Personal Inflation Rates in the Euro Area*

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Abstract

Using ECB Consumer Expectations Survey microdata, we construct household-level inflation measures for the euro area. Four findings emerge. (1) Personal inflation varies systematically across households, countries, and over time, with disparities widening markedly during the 2022–23 inflation surge. (2) Greater dispersion in personal inflation is closely associated with stronger disagreement in both perceived and expected inflation. (3) A one-percentage-point increase in personal inflation raises one-year-ahead inflation expectations by up to 0.2 percentage points. (4) Personal inflation affects consumption primarily through inflation expectations channel.

Keywords: Personal inflation rate, Inflation heterogeneity, Expectations, Consumption, Consumer Expectations Survey.

JEL: D30, D84, E31, E52.

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1 Introduction

Inflation affects households differently depending on their consumption patterns or portfolio choices (Pallotti et al. (2024), D'Acunto et al. (2021), among others). While headline inflation measures provide a useful aggregate perspective, they often mask substantial variation in individual inflation realizations (Kaplan and Schulhofer-Wohl, 2017). Understanding these personal inflation rates, i.e. the inflation households actually face based on their unique expenditure compositions, is therefore crucial for explaining their impact on both perceived and expected inflation in the euro area.

Analyzing how household inflation expectations respond to specific consumption components requires highly granular data. Ideally, individual inflation expectations, perceptions, and personally realized inflation rates would be sourced from the same household. D'Acunto et al. (2021) analyze this link using a subset of the consumption basket using the Kilts Nielsen Consumer Panel (KNCP), which captures U.S. households' non-durable goods expenditures, covering roughly 25% of the total consumption basket. Matched data on realized inflation on the one hand and perceived and expected inflation rates on the other are used inter alia by Anesti et al. (2024) for the UK, or Coibion and Gorodnichenko (2015) and Weber et al. (2023) for the US.

We exploit detailed, non-public data from the ECB Consumer Expectations Survey (CES), which records households' inflation perceptions, expectations, and self-reported spending expenditures across major consumption categories — covering approximately 85% of the HICP basket. By matching implied spending shares with official category-level inflation rates, we construct personal inflation rates for each household and link these to their inflation perceptions and expectations. Our approach abstracts from households potentially purchasing a different mix

of goods within broad categories as well as paying different prices for identical goods. Kaplan and Schulhofer-Wohl (2017) show using the KNCP sample that these dimensions can be the main drivers of varying inflation at the household level. Our approach is an essential first step towards understanding the impact of differences in consumption bundles on personal inflation rates consistently across countries and households in the euro area. Also, because the KNCP focuses only on goods sold in retail outlets which makes roughly a quarter of household consumption, we are able to measure the impact of heterogeneity in consumption of other goods and services, covering additionally 60% of the consumption basket. Furthermore, our sample spans April 2020 to October 2024, allowing us to analyze personal inflation dynamics across low-inflation, high-inflation surge, disinflation, and sticky-inflation regimes. Finally, our consumption data are quarterly allowing us to study consumption patterns at a higher frequency than the Household Budget Survey (HBS) consumption data collected only five years and used to determine official weights for the calculation of the HICP.

We document four main findings. First, we find that heterogeneity in realized inflation across households is economically sizeable, particularly during the recent inflation surge (July 2021 – October 2022): The lowest income group faced inflation rates approximately one percentage point higher than those of the highest income group. More substantial heterogeneity arises across countries and over time.

Second, higher personal inflation transmits to higher perceived and expected inflation at the household level. A one percentage point (pp) increase in realized inflation is associated with an increase of 0.35 pp and 0.22 pp in inflation perceptions and one-year-ahead inflation expectations, respectively. When controlling for time fixed effects—which capture common temporal variation, including headline inflation—the coefficients remain statistically significant, though smaller in magnitude. This suggests that personal inflation rates continue to influence sub-

sequent inflation perceptions and expectations, even after accounting for aggregate trends. We further find that personal inflation is significantly associated also with broader macroeconomic expectations, including expectations about interest rates, economic growth, unemployment, and individual income.

Third, we document that the rise in disagreement about perceived and expected inflation during the surge period — measured by an increase in cross-sectional standard deviations — is strongly associated with the increased dispersion in personal inflation rates. These findings suggest that variation in personal inflation rates significantly contributes to the heterogeneity of inflation beliefs. Notably, during the disinflation phase, variation in personal inflation remains a key driver of disagreement in inflation expectations.

Fourth, we show that personal inflation rates matter for economic decisions and cross-households inequality. We find that households facing higher personal inflation expect lower consumption growth as expected by the standard Euler-equation rationale, with this response driven mainly by inflation expectations beyond the realised price level. Moreover, we observe that consumption inequality is underestimated when using aggregate headline HICP to deflate expenditures. Deflating consumption by household-specific inflation rates reveals a widening of consumption inequality, even though these rates likely represent a lower bound because we cannot capture every possible variation in personal inflation. Decomposing the drivers of this effect, we find that higher prices in essential categories, especially food and utilities, outweigh the mitigating effect of reduced spending shares in these areas. As a result, low-income and older households faced systematically higher realized inflation.

Our paper makes three key contributions to the literature on inflation inequality and heterogeneous inflation effects. First, the heterogeneous impact of inflation on households has been studied in detail for instance in Pallotti et al.

(2024), or recently Kukk et al. (2025). While Kukk et al. (2025) show that group-specific inflation rates raise contemporaneous consumption and argue that this operates through inflation expectations, we are able to test this channel directly by matching realised and expected inflation at the household level. Our results reveal that roughly 85 % of the total effect of personal inflation on expected spending growth operates through the inflation expectations channel. Notably, this channel is nearly two orders of magnitude stronger than the direct effect of realized personal inflation, underscoring the dominant role of households' subjective outlook over their actual price experiences in shaping consumption behavior.

Second, we provide novel evidence that dispersion in personal inflation is a key driver of the dispersion in inflation perceptions and expectations, highlighting the informational role of individual inflation realizations. Our work is therefore complementary to papers studying the inflation expectations formation process, particularly the role of personal experiences such as Kaplan and Schulhofer-Wohl (2017), D'Acunto et al. (2021), or Malmendier and Nagel (2016). Third, our findings inform policy makers about the importance of acknowledging heterogeneous inflation burdens and targeted communication strategies to manage inflation expectations effectively (De Fiore et al., 2022; D'Acunto et al., 2024; Olivi et al., 2024).

The remainder of the paper is organized as follows. Section 2 introduces the dataset and explains how we construct household-level inflation rates. Section 3 presents our findings on the heterogeneity of realized inflation rates across households in the euro area, both in the cross section and over time. Section 4 concludes by discussing the implications of our findings for monetary policy.

2 Data and measuring realized inflation

The ECB Consumer Expectations Survey (CES) has been conducted online monthly by the ECB since April 2020, providing high-frequency data on euro area consumers' economic perceptions, expectations, and financial decisions. The survey follows an unbalanced panel structure and initially covered the six largest euro area economies: Belgium, Germany, Spain, France, Italy, and the Netherlands. In April 2022, the sample expanded to include Ireland, Greece, Austria, Portugal, and Finland. For further details, see Bańkowska et al. (2021) and Georgarakos and Kenny (2022).

At the beginning of each quarter, the CES includes a question on household spending over the past month. For this reason this paper primarily uses quarterly data from the six original countries, spanning April 2020 to October 2024. Note that this question is not part of the regular CES micro data made available for public use every quarter.

2.1 Key survey questions

The main survey questions of interest are eliciting households' spending levels, their inflation perceptions over past 12 months and their expectations of inflation for the next 12 months. Their formulations are as follows:.

- **Spending levels**: During *last month*, how much did your household spend on the goods and services listed [in Table A1]?
- **Inflation perceptions**: How much higher (lower) do you think prices in general are now compared with 12 months ago in the country you currently live in? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place. ...%

- **Inflation expectations**: How much higher (lower) do you think prices in general will be 12 months from now in the country you currently live in? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place. ...%[1]

The CES spending categories listed in Appendix Table A1 do not directly correspond to the COICOP (Classification of Individual Consumption According to Purpose) categories used in the HICP (Harmonized Index of Consumer Prices) consumption basket. Instead, we map CES categories to COICOP classifications based on their descriptions. For spending categories that span multiple COICOP groups, we construct a unique index by computing a weighted average of the inflation rates of the corresponding COICOP categories, applying their respective HICP weights. The mapping of COICOP classes to CES categories is provided in Table A1, with Table A2 providing descriptions for COICOP classes.

2.2 Constructing personal inflation rates

We calculate the personal inflation rate of household i in period t, denoted by $\pi_{i,t}$, as a weighted average of categorical official HICP inflation rates, using spending shares obtained from the CES. Hence,

$$\pi_{i,t} = \sum_{c=1}^{N} w_{i,c,t}\, \pi_{c,t}, \tag{1}$$

where $w_{i,c,t}$ is the implied CES spending share of household i in period t and sector c, and $\pi_{c,t}$ is the official y-o-y HICP inflation rate in sector c and period t. While simple, this approach enables an intuitive and straightforward comparison of inflation rates at the household level as in Kukk et al. (2025). Jaravel (2021)

[1]The respondent will quantify the increase or decrease in line with the qualitative question. As this is an online survey, the system automatically displays a plus or minus sign before the percentage field based on their previous qualitative answer.

provides a primer on price indices with household heterogeneity.

It is important to note that HICP weights are derived from the Household Budget Survey, which is conducted every five years, with only minor annual adjustments reflecting composition changes in the representative consumption baskets. Therefore our approach allows us to construct personal inflation rates at a much higher frequency to better track consumption patterns over time.

Because the dispersion in personal inflation rates in this paper stems from differences in households' spending shares relative to the official HICP weights, we examine the direct relationship between HICP and CES spending weights for 2020–2024 in Appendix B. Figure A2 then illustrates the cross-country heterogeneity in CES spending shares. The largest spending categories across all countries are expenditures on groceries, housing, and utilities. Using only category-level price indices smooths within category variation, so our household inflation dispersion is a lower bound. Using scanner data, Jaravel (2021) and Ampudia et al. (2024) find that higher-income households can mitigate price rises by exploiting promotions and brand substitution, further widening true inequality.

To eliminate the influence of outliers, we exclude the upper and lower 2.5% of observations per country and survey round for total spending as well as inflation perceptions and expectations.

3 Results

3.1 Summary statistics

Table 1 presents distributional statistics for key variables, including expected inflation, perceived inflation, personally realized inflation at the household level over the past 12 months, and total nominal expenditures.

Table 1: Summary statistics

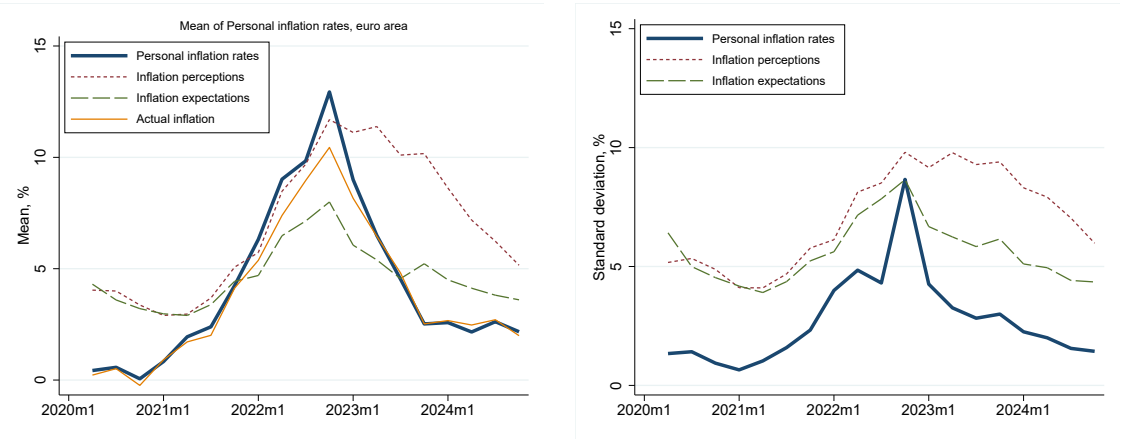
	Mean	Median	Std.Dev.	Min.	Max.	Obs.
Personal Inflation (pp)	4.53	3.30	4.91	-36.90	79.51	218,852
Perc. Inflation, point est. (pp)	6.98	5.00	7.64	-9.00	60.10	218,852
Exp. Inflation, point est. (pp)	4.71	3.00	5.83	-10.00	50.50	218,852
Actual inflation (pp)	4.09	3.20	3.34	-1.70	16.80	218,852
Nominal spending (EUR)	1691.34	1490.00	931.93	100.00	8100.00	218,852

Notes: This table presents summary statistics for selected variables from the Consumption Expectations Survey (CES) of the European Central Bank (ECB) for the six countries included since 2020. "pp" denotes variables measured in percentage points. "Obs" denotes the number of observations. The frequency is quarterly and the sample period is 2020:04 – 2024:10.

The left panel of Figure 1 illustrates the evolution of personally realized, perceived and expected inflation over time in relation to actual inflation at the euro area level. The time series evidence shows a strong positive relationship between realized, actual, and perceived inflation leading up to the peak in headline inflation. However, after inflation peaked, perceived inflation remained elevated, diverging from actual and realized inflation trends. It is also noteworthy that, using our methodology outlined above, the cross-sectional average of realized inflation rates exceeded the peak of actual inflation. The country-level Figure A4 in the appendix indicates that this gap is primarily driven by developments in Italy, Belgium, and the Netherlands. In other countries, average realized inflation rates closely follow actual inflation dynamics.

Disagreement among households: It is noteworthy how the cross-sectional variation in personal inflation rates changes over time as well as across countries. Remarkably, the right panel of Figure 1 illustrates that the fluctuations in disagreement regarding perceived and expected short-term inflation rates closely align with the dispersion of personal inflation rates at the eurozone level. Figure A7 in the appendix demonstrates that this strong comovement is observed across all countries, with particularly notable alignment in Germany, Italy, Belgium, and the

Figure 1: Realized, perceived, and expected inflation rates in the euro area



Notes: This figure presents time series evidence on the mean and standard deviation of realized, perceived, and expected inflation rates based on the Consumption Expectations Survey (CES) of the European Central Bank (ECB) for the six countries included since 2020.

Netherlands. Hence, the disagreement as observed at the eurozone level is not driven by cross-country differences in levels of personal inflation rates.

3.2 Heterogeneity in personal inflation rates

3.2.1 Differences across socio-demographic groups

Households in the euro area experience systematically different inflation dynamics depending on their socio-demographic characteristics. We find that variation in personal inflation rates—driven by differences in consumption bundles—is economically meaningful at the individual level, particularly during the inflation surge period. This finding complements the results of Kaplan and Schulhofer-Wohl (2017), who show that within-category price variation and differences in product choice often dominate the impact of differing expenditure shares. In contrast, we show that differences in consumption bundles play a key role in driving the heterogeneity of personal inflation rates across demographic groups during periods of surging inflation.

Table 2: Determinants of personal inflation rates

	(1) Whole sample 2020:04 - 2024:10	(2) Low inflation 2020:04 - 2021:05	(3) Inflation surge 2021:06 - 2022:10	(4) Disinflation 2022:11 - 2023:10	(5) Sticky inflation 2023:11 - 2024:10
Owner with mortgage	0.53***	-0.18***	1.42***	0.35***	-0.12***
	(0.022)	(0.012)	(0.049)	(0.038)	(0.015)
Owner without mortgage	0.68***	-0.17***	1.78***	0.55***	-0.14***
	(0.022)	(0.011)	(0.047)	(0.034)	(0.015)
Income Q2	0.040	0.015	-0.11*	0.097**	0.051**
	(0.030)	(0.015)	(0.064)	(0.048)	(0.021)
Income Q3	-0.076**	0.023	-0.45***	0.037	0.096***
	(0.030)	(0.015)	(0.064)	(0.049)	(0.021)
Income Q4	-0.15***	0.038**	-0.65***	0.11**	0.18***
	(0.031)	(0.015)	(0.065)	(0.051)	(0.022)
Income Q5	-0.24***	0.096***	-1.03***	0.12**	0.19***
	(0.032)	(0.016)	(0.069)	(0.055)	(0.023)
Age 35-49	0.10***	-0.025*	0.22***	0.083*	-0.018
	(0.027)	(0.014)	(0.060)	(0.048)	(0.018)
Age 50-70	0.19***	-0.031**	0.34***	0.18***	-0.012
	(0.029)	(0.015)	(0.064)	(0.049)	(0.019)
Age 71+	0.19***	-0.038*	0.34***	0.096	0.0053
	(0.040)	(0.021)	(0.087)	(0.065)	(0.025)
Middle education	-0.012	0.037**	-0.072	0.083*	-0.033*
	(0.030)	(0.015)	(0.065)	(0.049)	(0.020)
High education	-0.13***	0.042***	-0.33***	0.0066	0.020
	(0.027)	(0.014)	(0.059)	(0.046)	(0.018)
Financial literacy	-0.059***	0.025**	-0.22***	0.0032	-0.0065
	(0.018)	(0.010)	(0.040)	(0.030)	(0.012)
Female	-0.014	-0.016*	0.059	-0.13***	-0.053***
	(0.017)	(0.009)	(0.038)	(0.029)	(0.011)
HH size	0.10***	-0.0054	0.19***	0.15***	-0.032***
	(0.012)	(0.006)	(0.026)	(0.019)	(0.009)
Number of children	-0.10***	0.023***	-0.30***	-0.053*	0.081***
	(0.016)	(0.008)	(0.034)	(0.029)	(0.011)
With partner	-0.028	0.0063	-0.12**	0.092***	0.024
	(0.022)	(0.011)	(0.047)	(0.035)	(0.016)
Trust people	-0.000040	0.0013	-0.014*	0.0041	0.0092***
	(0.004)	(0.002)	(0.008)	(0.006)	(0.002)
R^2	0.560	0.353	0.500	0.479	0.494
N observations	234194	47505	76981	52148	57560
Other demos	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes

Notes: This table shows estimated coefficients from pool OLS regressions using quarterly data for the whole sample, from April 2020 to October 2024, for six original countries in the CES. Renters, lowest income quintile, and age 18–34 serve as reference groups. Robust standard errors clustered at the household level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 2 presents differences in realized inflation rates across socio-demographic groups for the period April 2020 to October 2024, with separate estimates for key inflation regimes: the pre-surge low-inflation phase (April 2020–May 2021), the inflation surge (June 2021–October 2022), the disinflation period (November 2022–October 2023), and the phase of sticky inflation (November 2023–October 2024). The regression results relate realized inflation rates to socio-demographic characteristics and a set of control variables. These include homeownership status, income, age, education, gender, household size, number of children, partnership status, financial literacy, and general trust in the other people. We also include controls for survey wave, and country fixed effects. Figure A3 in the appendix complements these findings by presenting time-series evidence across various demographic groups and results for the whole period at the country level can be found in Table A3 in the appendix.

Over the full sample period, renters consistently experienced lower realized inflation than homeowners, both with and without mortgages. This can be explained by the renters' lower expenditure share on utilities. Likewise, older individuals and those in the lower income distribution faced higher inflation rates. However, these patterns are not stable over time. The positive association between age and personal inflation, as well as the negative relationship between income and personal inflation, are largely concentrated in the surge period, suggesting that demographic heterogeneity becomes more pronounced when inflation accelerates. While the income and age patterns in inflation exposure align with prior findings (Kaplan and Schulhofer-Wohl, 2017), our finding that homeowners experience higher inflation than renters appears to be new.

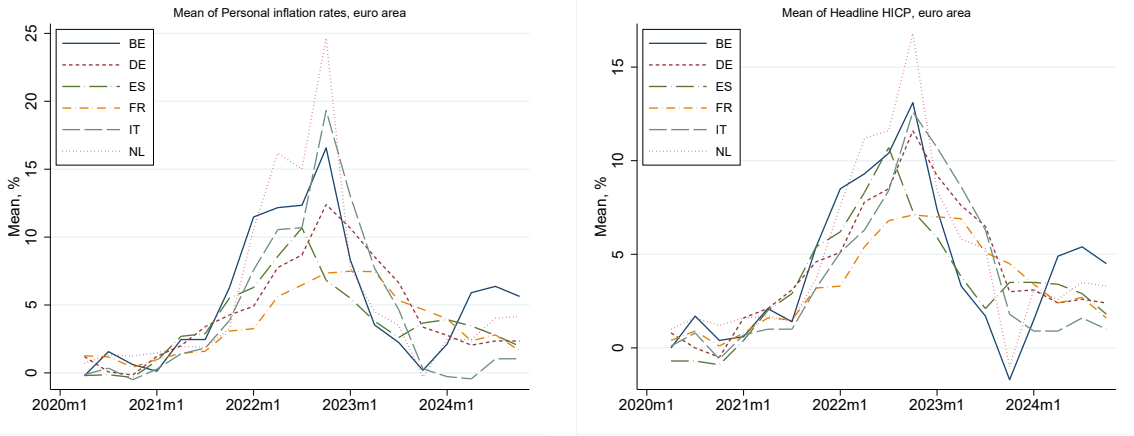
The elevated inflation experienced by homeowners, low-income households, and the elderly during the surge period may be attributed to higher inflation in key consumption categories that are particularly relevant to these groups, to larger

expenditure shares allocated to these categories, or to a combination of both factors. However, a comparison of spending shares across different phases of inflation (Table A4) with the corresponding category-specific inflation rates (Figure A9) reveals that the observed reductions in expenditure shares —particularly for food and utilities— were insufficient to counterbalance the sharp rise in prices in these categories.

3.2.2 Variation across countries and over time

Although the heterogeneity in realized inflation across socio-demographic groups appears economically sizeable primarily during the inflation surge, cross-country and temporal variation in personal inflation rates proves to be more substantial. Figure 2 compares the evolution of average personal inflation rates across countries (left panel) with official year-on-year HICP inflation rates (right panel). Before the inflation surge began in late 2021, cross-country differences in both personal and official inflation rates were minimal. However, during and after the surge, personal inflation rates became notably more dispersed—ranging from 7% to 25%—while official HICP inflation rates varied more narrowly, between 7% and 16%. Even among countries with similar peak official inflation rates (e.g., Germany, Italy, and Belgium, each around 12%), we observe markedly higher dispersion in personal inflation rates, ranging from 12% to 20%. This highlights the importance of personal inflation metrics for understanding the full extent of inflationary pressures across countries.

Figure 2: Variation in personal inflation rates across countries and over time vs. official HICP inflation



Notes: This figure presents time series evidence on the mean of personally realized and actual inflation rates across countries since 2020.

3.3 Pass-through of personal inflation rates into perceived and expected inflation rates

This subsection explores the relationship between personal realized inflation rates with perceived and expected inflation rates. Table 3 shows the results. With no controls, a one-percentage-point increase in personal inflation raises perceived and expected inflation by 0.35 pp (column 1) and 0.22 pp (column 3), respectively. When controlling for demographics, country and time fixed effects, both estimated coefficients fall to 0.06 pp but remain highly significant (column 2 and 4). As shown in Appendix F, the magnitudes decline primarily with time-fixed effects capturing variation common to all households, including the headline inflation at the eurozone level. Interestingly, we find no significant relationship between personal inflation rates and three-year-ahead inflation expectations (column 5), suggesting that medium-term expectations remain well anchored despite variations in individual price experiences.

Columns 6–7 show that when perceived inflation is added, the pass-through

from personal inflation to one-year-ahead expectations falls by roughly 50%, yet remains significant, while perceived inflation itself absorbs almost half of the explained variation. This shows that personal inflation shapes expectations mainly through the subjective perceptions channel.

Table 3: Effects of personal inflation on perceived and expected inflation

	(1) Perceived π	(2) Perceived π	(3) Exp. π in 1 year	(4) Exp. π in 1 year	(5) Exp. π in 3 years	(6) Exp. π in 1 year	(7) Exp. π in 1 year
Personal π	0.346***	0.0590***	0.220***	0.0594***	-0.000981		0.0283***
	(0.006)	(0.007)	(0.005)	(0.006)	(0.005)		(0.004)
Perceived π						0.480***	0.479***
						(0.004)	(0.004)
R^2	0.045	0.220	0.033	0.104	0.052	0.412	0.413
N obs.	235784	235784	235784	235784	235480	229439	229439
Demo.	No	Yes	No	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	Yes	Yes	Yes
Time FE	No	Yes	No	Yes	Yes	Yes	Yes

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table shows estimated coefficients from pool OLS regressions using quarterly data from April 2020 to October 2024 for six original countries in the CES. Demographic controls include age, income, education, financial literacy, housing type, gender, household size, number of children in the house, partnership, and trust in the other people. Standard errors, clustered at the household level, are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Interpretation Our estimated effect of personal inflation on one-year-ahead expectations (0.06; column 4) is larger than the corresponding estimate reported for the U.S. by Weber et al. (2023), and closely aligns with the magnitude observed for Germany in Lindemann (2025). Although one might expect coefficients approaching one, particularly for inflation perceptions, there are several factors suggestion smaller estimates. First and foremost, the regressions include time fixed effects that absorb any variation common to all households, including movements in headline euro area inflation. Because personal inflation rates are strongly correlated with the official HICP, much of their time-series variation might get absorbed by

these fixed effects, mechanically lowering the estimated coefficients.

Second, when forming inflation expectations, households might apply a specific notion of inflation different from official methodologies. Therefore the link between perceptions and expectations might be stronger than between personal inflation and expectations as argued by Weber et al. (2023). Second, households might weight their baskets differently than by applying the expenditure weights, for instance frequency weights (D'Acunto et al., 2022), or overweight significantly salient goods (D'Acunto et al., 2021).

Even after controlling for demographics, country and time fixed effects, which also capture the variation in headline inflation, personal inflation still passes through to one-year-ahead expectations. This confirms that households anticipate inflation in line with their own price experience.

When examining the stability of these relationships over time, we find them at the strongest during periods of inflation surges, while they are weak or even insignificant during other periods. Specifically, personal realized inflation rates are positively correlated with perceived inflation over the past 12 months across all inflation regimes, with the strongest correlation observed during inflation surges (Table A7). In contrast, the relationship between personal realized inflation rates and expected inflation over the next 12 months is strong during inflation surges, followed by periods of sticky inflation. However, during times of low inflation and disinflation, there is little to no correlation between personal realized inflation rates and expected future inflation (Table A8). Figure A5 and Figure A6 show bin-scatter plots illustrating these relationships across the euro area countries.

Our results align with the existing literature, which suggests that individuals pay less attention to inflation changes during periods of low inflation but become more attentive when inflation is high (see Weber et al. (2025), Dräger and Nghiem (2025), among others). Furthermore, our findings indicate that even during pe-

riods of high inflation, particularly in the disinflationary phase, individuals tend to maintain high inflation perceptions and expectations despite a sharp decline in personal realized inflation rates. This pattern suggests the presence of price nostalgia, where individuals' reference points extend beyond the past 12 months to a lower price level that existed before the inflation surge.

3.4 The relationship of personal inflation rates with personal and other macroeconomic expectations

Variation in personal inflation rates gets manifested also in other macroeconomic beliefs of households, beyond inflation perceptions and expectations. Table A9 shows that individuals with higher personal realized inflation rates have significantly lower personal income expectations and anticipate higher future mortgage rates. They are also more pessimistic about the national economic outlook, expecting lower economic growth and higher unemployment rates. Notably, these results hold even after controlling for country and time fixed effects, as well as a broad set of socio-demographic characteristics, including age, income, education, financial literacy, housing type, gender, household size, number of children, partnership status, and trust in others.

3.5 Implications for consumption

3.5.1 Effect of personal inflation rates on expected spending growth

Kukk et al. (2025) estimate that a one-percentage-point rise in a household's quarterly personal inflation rate lifts the quarterly real consumption growth rate by about 1.4%. This result holds across two-way and interactive fixed-effects models and intensifies during price surges. They interpret this positive elasticity as evidence of intertemporal substitution driven by higher inflation expectations, noting

that the expectations channel is only inferred rather than formally tested.

Using the CES data we test this transmission channel directly by regressing households' self-reported expected real consumption growth on both their personal inflation rate and their one-year-ahead inflation expectation. In this setting the coefficient on expected inflation can be interpreted as the elasticity of intertemporal substitution (EIS) at the household level. Marenčák and Nghiem (2025) directly estimate the EIS for the eurozone and its member countries from the consumers' Euler equation and report estimates between 0.7 and 0.8.

Table 4 shows the estimated impact of the personal inflation rate, with and without controlling for inflation expectations, on subjectively reported expected real consumption growth. We observe a significantly negative effect of the personal inflation rate, which is in line with the standard Euler-equation prediction of a stronger contemporaneous consumption response. When we control for expected inflation, the magnitude of the personal-inflation coefficient declines from –0.044 to -0.0072 yet remains statistically significant in both the pooled OLS specification and the panel regression with random effects. This drop implies that roughly 85% of the personal-inflation effect is transmitted to consumption growth through inflation expectations.

The EIS estimates, i.e. the coefficients on expected inflation, remain robust after including personal inflation as a regressor. Hence, the impact of expected inflation on consumption is substantial and largely independent of the personal inflation rate. These results complement Kukk et al. (2025) and underscore the importance of inflation expectations more generally.

3.5.2 Consumption inequality

Finally, to highlight the impact of personal inflation rates on expenditure inequality, we compute the interquartile range (IQR) of real total expenditures, deflated

Table 4: Results using probabilistic questions to measure inflation expectations

	Dependent variable: Real Spending growth expectations					
	Pool OLS			Panel regression		
	(1)	(2)	(3)	(4)	(5)	(6)
Personal π	-0.061***	-0.025***		-0.044***	-0.0072*	
	(0.006)	(0.004)		(0.005)	(0.004)	
Expected π		-0.70***	-0.71***		-0.77***	-0.77***
		(0.005)	(0.005)		(0.004)	(0.004)
N observations	227460	227460	227460	227460	227460	227460
Demographics	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	No	Yes	Yes	No	Yes	Yes

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

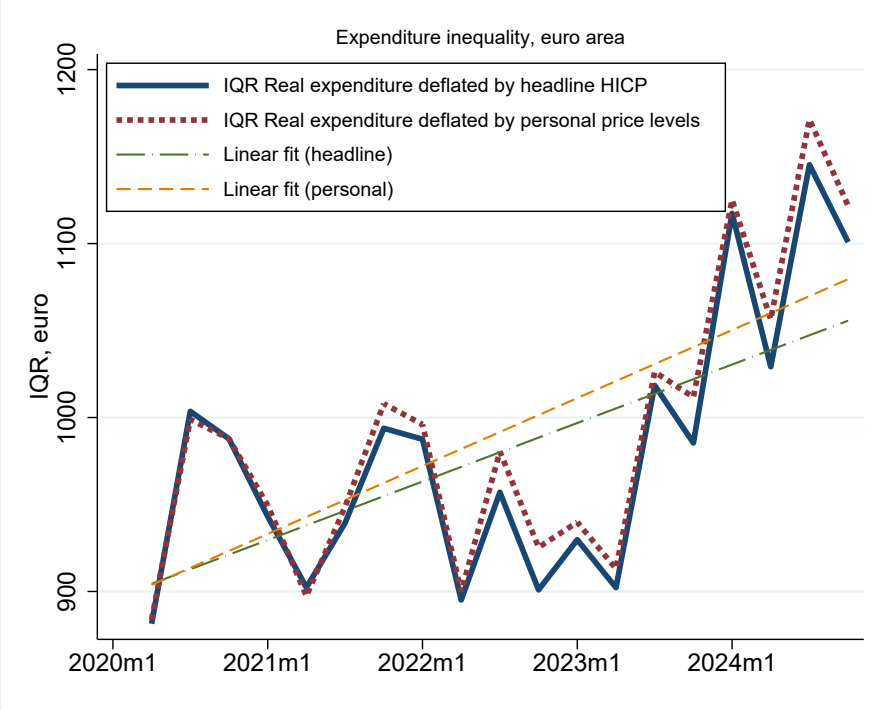
Notes: This table presents estimation results where the dependent variable is the respondent's forecast of expected household spending growth over the next 12 months. Columns (1) to (3) show results for pool OLS regressions, while columns (4) to (6) involve panel OLS regressions with random individual effects. Standard errors, clustered at the household level, are reported in parentheses. The sample period is 2020:04 – 2024:10.

using both the headline HICP and personal price levels.[2] Figure 3 presents the results for the period from April 2020 to October 2024.

The findings indicate that expenditure inequality has increased over time, particularly since the second half of 2023. With the exception of periods of low inflation, we observe that the IQR of real expenditures deflated by personal price levels is generally larger than that deflated by headline HICP. Moreover, the slope of the IQR based on personal price levels becomes steeper, suggesting that accounting for personal inflation rates accentuates the measured rise in expenditure inequality. In the appendix (Figure A8), we further show cross-country heterogeneity. With the exception of Belgium, all member countries exhibit a similar pattern of intensifying expenditure inequality when personal inflation rates are considered. The effect is most pronounced in the case of Germany.

[2]Personal price levels are calculated similarly to personal inflation rates, i.e. as a weighted average of categorical price levels, using self-reported spending shares from the CES as weights.

Figure 3: Real expenditure inequality



Notes: The figure shows interquartile range (IQR) of real expenditure using quarterly data from April 2020 to October 2024 for six original countries in the CES.

4 Discussion

We provide household-level evidence on how inflation heterogeneity shapes beliefs and spending in the euro area. A key contribution of this paper is linking inflation perceptions and expectations with personal inflation at the household level consistently across euro area countries. We show that wider dispersion in personal inflation is mirrored by greater cross-household disagreement about both perceived and expected inflation, especially during the 2022–23 surge. Personal inflation feeds into perceptions and, to a lesser extent, into expectations, and these expectations in turn shape planned consumption. Yet most of the influence of expectations on consumption arises from factors other than personal inflation. Thus, although personal inflation contributes to the formation of inflation expectations,

it is not their primary driver.

Importantly, we also show that while realized inflation rates significantly shape short-term inflation expectations, they do not influence long-term inflation expectations. This aligns with previous findings that long-run inflation expectations remain anchored, suggesting that short-term inflation shocks do not fully alter household belief systems.

Because real consumption inequality widens once household-specific price levels and inflation rates are considered, keeping aggregate inflation low and stable would help mute the transmission of inflation inequality into consumption inequality. This consideration could be extended by taking into account the general equilibrium effects as in Olivi et al. (2024) who argue that negative shocks to necessity sectors, such as food or electricity and gas, lead to an increase in inflation but an initial decline in the output gap, introducing additional policy trade-offs and eventually leading in fact to a more accommodative monetary policy.

Since monetary policy has distributional effects which in turn affects its transmission, future research should explore and quantify these policy-trade-offs in more detail and assess how central bank communication strategies can stabilize inflation expectations among the most affected groups.

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A HICP-CES mapping

Table A1: CES Description and Corresponding COICOP Codes

	CES category	**COICOP class**
1	Food, beverages, groceries, tobacco	CP01, CP02
2	Restaurants (including take-out food, delivery), cafes/ canteens	CP111
3	Housing (including rent, maintenance/repair costs, home owner/renter insurance, but excluding mortgage payments)	CP041-043
4	Utilities (including water, sewerage, electricity, gas, heating oil, phone, cable, internet)	CP044-045, CP083
5	Furnishings (furniture, carpets), household equipment (textiles, appliances, garden tools), small appliances and routine maintenance of the house (cleaning, gardening)	CP05
6	Debt repayments (instalments in mortgage, consumer loans, car loans, credit cards, student loans, other loans)	-
7	Clothing, footwear	CP03
8	Health (health insurance, medical products and appliances, dental and paramedical services, hospital services, prescription and non-prescription medication, personal care products and services)	CP06
9	Transport (fuel, car maintenance, public transportation fares)	CP072-074
10	Travel, recreation, entertainment and culture (holidays, theatre/ movie tickets, club/ gym membership, newspapers, books, hobbies equipment)	CP09
11	Childcare and education (including tuition fees for child and adult education, costs of after school activities, care of children/ babysitting, but excluding instalments on student loans)	CP10
12	Other expenditures not mentioned above	-

Notes: This table maps the expenditure categories in the Consumption Expectations Survey (CES) of the European Central Bank (ECB) to the corresponding Classification of Individual Consumption According to Purpose (COICOP) groups used in calculating the Harmonized Index of Consumer Prices (HICP).

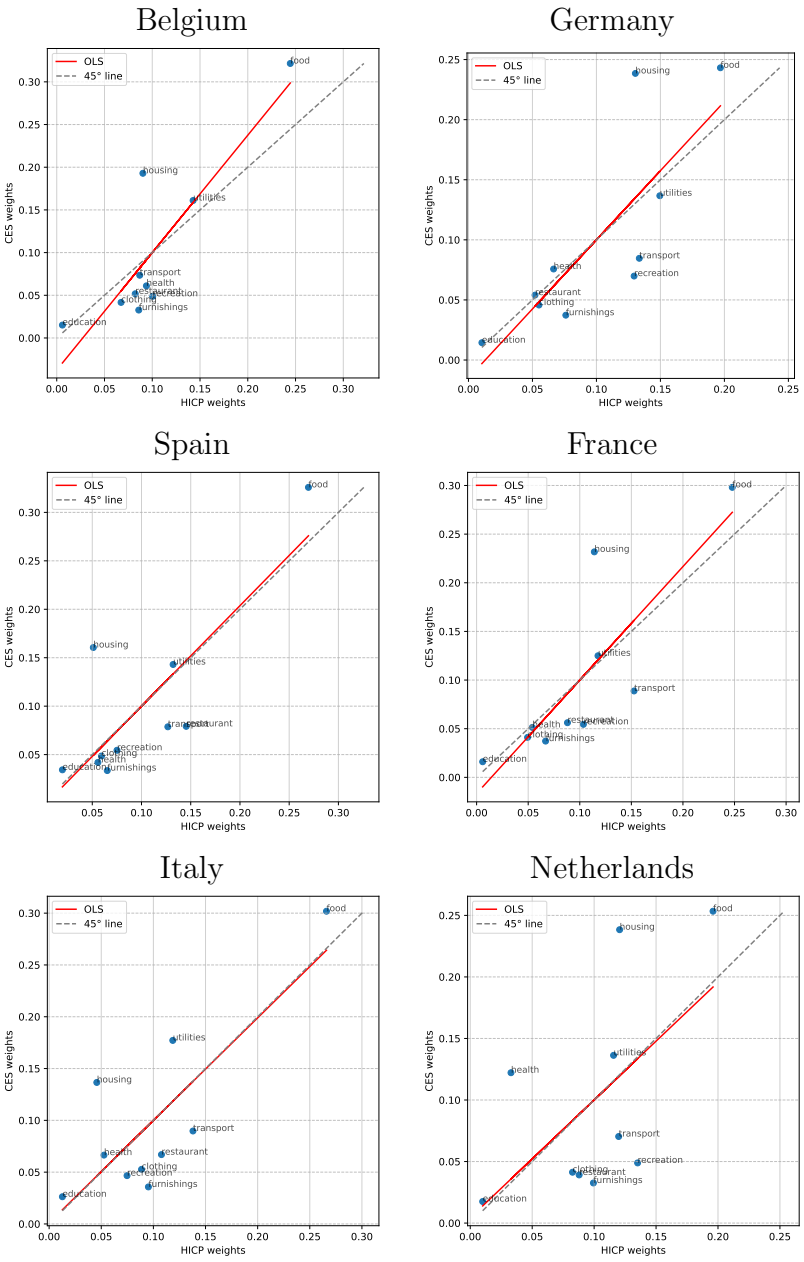
Table A2: COICOP classes description

COICOP class	**Description**
CP01	Food and non-alcoholic beverages
CP02	Alcoholic beverages, tobacco and narcotics
CP111	Catering services (Restaurants, cafés and the like & Canteens)
CP041	Actual rentals for housing
CP043	Maintenance and repair of the dwelling
CP044	Water supply and miscellaneous services relating to the dwelling
CP045	Electricity, gas and other fuels
CP083	Telephone and telefax services
CP03	Clothing and footwear
CP06	Health
CP072	Operation of personal transport equipment
CP073	Transport services
CP09	Recreation and culture
CP10	Education

Notes: This table complements Table A1 by listing the full names of the Classification of Individual Consumption According to Purpose (COICOP) groups.

B HICP vs CES weights

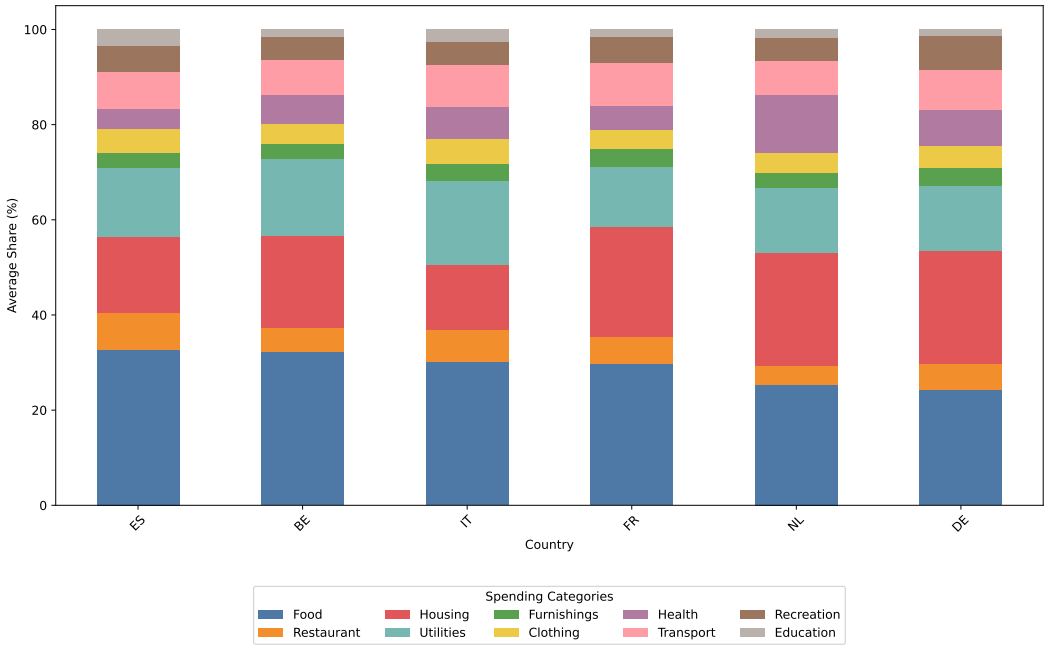
Figure A1: HICP vs CES weights at the country level



Notes: This figure plots the mean expenditure weights from the ECB's Consumption Expectations Survey (CES) against the corresponding mean official HICP weights—mapped via Table A1 — for quarterly data from 2000 Q4 to 2024 Q1.

C Spending shares across countries

Figure A2: Average CES spending share per category by country



Notes: This figure shows the expenditure composition of the average household—according to the ECB Consumer Expectations Survey (CES)—for each country, using quarterly data from 2000 Q4 to 2024 Q1. Full names of the expenditure categories are provided in Table A1.

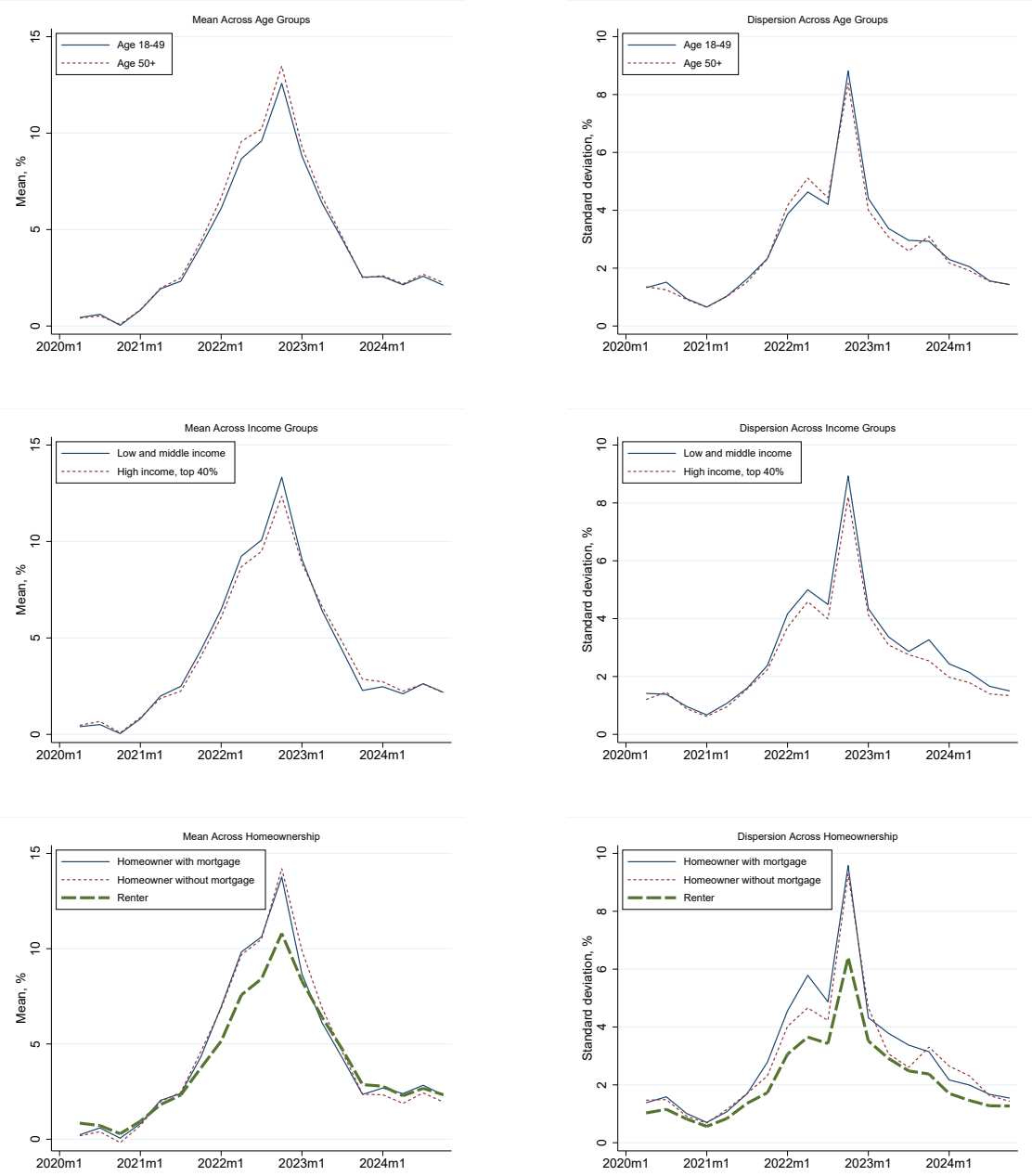
D Further results

Table A3: Personal inflation rate: Country level

	(1) BE	(2) DE	(3) ES	(4) FR	(5) IT	(6) NL
Owner with mortgage	0.41***	0.43***	0.41***	0.35***	0.45***	0.81***
	(0.078)	(0.030)	(0.026)	(0.021)	(0.057)	(0.107)
Owner without mortgage	0.52***	0.49***	0.54***	0.49***	0.69***	0.87***
	(0.081)	(0.027)	(0.026)	(0.021)	(0.055)	(0.157)
Income Q2	0.061	0.048	-0.046	-0.100***	-0.061	0.20
	(0.101)	(0.034)	(0.036)	(0.027)	(0.072)	(0.140)
Income Q3	-0.14	-0.011	-0.10***	-0.19***	-0.15**	0.061
	(0.105)	(0.036)	(0.034)	(0.027)	(0.071)	(0.143)
Income Q4	-0.024	-0.086**	-0.17***	-0.21***	-0.13*	0.093
	(0.111)	(0.038)	(0.035)	(0.029)	(0.070)	(0.155)
Income Q5	-0.21*	-0.27***	-0.25***	-0.32***	-0.31***	0.013
	(0.109)	(0.041)	(0.037)	(0.030)	(0.073)	(0.178)
Age 35-49	0.038	0.092***	0.13***	0.079***	0.099	-0.14
	(0.085)	(0.032)	(0.032)	(0.023)	(0.066)	(0.173)
Age 50-70	0.14	0.059*	0.23***	0.17***	0.11	-0.053
	(0.092)	(0.033)	(0.034)	(0.026)	(0.071)	(0.171)
Age 71+	0.060	0.0029	0.18***	0.18***	0.31***	-0.019
	(0.132)	(0.043)	(0.053)	(0.036)	(0.112)	(0.187)
Middle education	-0.19*	-0.012	0.0059	0.069***	-0.088	-0.16
	(0.111)	(0.035)	(0.035)	(0.027)	(0.084)	(0.128)
High education	-0.24**	-0.044	-0.092***	-0.013	-0.27***	-0.25*
	(0.110)	(0.036)	(0.027)	(0.024)	(0.087)	(0.141)
Financial literacy	0.036	-0.25***	0.033*	0.014	-0.12***	0.11
	(0.063)	(0.023)	(0.020)	(0.017)	(0.045)	(0.097)
Female	0.067	-0.023	0.0057	-0.0040	-0.059	-0.068
	(0.060)	(0.021)	(0.020)	(0.016)	(0.043)	(0.089)
HH size	0.088**	0.14***	0.020	0.10***	0.037	0.11
	(0.038)	(0.015)	(0.013)	(0.011)	(0.024)	(0.079)
Number of children	-0.086	-0.13***	-0.066***	-0.081***	-0.12***	0.060
	(0.053)	(0.021)	(0.017)	(0.015)	(0.034)	(0.106)
With partner	-0.13*	-0.030	0.022	-0.012	-0.094*	-0.15
	(0.074)	(0.027)	(0.025)	(0.021)	(0.052)	(0.127)
Trust people	-0.023**	0.0075*	-0.0089**	-0.0094***	-0.014	0.011
	(0.012)	(0.004)	(0.004)	(0.003)	(0.009)	(0.020)
R^2	0.656	0.816	0.748	0.783	0.733	0.619
N observations	19064	50272	52169	51723	54325	18707

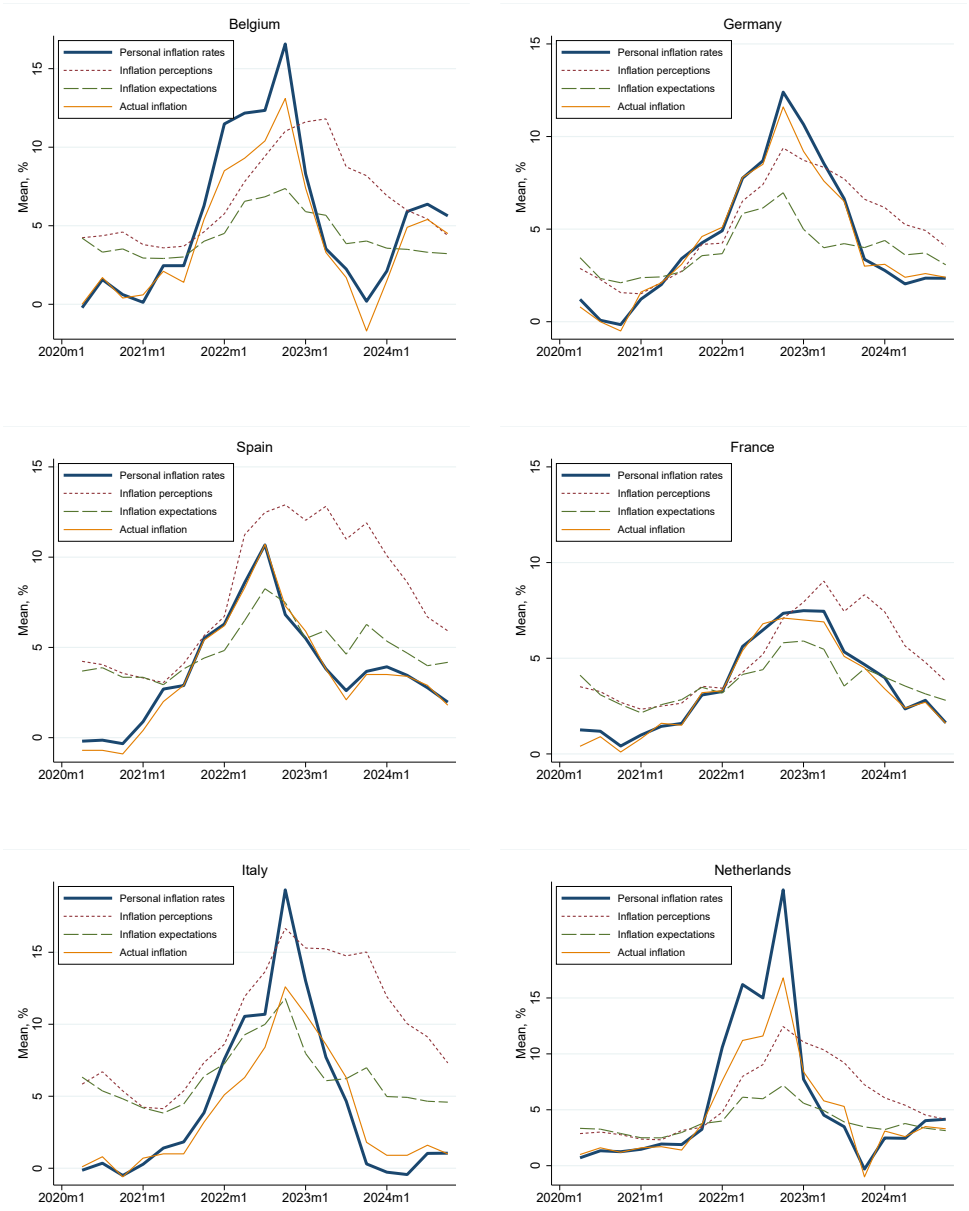
Notes: This table shows estimated coefficients from OLS regressions using quarterly data from April 2020 to October 2024 for six original countries in the CES, controlling for time and country fixed effects. Renters, individuals in the first income quintile, low education, and those aged 18 to 34 serve as the reference groups. Standard errors, clustered at the household level, are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure A3: Heterogeneity in Personal Inflation Rates at the euro area level



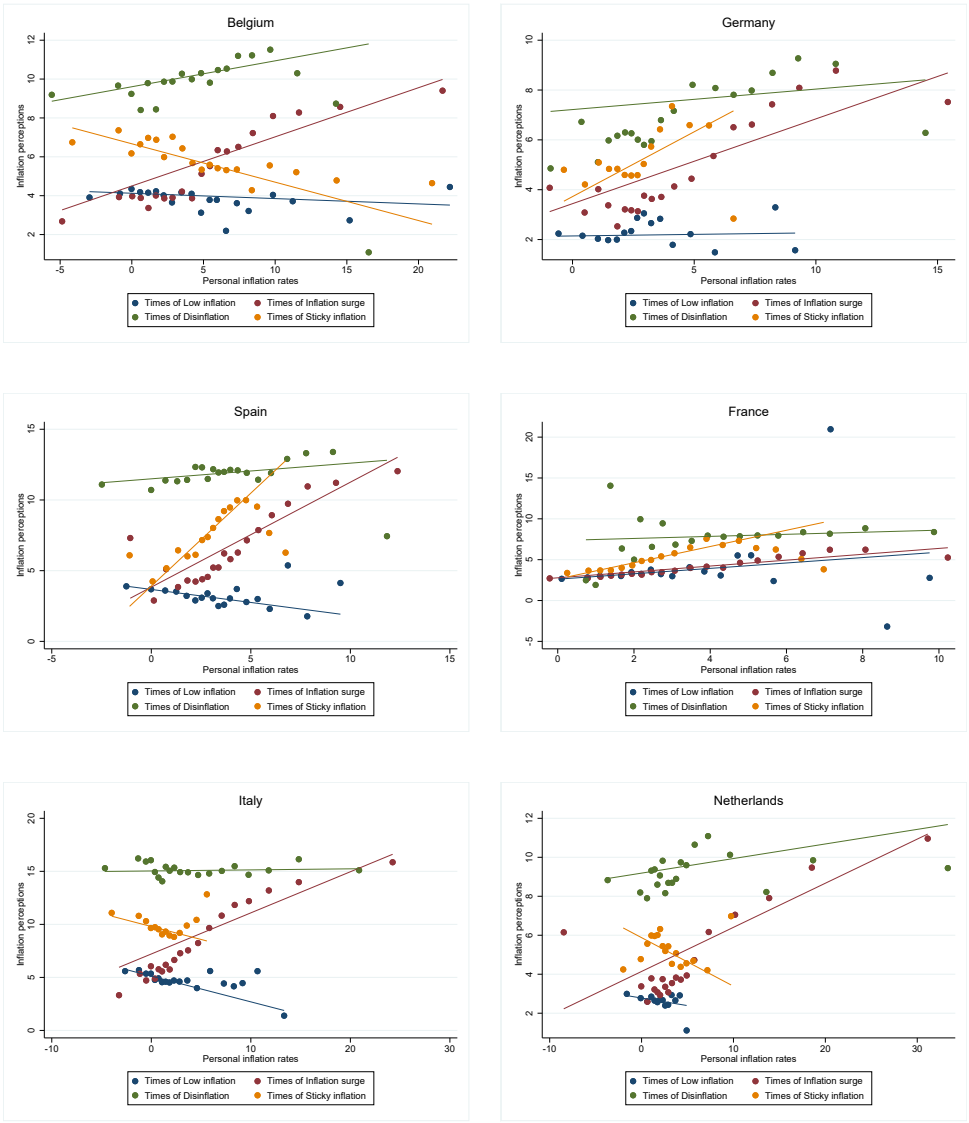
Notes: This exhibit presents heterogeneity in personal realized inflation rates across households based on age, income distribution, and home-ownership status. The sample period covers quarterly data between April 2020 and October 2024 for six original countries in the CES.

Figure A4: Mean of realized, perceived, expected and actual inflation rates across country members



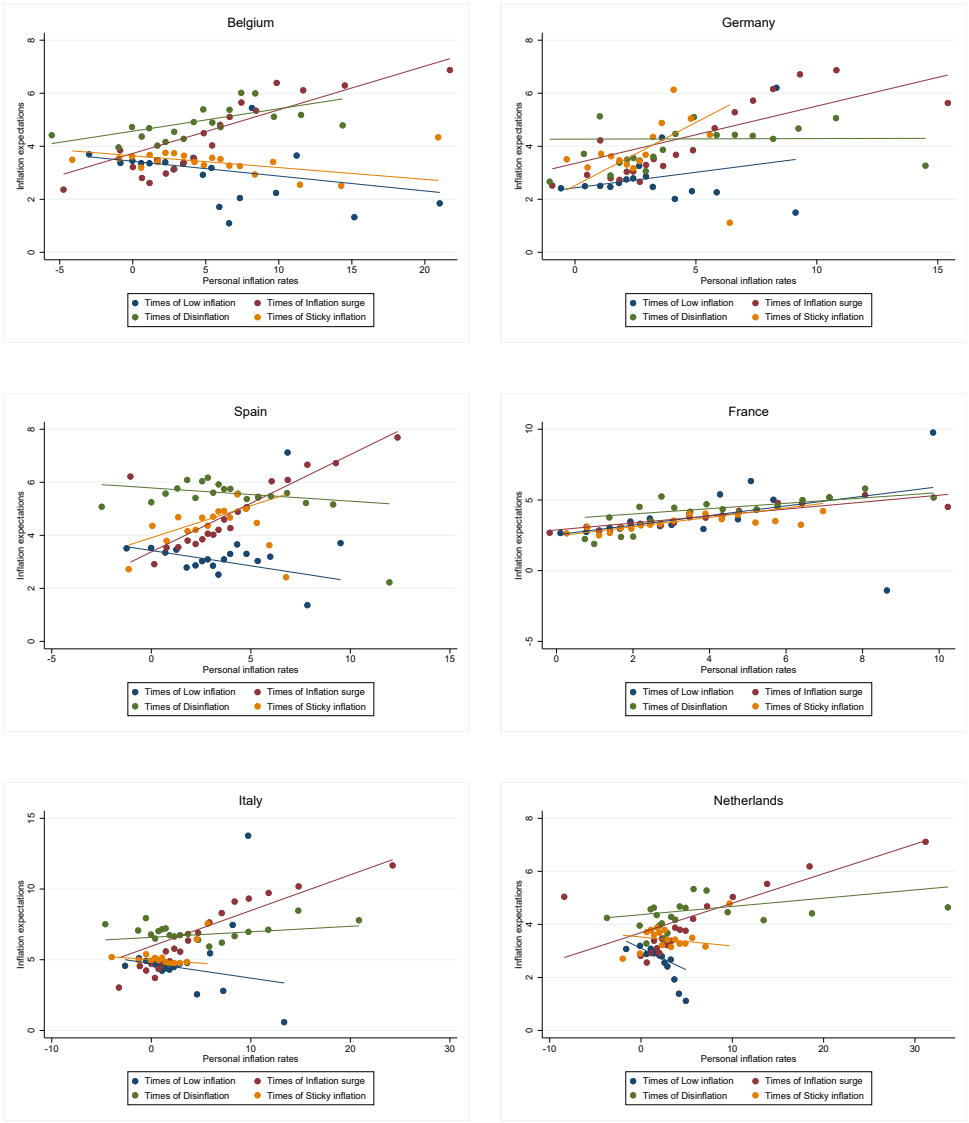
Notes: The figure shows mean of realized, perceived, expected inflation rates as well as the actual inflation rate for each country member using quarterly data from April 2020 to October 2024 for six original countries in the CES.

Figure A5: Binscatter of Personal inflation rates vs inflation perceptions across country members



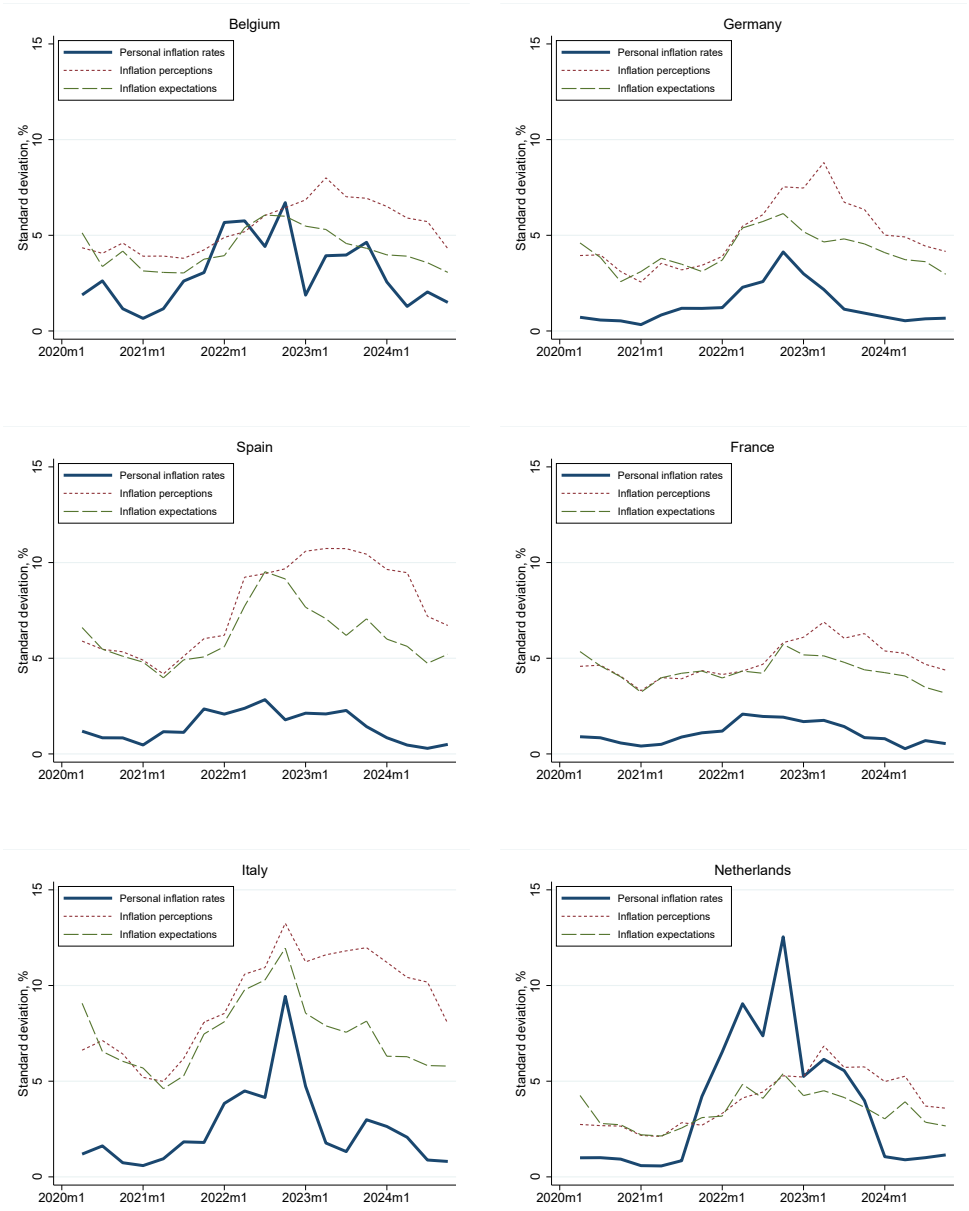
Notes: The figures show binscatter plots using quarterly data from April 2020 to October 2024 for six original countries in the CES across different inflation regimes: periods of low inflation (April 2020 - April 2021), inflation surges (July 2021 - October 2022), disinflation (January 2023 - October 2023), and sticky inflation (Januray 2024 - October 2024). The binscatter plots control for age, income, education, financial literacy, housing type, gender, household size, number of children in the house, partnership, and trust in the other people.

Figure A6: Binscatter of Personal inflation rates vs inflation expectations across country members



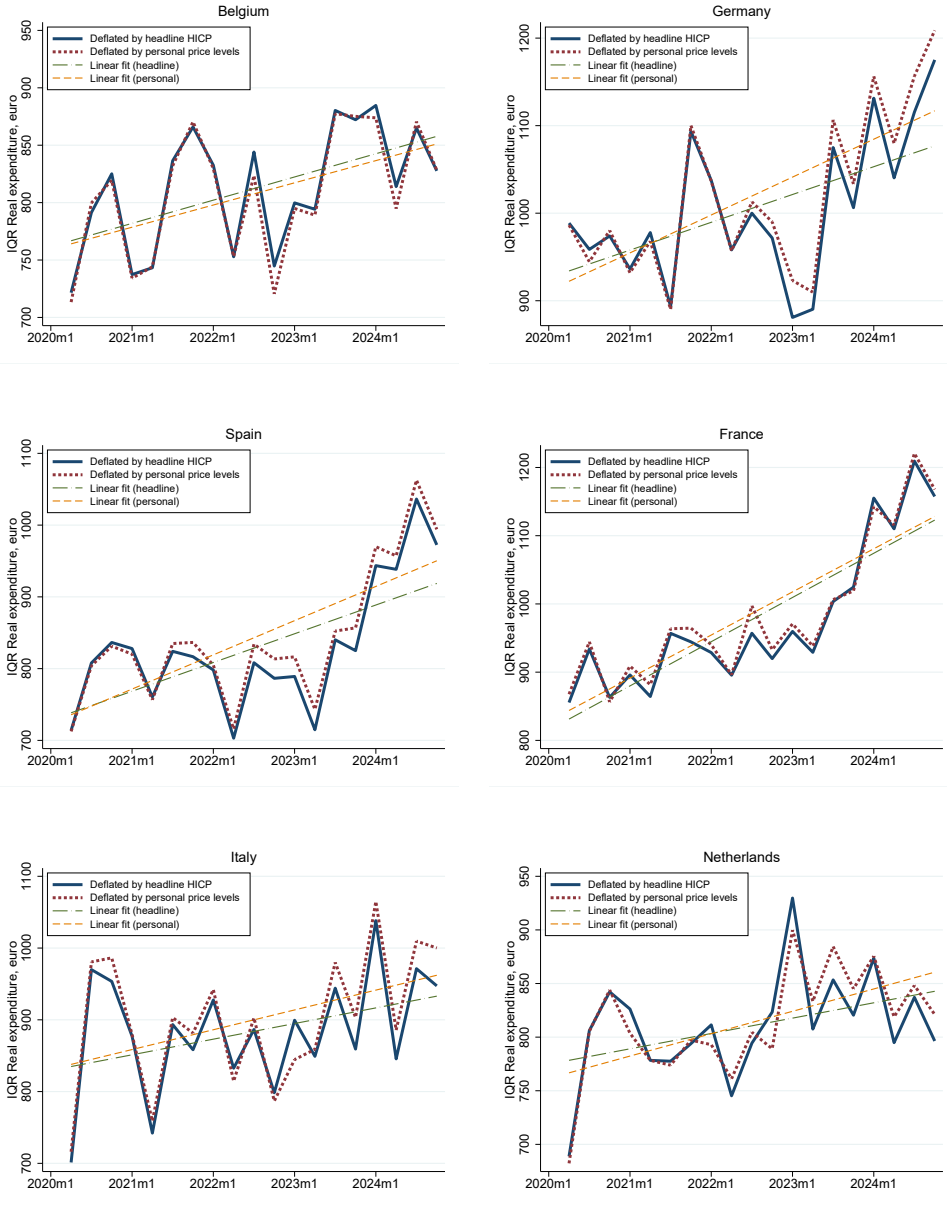
Notes: The figures show binscatter plots using quarterly data from April 2020 to October 2024 for six original countries in the CES across different inflation regimes: periods of low inflation (April 2020 - April 2021), inflation surges (July 2021 - October 2022), disinflation (January 2023 - October 2023), and sticky inflation (Januray 2024 - October 2024). The binscatter plots control for age, income, education, financial literacy, housing type, gender, household size, number of children in the house, partnership, and trust in the other people.

Figure A7: Dispersion of realized, perceived, and expected inflation rates across country members



Notes: The figure shows standard deviations of realized, perceived, and expected inflation rates for each country member using quarterly data from April 2020 to October 2024 for six original countries in the CES.

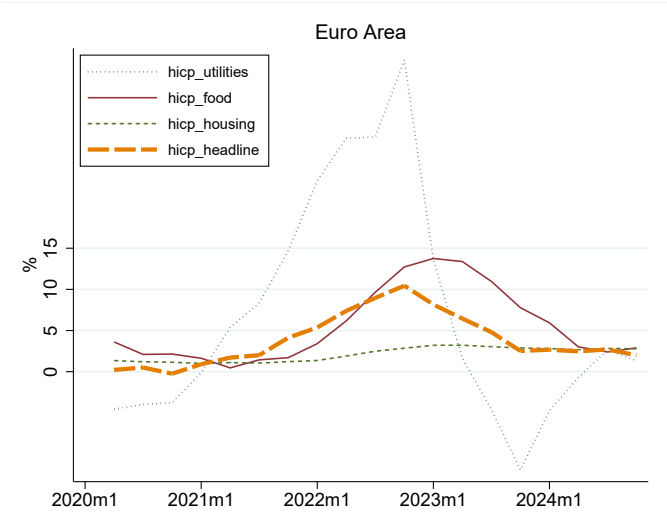
Figure A8: Expenditure inequality across country members



Notes: The figure shows interquartile range (IQR) of real expenditure using quarterly data from April 2020 to October 2024 for six original countries in the CES.

E Share versus price effects

Figure A9: HICP inflation in selected categories at the euro area level



Notes: The figure plots year-on-year euroarea inflation (in percentage points) for utilities, food, and housing alongside headline HICP inflation, covering April 2020 – December 2024.

Table A4: Average Spending Shares by Item Across Inflation Regimes (Percentage Points)

	Whole sample 2020:04 - 2024:10	Low inflation 2020:04 - 2021:05	High inflation 2021:06 - 2023:10	Sticky inflation 2023:11 - 2024:10
Food	29.2	31.3	28.8	28.4
Restaurant	6.1	4.4	6.2	7.4
Housing	19.5	20.7	19.6	18.2
Utilities	14.6	15.1	14.9	13.7
Furnishings	3.5	4.0	3.4	3.6
Clothing	4.6	4.4	4.6	4.8
Health	6.4	6.7	6.2	6.6
Transport	8.3	8.0	8.6	8.1
Recreation	5.5	3.3	5.7	6.9
Education	2.2	2.1	2.1	2.4

Notes: This table reports the average expenditure weights for the euro area from the ECB Consumer Expectations Survey (CES) across different subsample periods.

F Role of controls in the pass-through from personal to perceived and short-term expected inflation

Table A5: Effects of Personal Inflation Rates on Inflation Perceptions

	(1)	(2)	(3)	(4)	(5)
Personal inflation	0.346***	0.338***	0.346***	0.0664***	0.0590***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
R^2	0.045	0.074	0.110	0.135	0.220
N observations	235784	235784	235784	235784	235784
Demo.	No	Yes	No	No	Yes
Country FE	No	No	Yes	No	Yes
Time FE	No	No	No	Yes	Yes

Notes: OLS estimates using quarterly CES data. Robust standard errors clustered at the household level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A6: Effects of Personal Inflation Rates on One-year Ahead Inflation Expectations

	(1)	(2)	(3)	(4)	(5)
Personal inflation	0.220***	0.215***	0.219***	0.0636***	0.0594***
	(0.005)	(0.004)	(0.004)	(0.006)	(0.006)
R^2	0.033	0.059	0.061	0.055	0.104
N observations	235784	235784	235784	235784	235784
Demo.	No	Yes	No	No	Yes
Country FE	No	No	Yes	No	Yes
Time FE	No	No	No	Yes	Yes

Notes: OLS estimates using quarterly CES data. Robust standard errors clustered at the household level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

G Effects of Personal Inflation Rate on Perceived and Expected Inflation Rates Across Different Inflation Regimes

Table A7: Effects of Personal Inflation Rate on Perceived Inflation Across Inflation Regimes

	(1) Low inflation 2020:04 - 2021:05	(2) Inflation surge 2021:06 - 2022:10	(3) Disinflation 2022:11 - 2023:10	(4) Sticky inflation 2023:11 - 2024:10
Personal inflation	-0.00736	0.0756***	-0.0280*	0.0536*
	(0.023)	(0.009)	(0.015)	(0.030)
R^2	0.098	0.234	0.124	0.117
N observations	45589	73986	49972	55173
Demographics	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: OLS estimates using quarterly CES data. Robust standard errors clustered at the household level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A8: Effects of Personal Inflation Rate on Expected Inflation Across Inflation Regimes

	(1) Low inflation 2020:04 - 2021:05	(2) Inflation surge 2021:06 - 2022:10	(3) Disinflation 2022:11 - 2023:10	(4) Sticky inflation 2023:11 - 2024:10
Personal inflation	0.0546**	0.0535***	-0.0377***	0.0349*
	(0.024)	(0.008)	(0.010)	(0.018)
R^2	0.067	0.131	0.050	0.053
N observations	45547	73890	49905	55270
Demographics	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes

Notes: OLS estimates using quarterly CES data. Robust standard errors clustered at the household level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

H The relationship with other macroeconomic expectations

Table A9: Effects of Personal realized inflation on Personal income and other Macroeconomic expectations

	(1) Income exp.	(2) Mortgage rate exp.	(3) GDP exp.	(4) Unemployment rate exp.
Personal inflation	-0.022***	0.012***	-0.033***	0.079***
	(0.004)	(0.002)	(0.005)	(0.008)
R^2	0.029	0.128	0.096	0.265
N observations	224360	208585	224329	225538
Demographics	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes

Notes: This table shows estimated coefficients from OLS regressions using quarterly data from April 2020 to October 2024 for six original countries in the CES. Demographic controls include age, income, education, financial literacy, housing type, gender, household size, number of children in the house, partnership, and trust in the other people. Standard errors, clustered at the household level, are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$