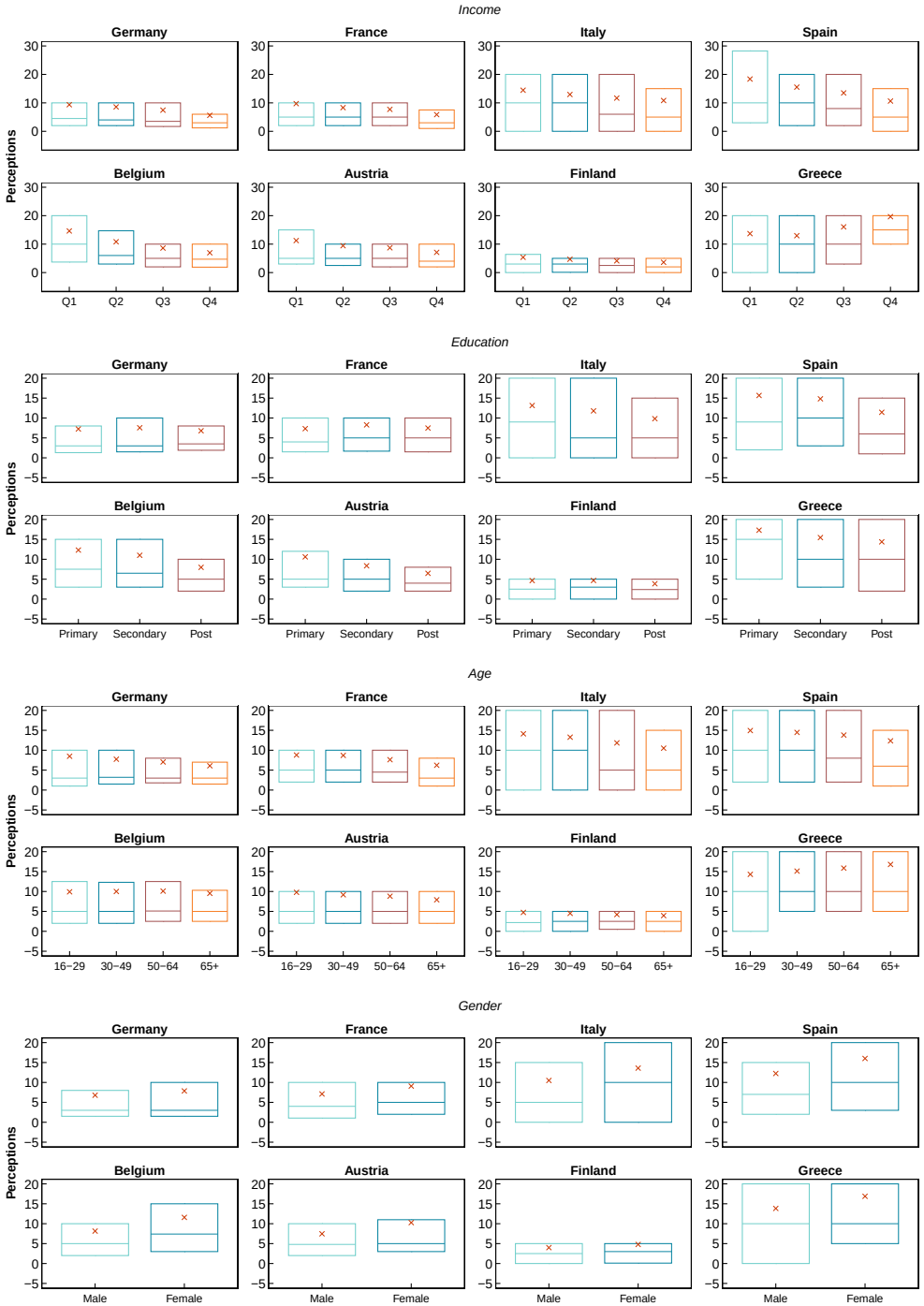
Inflation items:	**Headline**			**Core**			**Food**			**Energy**		
Panels:	**A**	**B**	**D**	**A**	**B**	**D**	**A**	**B**	**D**	**A**	**B**	**D**
Germany		**	*** **			***	**	***	*** **		***	*** ***
France	**		***	*	*	***	**		***	*		***
Italy							***					
Spain	**	**	***	**	**	*** **	**		***	**		***
Belgium		***	*** ***			***	*		***		***	*** ***
Austria		***	*** ***	**		***	**		***		***	*** ***
Finland	***	***	**	**	*	*	**			**	**	**
Greece		**	*** **			***			***		***	*** **

Note: This table provides a summary of the results obtained from panels A, B and D of Tables 4, C1, C2 and C3. Panel A summarizes the results of the changes in perceived inflation on the changes in realized inflation; Panel B, the changes in expected inflation on the changes in realized inflation; and Panel D, the changes in expected inflation on both the changes in perceived and realized inflation (in dark and blue colors, respectively). The number of stars refers to the statistical significance of the coefficients such as: * p< .1; ** p< .05; *** p< .01. In panels D, the size of the stars show which coefficients is the largest between the two.

Source: European Commission, Eurostat, authors estimates.

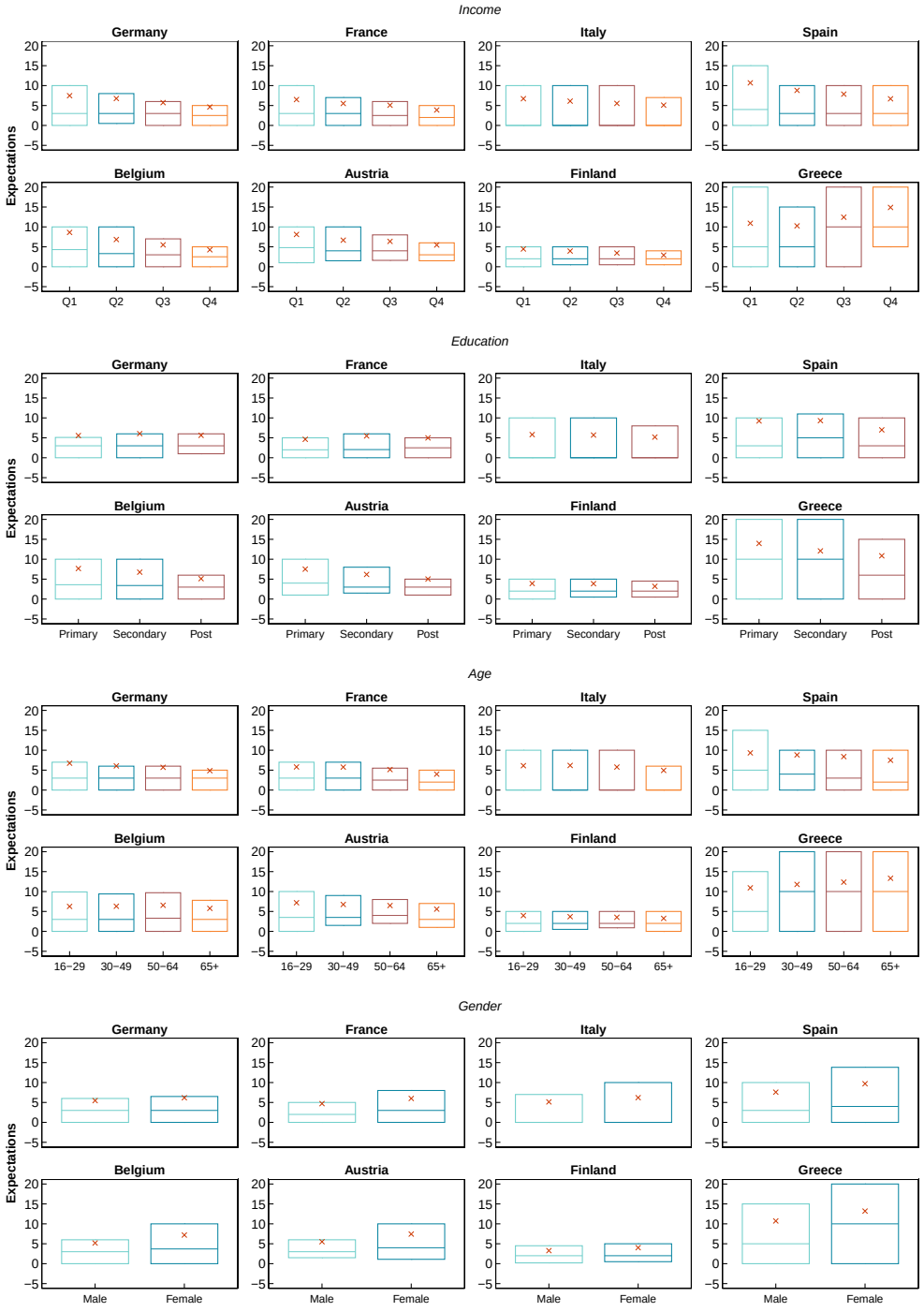
D Appendix: Quartiles analysis

Figure D1: Inflation perceptions: box plot



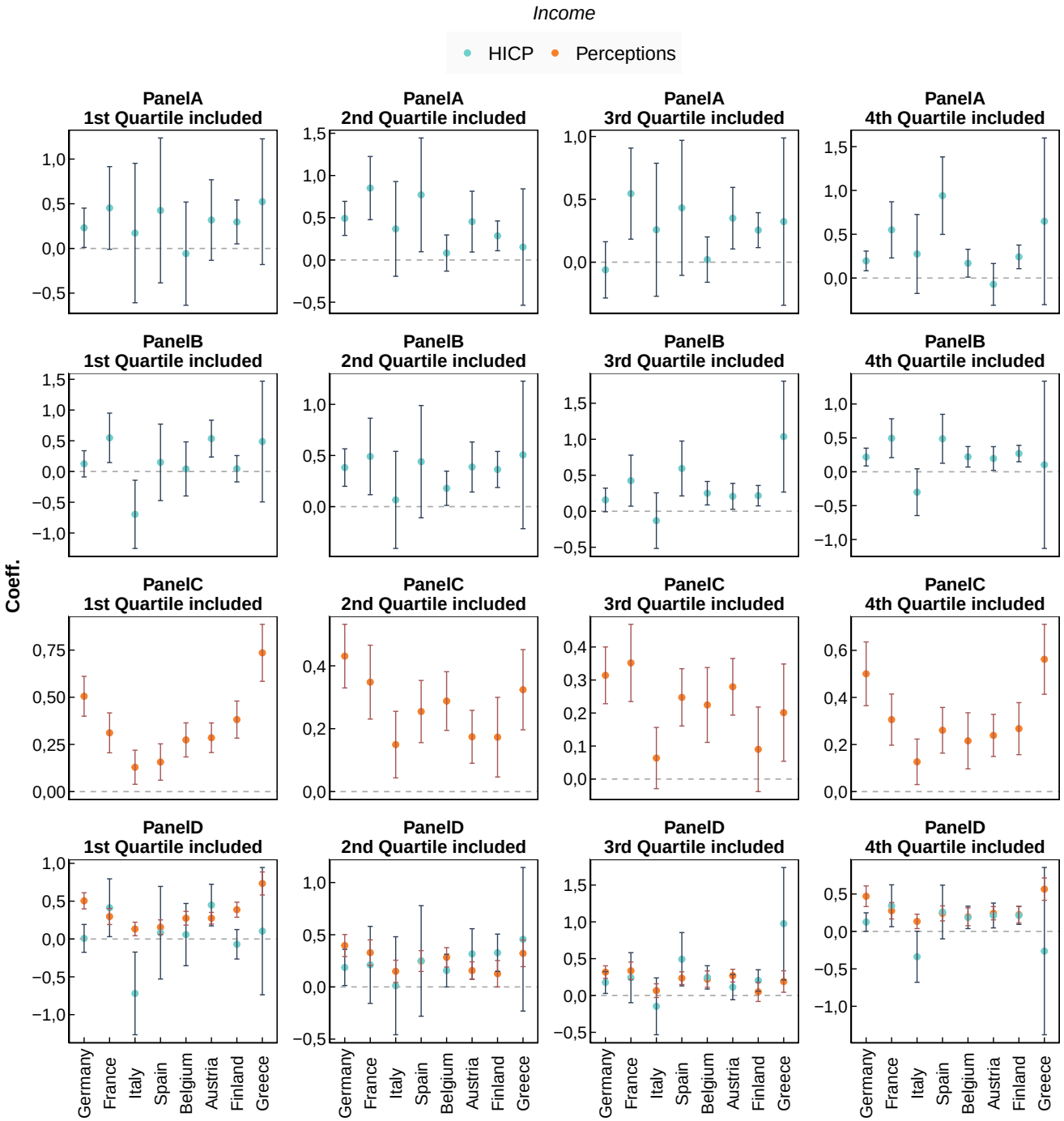
Note: The figure shows the box plot of consumers inflation perceptions by cohorts and countries. The rectangle represents the interquartile range (P25 for the lower bar and P75 for the upper bar), the middle bar is the median and the red cross corresponds to the mean. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, and authors' calculations.

Figure D2: Inflation expectations: box plot



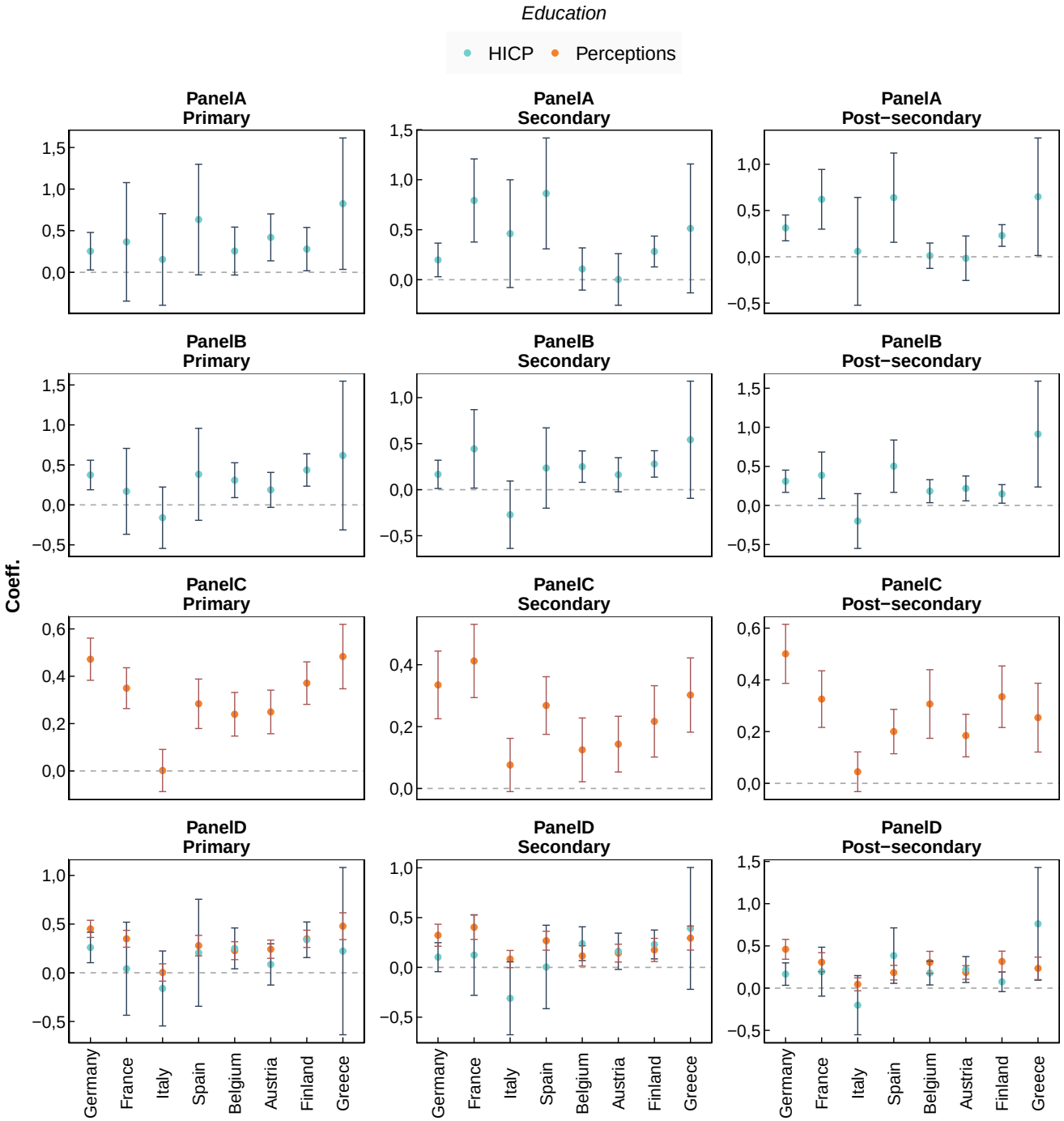
Note: The figure shows the box plot of consumers inflation expectations by cohorts and countries. The rectangle represents the interquartile range (P25 for the lower bar and P75 for the upper bar), the middle bar is the median and the red cross corresponds to the mean. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, and authors' calculations.

Figure D3: Backward-looking component of the ECCS inflation perceptions and expectations, median consumer, income



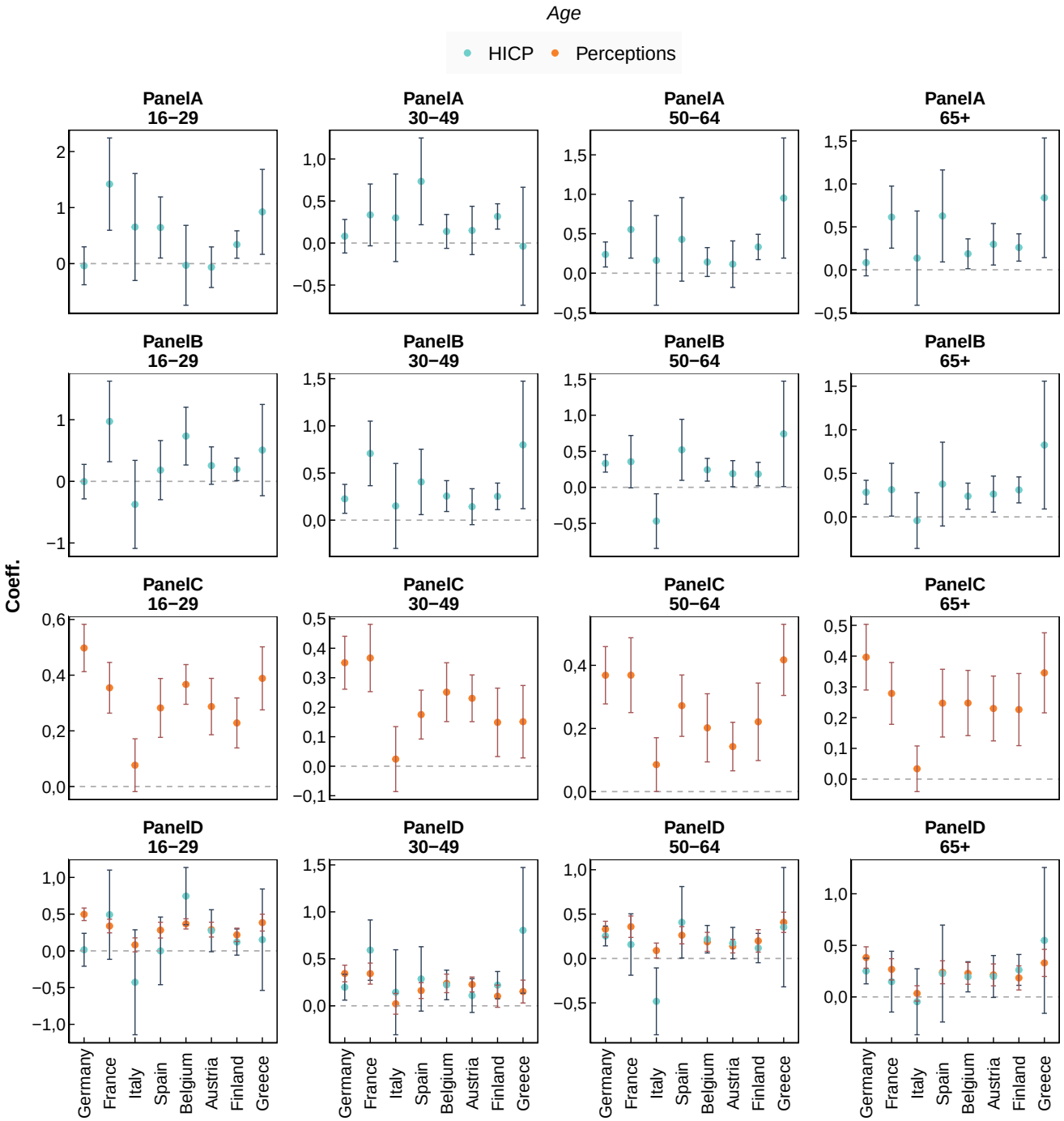
Note: This figure shows regression results of Eqs. (2)-(5) estimated by income cohorts and countries using the European Commission Consumer Survey (ECCS) filtered data set based on median consumers. The four income cohorts are: first quartile included (assuming lowest income), second quartile included, third quartile included and fourth quartile included (assuming highest income). Panel A corresponds to the results of the changes in inflation perceptions on the changes in realized inflation in the previous month; Panel B the changes in inflation expectations on the changes in realized inflation in the previous month; Panel C the changes in inflation expectations on the changes in inflation perceptions; and Panel D the changes of inflation expectations on both the changes in inflation perceptions and the changes in realized inflation in the previous month. Realized inflation is the country-specific Harmonized Index of Consumer Prices (HICP) for all items. The vertical bars correspond to the 95 percent confidence interval. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat and authors' calculations.

Figure D4: Backward-looking component of the ECCS inflation perceptions and expectations, median consumer, education



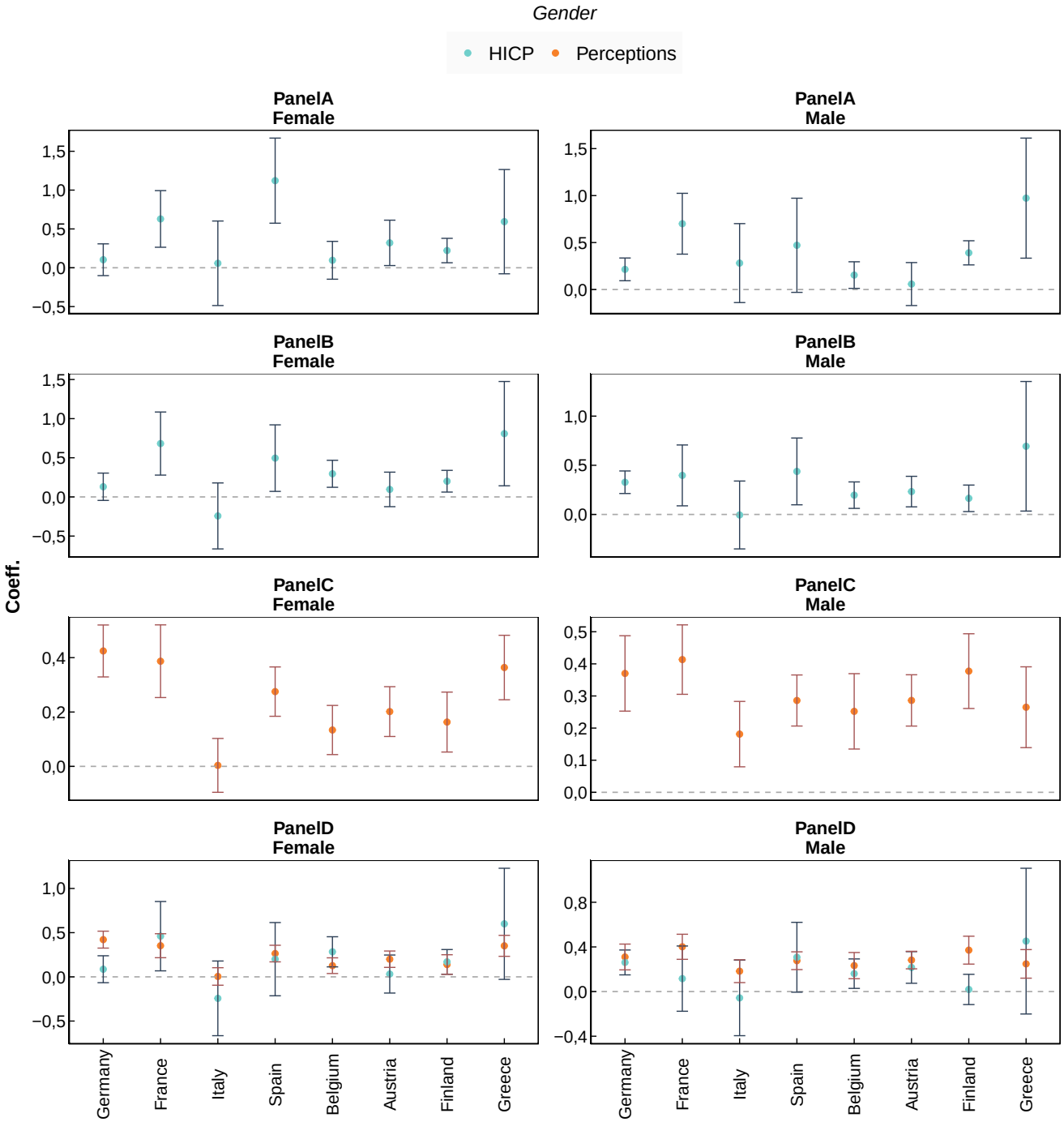
Note: This figure shows regression results from Eqs. (2)-(5) estimated by education cohorts and countries using the European Commission Consumer Survey (ECCS) filtered data set based on median consumers. The three education cohorts are: primary, secondary and post-secondary. Panel A corresponds to the results of the changes in inflation perceptions on the changes in realized inflation in the previous month; Panel B the changes in inflation expectations on the changes in realized inflation in the previous month; Panel C the changes in inflation expectations on the changes in inflation perceptions; and Panel D the changes of inflation expectations on both the changes in inflation perceptions and the changes in realized inflation in the previous month. Realized inflation is the country-specific Harmonized Index of Consumer Prices (HICP) for all items. The vertical bars correspond to the 95 percent confidence interval. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat and authors' calculations.

Figure D5: Backward-looking component of the ECCS inflation perceptions and expectations, median consumer, age



Note: This figure shows regression results from Eqs. (2)-(5) estimated by age cohorts and countries using the European Commission Consumer Survey (ECCS) filtered data set based on median consumers. The four age cohorts are: 16-29y, 30-49y, 50-64y and more than 65y. Panel A corresponds to the results of the changes in inflation perceptions on the changes in realized inflation in the previous month; Panel B the changes in inflation expectations on the changes in realized inflation in the previous month; Panel C the changes in inflation expectations on the changes in inflation perceptions; and Panel D the changes of inflation expectations on both the changes in inflation perceptions and the changes in realized inflation in the previous month. Realized inflation is the country-specific Harmonized Index of Consumer Prices (HICP) for all items. The vertical bars correspond to the 95 percent confidence interval. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat and authors' calculations.

Figure D6: Backward-looking component of the ECCS inflation perceptions and expectations, median consumer, gender



Note: This figure shows regression results from Eqs. (2)-(5) estimated by gender cohorts and countries using the European Commission Consumer Survey (ECCS) filtered data set based on median consumers. The two gender cohorts are: male and female. Panel A corresponds to the results of the changes in inflation perceptions on the changes in realized inflation in the previous month; Panel B the changes in inflation expectations on the changes in realized inflation in the previous month; Panel C the changes in inflation expectations on the changes in inflation perceptions; and Panel D the changes of inflation expectations on both the changes in inflation perceptions and the changes in realized inflation in the previous month. Realized inflation is the country-specific Harmonized Index of Consumer Prices (HICP) for all items. The vertical bars correspond to the 95 percent confidence interval. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat and authors' calculations.

E Appendix: Events analysis

Table E1: The effect of macro events on consumer perceptions

	Dependent variable: $\Delta\mathbb{P}_t\pi_{c,t-12,t}$							
	Germany	**France**	**Italy**	**Spain**	**Belgium**	**Austria**	**Finland**	**Greece**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.15	0.03	0.15	-0.84	-0.34 **	-0.25 **	-0.18 **	-0.86
	(0.11)	(0.21)	(0.33)	(0.60)	(0.15)	(0.12)	(0.09)	(0.69)
$\Delta\pi_{c,t-13,t-1}$	-0.09	0.47	-0.41	-0.17	0.07	-0.29	0.28 *	0.33
	(0.12)	(0.29)	(0.33)	(0.40)	(0.15)	(0.25)	(0.16)	(0.48)
Subprime	-0.14	-0.02	0.07	-0.23	-0.22	0.00	-0.08	0.17
	(0.17)	(0.24)	(0.49)	(0.48)	(0.21)	(0.19)	(0.13)	(0.46)
ELB	0.13 **	0.11	0.36	0.24	0.02	0.08	0.06	0.24
	(0.05)	(0.11)	(0.26)	(0.22)	(0.09)	(0.09)	(0.06)	(0.28)
Covid	-0.12	-0.16	-0.29	0.05	0.14	-0.10	-0.04	-0.08
	(0.15)	(0.27)	(0.47)	(0.29)	(0.29)	(0.10)	(0.03)	(0.28)
Ukrainian conflict	0.01	0.12	1.14 ***	0.31	0.35	0.80 **	0.41	1.35 *
	(0.16)	(0.21)	(0.38)	(0.48)	(0.27)	(0.40)	(0.37)	(0.79)
Sovereign debt	0.16 ***	0.08	0.50	0.33	0.05	0.05	0.11	0.21
	(0.05)	(0.12)	(0.35)	(0.27)	(0.12)	(0.12)	(0.07)	(0.22)
$\Delta\pi_{c,t-13,t-1}$ x Subprime	-0.34	-0.34	2.23 *	1.30 **	0.31	1.24 **	-0.03	1.70
	(0.84)	(0.39)	(1.26)	(0.58)	(0.32)	(0.59)	(0.18)	(1.09)
$\Delta\pi_{c,t-13,t-1}$ x ELB	0.28 **	0.32	0.89 **	0.63	0.00	0.57 **	-0.01	-0.27
	(0.13)	(0.45)	(0.40)	(0.48)	(0.16)	(0.26)	(0.21)	(0.69)
$\Delta\pi_{c,t-13,t-1}$ x COVID	-0.95 **	-1.35 **	-0.75	-1.39 *	-0.32	-0.27	-0.26	-0.33
	(0.47)	(0.55)	(0.58)	(0.76)	(0.20)	(0.30)	(0.18)	(0.83)
$\Delta\pi_{c,t-13,t-1}$ x Ukrainian conflict	1.03 ***	-0.29	0.12	0.42	0.23	-0.29	0.00	-0.39
	(0.22)	(0.40)	(0.43)	(0.48)	(0.26)	(0.42)	(0.59)	(0.84)
$\Delta\pi_{c,t-13,t-1}$ x Sovereign debt	0.08	0.03	0.99	1.03 *	0.79 **	0.91 **	-0.26	0.27
	(0.20)	(0.49)	(0.61)	(0.53)	(0.39)	(0.41)	(0.18)	(0.63)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.226	0.135	0.130	0.134	0.126	0.131	0.173	0.079
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports the results of the change in the European Commission Consumer Survey (ECCS) median consumer's inflation perceptions on the change in the annualized rate of the country-specific Harmonized Index of Consumer Prices (HICP) inflation in the previous month and the interactions with dummy variables of macroeconomic periods. The macroeconomic periods are the Subprime crisis defined between January 2008 and December 2009, the sovereign debt crisis – between January 2010 and December 2012, the Effective Lower Bound (ELB) – between July 2012 to August 2022, the COVID-19 – between January and December 2020 and the Ukrainian conflict – between March 2022 and December 2022. Each dummy variable is equal to 1 during the relevant aforementioned period and zero otherwise. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The sample period is from January 2004 to December 2024. The frequency is monthly.
Source: European Commission, Eurostat, and authors' calculations.

Table E2: The effect of macro events on consumer expectations

	Dependent variable: $\Delta\mathbb{E}_t\pi_{c,t,t+12}$							
	Germany	**France**	**Italy**	**Spain**	**Belgium**	**Austria**	**Finland**	**Greece**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-0.17	-0.25	0.18	0.08	-0.10	-0.18	-0.22	0.04
	(0.14)	(0.19)	(0.24)	(0.24)	(0.14)	(0.17)	(0.16)	(0.57)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$	0.27 **	0.16 *	0.01	0.06	0.26 ***	0.06	-0.07	0.31 **
	(0.13)	(0.08)	(0.03)	(0.05)	(0.07)	(0.04)	(0.18)	(0.12)
$\Delta\pi_{c,t-13,t-1}$	0.18	0.08	-0.15	0.97 ***	0.21 **	0.27 **	0.07	0.47
	(0.16)	(0.26)	(0.29)	(0.25)	(0.10)	(0.13)	(0.12)	(0.44)
Subprime	-0.09	-0.09	-0.23	-0.11	-0.15	-0.06	-0.01	-0.25
	(0.09)	(0.18)	(0.25)	(0.36)	(0.17)	(0.09)	(0.15)	(0.56)
ELB	0.03	0.06	0.04	0.08	0.00	0.03	0.06	0.06
	(0.05)	(0.11)	(0.14)	(0.17)	(0.09)	(0.06)	(0.07)	(0.32)
Covid	-0.05	-0.02	-0.12	-0.23	0.08	0.08	0.01	-0.19
	(0.14)	(0.15)	(0.11)	(0.19)	(0.24)	(0.17)	(0.03)	(0.34)
Ukrainian conflict	0.33	0.80	1.26	-0.35	-0.08	-0.38	0.65 ***	1.04
	(0.40)	(0.54)	(0.77)	(0.85)	(0.34)	(0.43)	(0.20)	(1.26)
Sovereign debt	0.08	0.13	-0.06	0.02	0.09	0.06	0.08	0.01
	(0.05)	(0.12)	(0.18)	(0.22)	(0.13)	(0.08)	(0.06)	(0.48)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$ x Subprime	-0.06	-0.05	-0.08	0.18 *	-0.22 *	0.24	-0.24	0.26
	(0.14)	(0.14)	(0.11)	(0.10)	(0.13)	(0.15)	(0.26)	(0.33)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$ x ELB	0.37 *	0.50 ***	0.24 **	0.11	-0.07	0.09	0.55 **	-0.06
	(0.20)	(0.17)	(0.12)	(0.09)	(0.17)	(0.09)	(0.22)	(0.19)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$ x COVID	-0.37	-0.46 **	-0.27 *	0.12	-0.22	1.01 ***	-0.37 *	
	(0.28)	(0.20)	(0.15)	(0.12)	(0.24)	(0.24)	(0.21)	
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$ x Ukrainian conflict	0.07	-0.34	-0.87 *	2.04 ***	0.35	0.33	-0.99 ***	-0.37 **
	(0.37)	(0.49)	(0.47)	(0.34)	(0.96)	(0.31)	(0.17)	(0.15)
$\Delta\mathbb{P}_t\pi_{c,t-12,t}$ x Sovereign debt	0.04	0.33	0.37 **	0.45 ***	-0.26 *	-0.01	0.17	-0.46 ***
	(0.24)	(0.25)	(0.18)	(0.15)	(0.15)	(0.09)	(0.24)	(0.14)
$\Delta\pi_{c,t-13,t-1}$ x Subprime	0.20	-0.10	0.70	-0.21	0.23	-0.31	0.40	0.32
	(0.30)	(0.38)	(0.83)	(0.73)	(0.33)	(0.19)	(0.31)	(1.94)
$\Delta\pi_{c,t-13,t-1}$ x ELB	-0.09	0.06	0.83	-0.94 ***	-0.06	-0.17	0.17	-0.42
	(0.16)	(0.45)	(0.51)	(0.32)	(0.19)	(0.20)	(0.19)	(0.60)
$\Delta\pi_{c,t-13,t-1}$ x COVID	-0.39	0.27	-0.55	0.24	-0.13	-0.25	-0.14	-0.58
	(0.47)	(0.90)	(0.35)	(0.57)	(0.19)	(0.36)	(0.17)	(0.73)
$\Delta\pi_{c,t-13,t-1}$ x Ukrainian conflict	-0.45	-0.87	-1.61 **	-1.38 **	-0.31	0.61	0.37	0.12
	(0.51)	(1.16)	(0.80)	(0.61)	(1.32)	(0.61)	(0.32)	(0.49)
$\Delta\pi_{c,t-13,t-1}$ x Sovereign debt	-0.04	0.43	0.03	-1.10 **	0.60 *	-0.12	-0.23	0.93
	(0.23)	(0.73)	(0.37)	(0.55)	(0.31)	(0.32)	(0.17)	(0.70)
Num.Obs.	245	243	249	246	251	251	251	249
R2	0.325	0.213	0.265	0.369	0.195	0.235	0.276	0.154
FE Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports the results of the change in the European Commission Consumer Survey (ECCS) median consumer's inflation expectations on the changes in both ECCS inflation perceptions and the annualized rate of the country-specific HICP inflation in the previous month, and the interactions with dummy variables of macroeconomic periods. The macroeconomic periods are: the Subprime crisis is defined between January 2008 and December 2009, the sovereign debt crisis – between January 2010 and December 2012, the Effective Lower Bound (ELB) – between July 2012 to August 2022, the COVID-19 – between January and December 2020 and the onset of the Russian invasion of Ukraine – between March 2022 and December 2022. Each dummy variable is equal to 1 during the relevant aforementioned period. The standard errors are reported in parentheses below the coefficients and are Heteroscedasticity and Autocorrelation Consistent (HAC, Andrews). * p< .1; ** p< .05; *** p< .01. The sample period is from January 2004 to December 2024. The frequency is monthly.

Source: European Commission, Eurostat, and authors' calculations.