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Personal Inflation Rates in the Euro Area

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Keywords

personal inflation rate, expectations, consumer expectations survey

JEL Classification

C33, D84, E31, E52

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Personal Inflation Rates in the Euro Area*

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1 Introduction

Inflation affects households differently depending on their income, spending habits, portfolio choices, and consumption patterns.[1] While headline inflation measures provide a useful aggregate perspective, they often mask substantial variation in individual inflation experiences (Kaplan and Schulhofer-Wohl, 2017). This paper explores personal inflation rates — the inflation households actually experience based on their unique expenditure compositions — and examines how these experiences shape inflation expectations across different demographic and economic groups in the euro area and over time.

Studying the sensitivity of household inflation expectations to specific consumption components is highly data-intensive. Ideally, individual inflation expectations, perceptions, and personally experienced 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, which captures U.S. households' non-durable goods expenditures, covering roughly 25% of the total consumption basket.[2]

We leverage detailed non-public data from the ECB Consumer Expectations Survey (CES) on households' inflation perceptions, expectations, and self-reported consumption patterns. The survey structure allows us to construct personal inflation rates based on spending shares across major consumption categories, covering approximately 85% of the basket used for the Harmonized Index of Consumer Prices (HICP).[3] Crucially, we can link these inflation experiences with perceptions

[1] See, among others, Pallotti et al. (2024) or D'Acunto et al. (2021).

[2] Matched data on experienced 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 by Coibion and Gorodnichenko (2015) and Weber et al. (2022) for the US.

[3] We match reported spending shares on goods and services with official inflation rates but cannot account for price and quality differences within the same category across population groups.

and expectations within the same household, enabling a detailed analysis of inflation belief formation across different demographic and economic groups in eurozone countries. Moreover, our sample spans a relatively long period (2020–2024), allowing us to examine stylized facts of personal inflation rates across different inflation regimes: low inflation (April 2020–April 2021), inflation surges (July 2021–October 2022), disinflation (January 2023–October 2023), and sticky inflation (January 2024–October 2024).[4]

Our findings challenge conventional wisdom on inflation heterogeneity. We document that, in the periods before and after the recent high-inflation episode in the euro area (April 2020–April 2021 and Januray 2024–October 2024, respectively), low-income and older households experienced lower inflation rates relative to their counterparts, though the differences are relatively small. However, during the high-inflation period (July 2021–October 2023), this pattern reversed, with these groups facing inflation rates significantly higher by approximately 1 percentage point. Similarly, homeowners experienced lower inflation in normal periods but significantly higher inflation during the high-inflation episode compared to renters. Furthermore, we show that the inflation surge, rather than the disinflationary phase, primarily drive these results during the high-inflation period.

We distinguish between two main drivers of these trends: price effects and spending composition effects. First, higher price increases in essential categories, such as utilities and food, disproportionately impacted vulnerable groups. Second, spending composition effects, i.e. lower food and utility spending shares, failed to offset rising prices in these categories. Additionally, we show that personally experienced inflation significantly explains cross-sectional variation in inflation per-

[4]In the euro area, during the low-inflation period (April 2020–April 2021), inflation averaged 0.6%, ranging from -0.3% to 1.6%. During inflation surges (July 2021–October 2022), the average inflation rate rose to 6.5%, from 2.2% to 10.6%. In the disinflationary phase (January 2023–October 2023), inflation averaged 5.9%, declining from 8.6% to 2.9%. During sticky inflation (January 2024–October 2024), the average rate was 2.4%, fluctuating between 2% and 2.8%.

ceptions and expectations, as well as personal income and other macroeconomic expectations, emphasizing the role of individual experiences in shaping economic beliefs.

Our paper makes three key contributions. First, it extends prior research on inflation heterogeneity by constructing a granular, high-frequency measure of household-level inflation, leveraging novel CES data. It 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). Second, it provides empirical evidence on how inflation expectations are shaped by both the level and volatility of personal inflation experiences, particularly during inflation surges. Third, it provides valuable insights for policymakers seeking to improve inflation forecasting, enhance policy communication, and mitigate the uneven impact of inflation shocks—especially in periods of high inflation volatility.

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 experienced 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.

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 below [Table 1]?
- **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. ...%[5]

The CES spending categories listed in Table 1 do not directly correspond to the COICOP (Classification of Individual Consumption According to Purpose)

[5]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.

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. A mapping of COICOP classes to CES categories is provided in Table 1, while Table A1 in Appendix provides descriptions for COICOP classes used in the mapping.

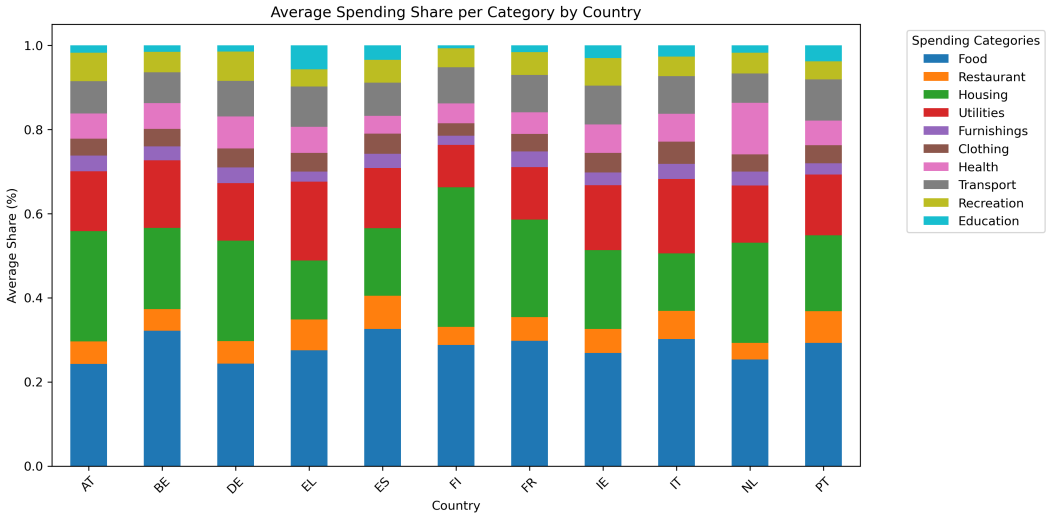
Table 1: CES Description and Corresponding COICOP Codes

	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	-

We calculate personal inflation rates as weighted averages of categorical inflation rates, using spending shares obtained from the CES. Appendix B examines the relationship between HICP and CES spending weights over the 2020–2024 period. 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. Figure 1 illustrates cross-country heterogeneity in CES spending shares.

To reduce the influence of outliers, we exclude the upper and lower 2.5% of observations per country and survey round for inflation perceptions and expectations.

Figure 1: CES spending shares across countries



2.2 Descriptive statistics

Table 2 presents distributional statistics for key variables, including expected inflation, perceived inflation, and personally experienced inflation at the household level over the past 12 months.

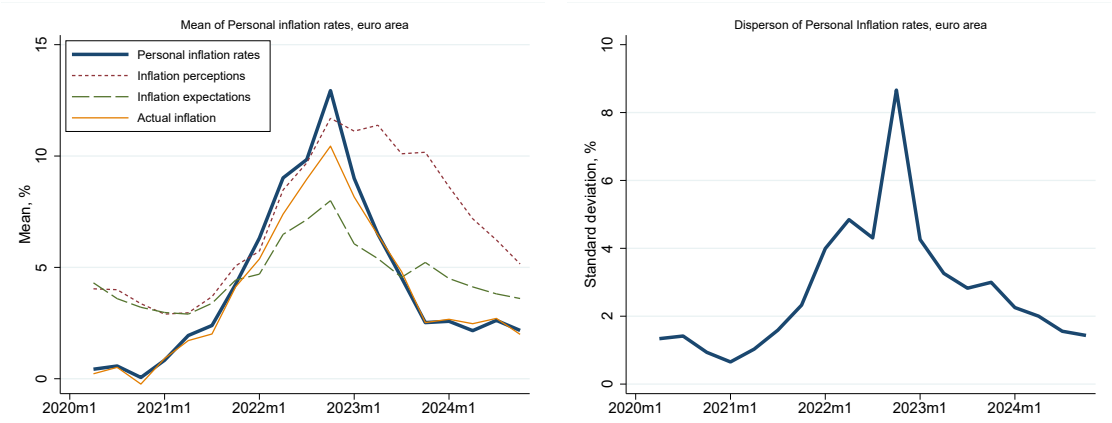
Table 2: Summary statistics

	Mean	Median	Std.Dev.	Min.	Max.	Obs.
Personal Inflation (pp)	4.51	3.28	4.92	-36.90	79.51	229,439
Perc. Inflation, Point Estimate (pp)	6.94	5.00	7.63	-9.00	60.10	229,439
Exp. Inflation, Point Estimate (pp)	4.68	3.00	5.82	-10.00	50.50	229,439
Actual inflation (pp)	4.17	2.90	3.09	-0.30	10.60	229,439

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. All variables are obtained monthly. "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.

Figure 2 illustrates the evolution of these variables over time in relation to actual inflation at the euro area level. The time series evidence shows a positive relationship between experienced, actual, and perceived inflation leading up to the peak in headline inflation. However, after inflation peaked, perceived inflation remained elevated, diverging from actual and experienced inflation trends. It is also noteworthy that, using our methodology outlined above, the cross-sectional average of experienced inflation rates exceeded the peak of actual inflation.

Figure 2: Personal Inflation Rates



3 Results

In this section, we document key patterns of heterogeneity in experienced inflation rates across euro area households, examining variations by socio-demographic factors, over time as well as across countries.

3.1 Heterogeneity in personal inflation rates

Eurozone households experience systematically different inflation dynamics, with notable heterogeneity across socio-demographic groups. Figure 3 illustrates these disparities in experienced inflation rates from April 2020 to October 2024 at a quarterly frequency. Over this period, renters consistently faced lower inflation rates than homeowners, both with and without a mortgage. Similarly, older individuals and those in the lower income distribution experienced higher rates of price changes than their counterparts.

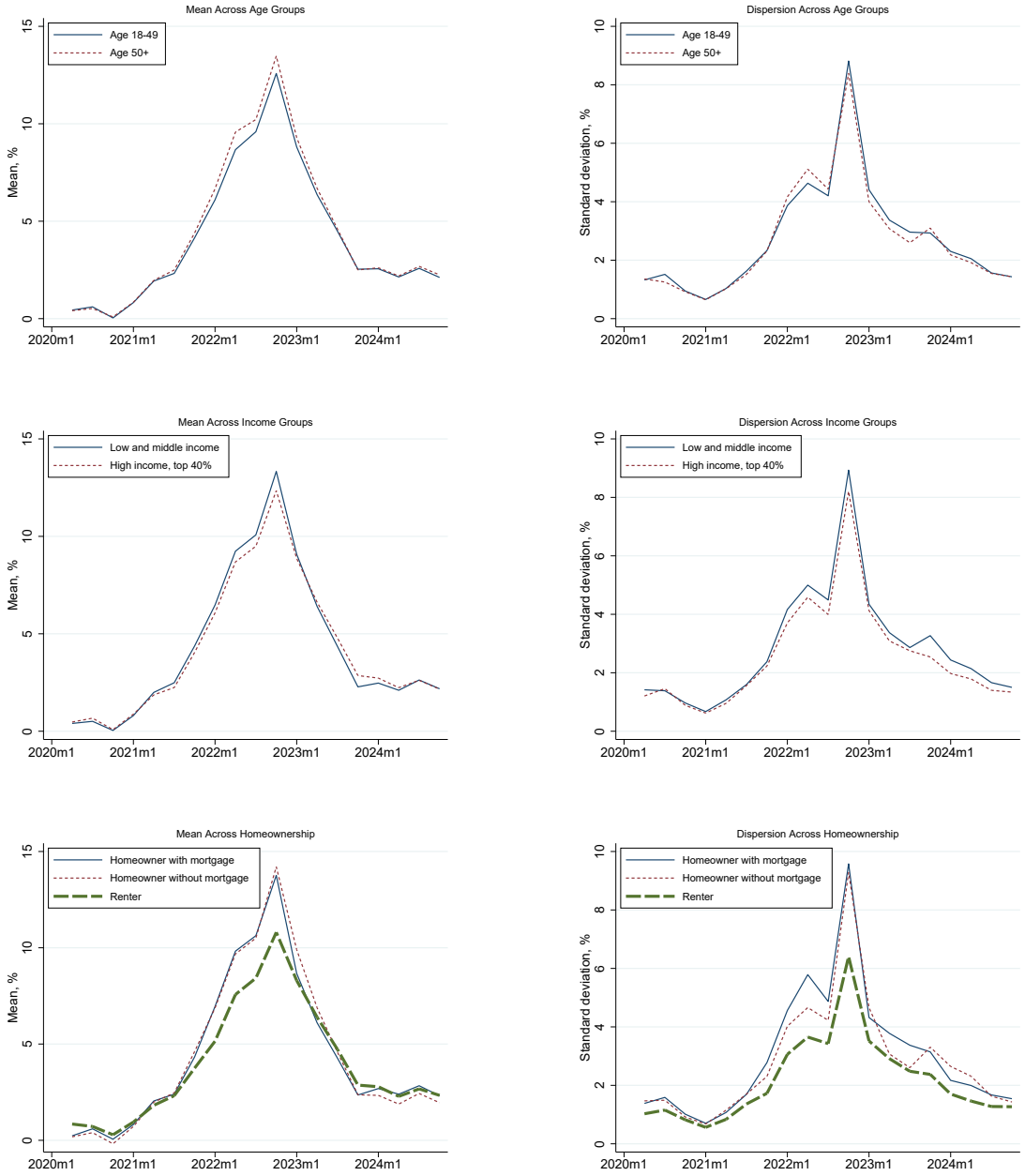
However, this pattern does not hold consistently throughout the sample period. As shown in Figure 3, the relationship between age and income — typically observed in the literature (Kaplan and Schulhofer-Wohl, 2017) — is primarily driven by the high-inflation period, particularly during the inflation surge when inflation shifted from low to high levels. In contrast, our finding on homeowners facing higher inflation is new.

Another novel finding is the increased dispersion of realized inflation rates among euro area households. Notably, this dispersion grew more significantly for households experiencing higher realized inflation rates, highlighting important resource allocation and inequality implications.

These results are formally documented in Table 3, which presents regression estimates of realized inflation rates on socio-demographic factors and a set of control variables. The demographic variables include homeownership status, income,

age, educational attainment, gender, household size, number of children, partnership status, and financial literacy. Control variables account for trust in others, as well as survey round and country fixed effects.

Figure 3: Heterogeneity in Personal Inflation Rates



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.

Table 3: Determinants of Personal Inflation Rate

	(1) Whole sample 2020:04 - 2024:10	(2) Low inflation 2020:04 - 2021:04	(3) High inflation 2021:07 - 2023:10	(4) Sticky inflation 2024:01 - 2024:10
Owner w/ mortgage	0.51***	-0.18***	1.02***	-0.11***
	(0.022)	(0.012)	(0.036)	(0.016)
Owner w/o mortgage	0.65***	-0.17***	1.27***	-0.14***
	(0.022)	(0.012)	(0.035)	(0.015)
Income Q2	0.040	0.0025	0.034	0.056**
	(0.030)	(0.016)	(0.048)	(0.022)
Income Q3	-0.072**	0.017	-0.22***	0.10***
	(0.030)	(0.016)	(0.048)	(0.022)
Income Q4	-0.15***	0.032**	-0.28***	0.18***
	(0.031)	(0.016)	(0.049)	(0.022)
Income Q5	-0.26***	0.088***	-0.54***	0.21***
	(0.032)	(0.017)	(0.051)	(0.023)
Age 35-49	0.097***	-0.031**	0.17***	-0.028
	(0.027)	(0.015)	(0.043)	(0.018)
Age 50-70	0.17***	-0.047***	0.29***	-0.025
	(0.028)	(0.015)	(0.045)	(0.019)
Age 71+	0.17***	-0.050**	0.23***	-0.0065
	(0.040)	(0.021)	(0.064)	(0.025)
R^2	0.546	0.323	0.416	0.470
N observations	246260	49933	135806	60521
Other 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. Renters, individuals in the first income quintile, and those aged 18 to 34 serve as the reference groups. Other demographic controls include education, financial literacy, 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

While Table 3 focuses on key factors—homeownership, age, and income, the complete results for all regressors are provided in Table A2. Table 3 reports regression estimates for the full sample period as well as three distinct subperiods: the COVID-19 period (April 2020–April 2021), the high-inflation period (July 2021–October 2023), and the subsequent sticky inflation period (January 2024–October 2024).

Table 4: Determinants of Personal Inflation Rates: Times of High Inflation

	(1)	(2)
	Times of high inflation: 2021:07 - 2023:10	
	Inflation surge 2021:07-2022:10	Disinflationary phase 2023:01 - 2023:10
Owner with mortgage	1.39***	0.33***
	(0.049)	(0.040)
Owner without mortgage	1.72***	0.51***
	(0.047)	(0.035)
Income Q2	-0.083	0.074
	(0.064)	(0.049)
Income Q3	-0.43***	0.042
	(0.064)	(0.051)
Income Q4	-0.63***	0.087*
	(0.065)	(0.052)
Income Q5	-1.06***	0.066
	(0.069)	(0.056)
Age 35-49	0.26***	0.023
	(0.060)	(0.050)
Age 50-70	0.37***	0.089*
	(0.063)	(0.050)
Age 71+	0.36***	0.0016
	(0.087)	(0.066)
R^2	0.482	0.453
N observations	80958	54848
Other demographics	Yes	Yes
Country fixed effect	Yes	Yes
Time fixed effect	Yes	Yes

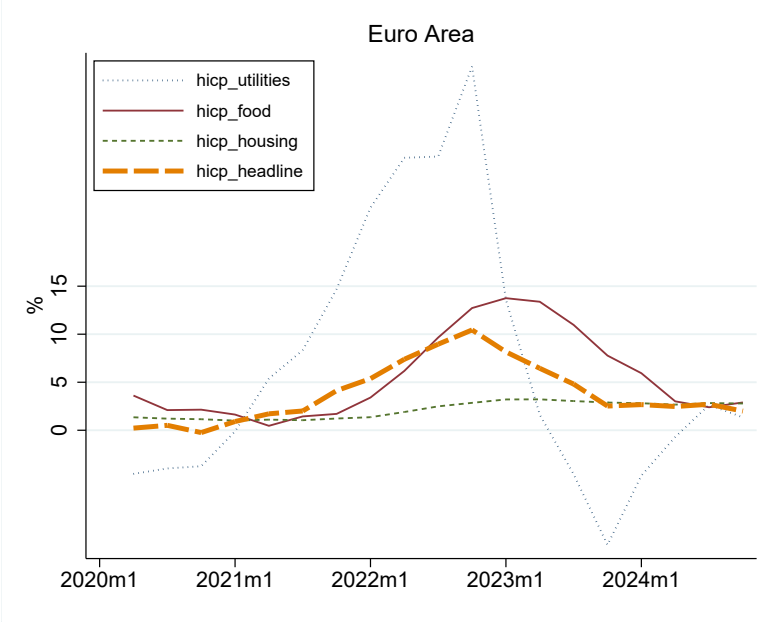
Notes: This table shows estimated coefficients from OLS regressions using quarterly data from July 2021 to October 2023 for six original countries in the CES. Renters, individuals in the first income quintile, and those aged 18 to 34 serve as the reference groups. Other demographic controls include education, financial literacy, 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

We find that homeowners and households in the upper part of income and age distributions exhibited higher average realized inflation, a pattern primarily driven by the high-inflation period. To better understand this dynamic, it is useful to distinguish between the two phases of the high-inflation period — the inflation surge and the disinflationary phase. Table 4 presents regression results for these

sub-periods, showing that the observed effect is particularly driven by the inflation surge (July 2021–October 2022), rather than the disinflationary phase (January 2023–October 2023).[6]

This pattern may be driven by higher inflation rates in key consumption categories for these household groups (see Figure 4), larger spending shares, or a combination of both. Table 5 presents spending shares across all categories and inflation regimes. The three main consumption categories—food, utilities, and housing costs—are shown in Figure 1 for all individual countries. Spending shares in these categories have either declined or remained stable over time. Figure 5 illustrates this trend across different homeownership statuses.

Figure 4: HICP inflation in selected categories at the euro area level

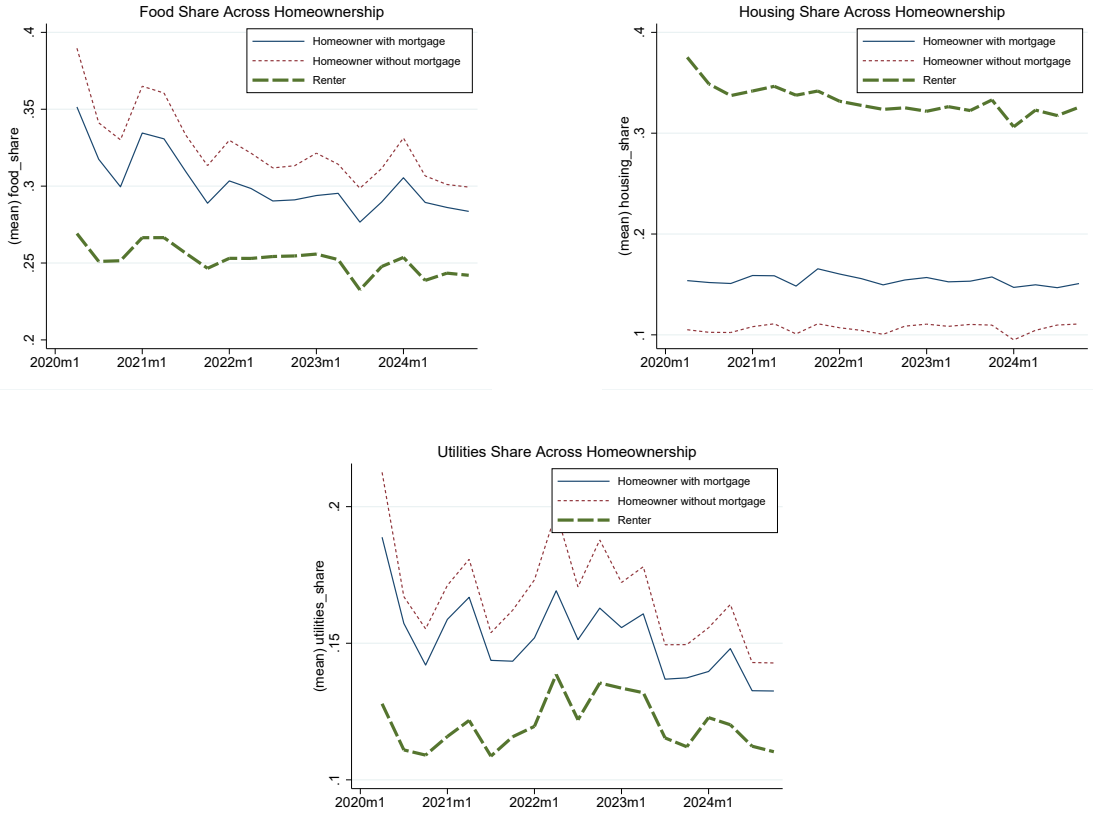


[6]Results on all regressors can be found in Table A3 in Appendix.

Table 5: Average Share Analysis Across Periods (Percentage Points)

	Whole sample 2020:04 - 2024:10	Low inflation 2020:04 - 2021:04	High inflation 2021:07 - 2023:10	Sticky inflation 2024:01 - 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

Figure 5: Spending shares based on home-ownership



When comparing these trends with inflation rates in these categories (Fig-

ure 4), we observe that the decline in spending shares was insufficient to offset rising food and utility prices. Together, these dynamics resulted in higher experienced inflation for homeowners compared to renters.

Cross-country heterogeneity: Table 6 summarizes the results across the six original CES countries. While the findings on homeownership are consistent across all countries, the patterns for income and age vary. Specifically, in the Netherlands, we do not observe the expected relationship for income and age, whereas in Italy, the age effect is particularly pronounced. We report findings for all regressors at the country level in Table A4 in Appendix.

Table 6: 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)
R^2	0.656	0.816	0.748	0.783	0.733	0.619
N observations	19064	50272	52169	51723	54325	18707
Other demographics	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows estimated coefficients from OLS regressions using quarterly data from July 2021 to October 2023 for six original countries in the CES. Renters, individuals in the first income quintile, and those aged 18 to 34 serve as the reference groups. Other demographic controls include education, financial literacy, 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.2 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 7 shows the results. Columns 1 to 3 show that while realized inflation rates significantly explain both perceived inflation over the past 12 months and one-year-ahead expected inflation, they have no impact on three-year-ahead expectations. This finding aligns with Anesti et al. (2024), suggesting that longer-term inflation expectations remain anchored and less influenced by recent personal inflation experiences.

Table 7: Effects of Personal realized inflation on Perceived and Expected Inflation

	(1) Perceived inflation	(2) Exp. inflation in 1 year	(3) Exp. inflation in 3 years	(4) Exp. inflation in 1 year	(5) Exp. inflation in 1 year
Personal inflation	0.0590***	0.0594***	-0.000981		0.0283***
	(0.007)	(0.006)	(0.005)		(0.004)
Perceived inflation				0.480***	0.479***
				(0.004)	(0.004)
R^2	0.220	0.104	0.052	0.412	0.413
N observations	235784	235784	235480	229439	229439
Demographics	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

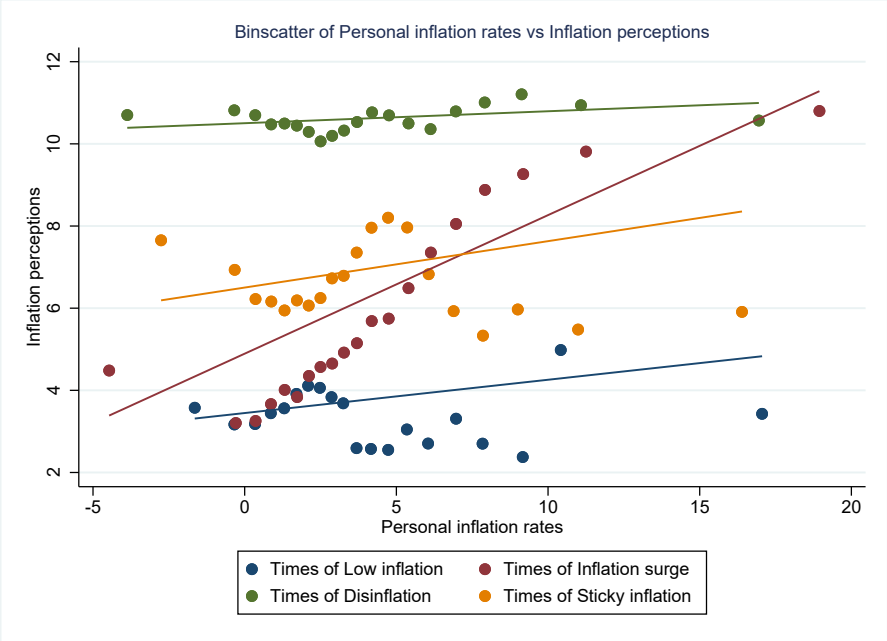
Furthermore, to examine the effects of personal inflation rates on the formation of inflation expectations for the next 12 months, mediated through inflation perceptions over the past 12 months, we include inflation perceptions as a control variable in column 5 of Table 7. Our results indicate that personal realized infla-

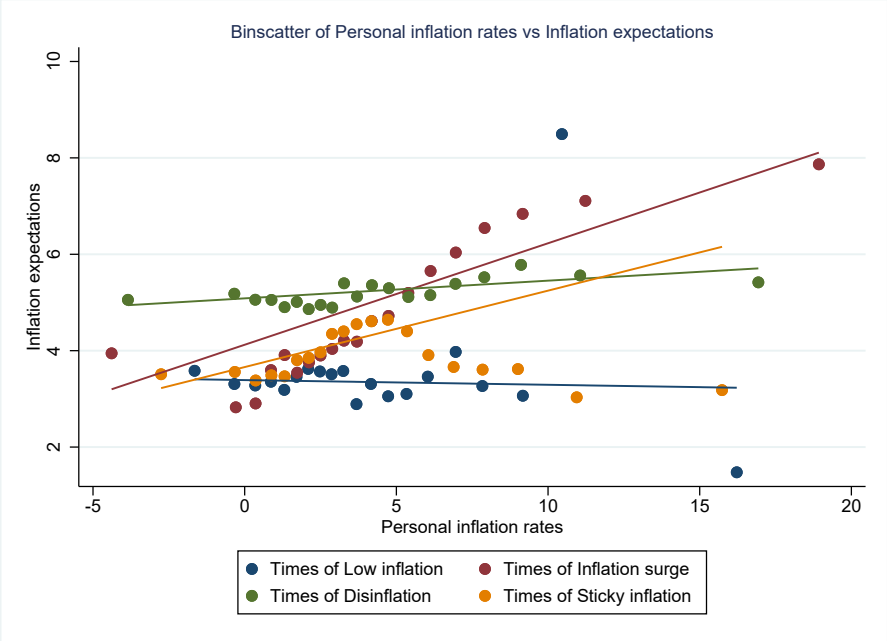
tion rates continue to have a significant impact on inflation expectations; however, the magnitude of the effect is reduced by half. This finding suggests that personal inflation rates influence the formation of inflation expectations primarily through their effect on inflation perceptions. Additionally, we observe that inflation perceptions account for a significant portion of the variation in inflation expectations, consistent with the findings of Weber et al. (2022) for U.S. data during the pandemic.

Next, we examine the heterogeneous effects of personal inflation rates on perceived and expected inflation 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). Figure 6 shows binscatter plots illustrating these relationships.

Interestingly, we find these relationships are strongest during periods of inflation surges, while they are weak or even insignificant during other periods. Specifically, the upper graph in Figure 6 shows that 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. In contrast, the lower graph of Figure 6 illustrates the relationship between personal realized inflation rates and expected inflation over the next 12 months. The results reveal a positive correlation 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.

Figure 6: The relationship of personal inflation rates with perceived and expected inflation over time





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 country fixed effects, age, income, education, financial literacy, housing type, gender, household size, number of children in the house, partnership, and trust in the other people.

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 periods 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.

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

In this subsection, we estimate the effect of personal realized inflation rates on personal income expectations and other macroeconomic outlooks, including mortgage rates, national economic growth, and the national unemployment rate. Table 8 presents the results.

We find 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.

Our results suggest that economic expectations are shaped not only by *subjective* inflation perceptions—an effect well documented in the literature—but also

by *objective* realized inflation rates.

Table 8: 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	-0.020***	0.011***	-0.031***	0.078***
	(0.004)	(0.002)	(0.004)	(0.007)
R^2	0.028	0.126	0.096	0.261
N observations	235673	219012	235640	236201
Demographics	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes

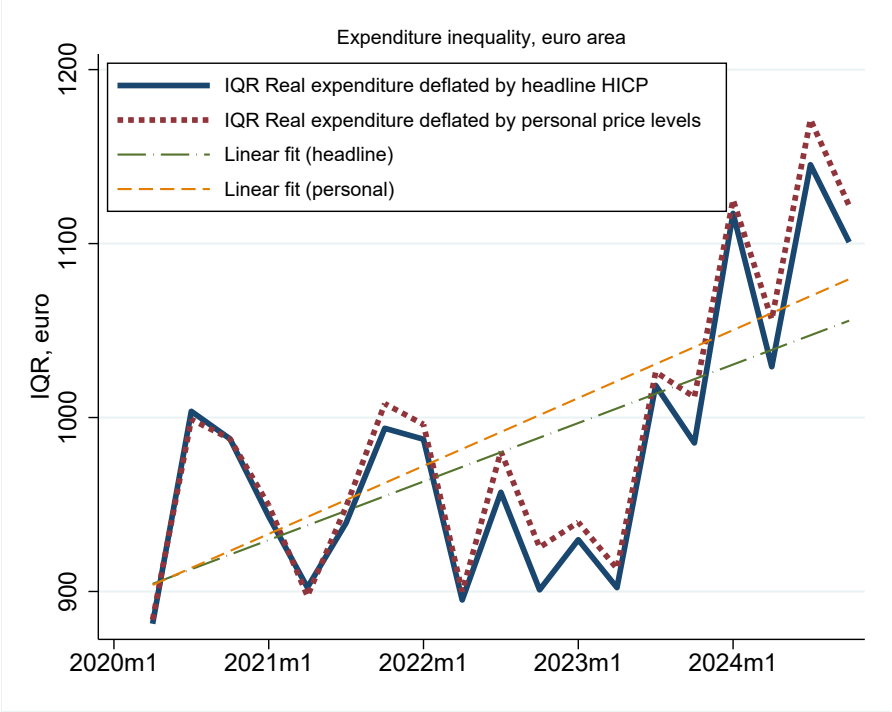
Notes: This table shows estimated coefficients from OLS regressions using quarterly data from April 2020 to October 2024 for six original countries in the CES. Demographic controls include age, income, education, financial literacy, housing type, gender, household size, number of children in the house,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

4 Discussion

Our study provides new insights into inflation heterogeneity among euro area households, leveraging detailed household-level data from the ECB Consumer Expectations Survey (CES). We document how experienced inflation rates vary across demographic and economic groups and show that these disparities evolve over different inflationary environments.

A key contribution of this paper is the finding that homeowners, higher-income, and older households faced lower inflation in stable periods but experienced higher inflation during the recent surge (July 2021–October 2023). This shift was largely driven by rising utility prices and spending shares, which outpaced the mitigating effect of lower food expenditure shares. Additionally, we highlight

Figure 7: 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.

that dispersion in experienced inflation has increased, particularly for households facing higher inflation, which has implications for inequality and policy responses.

Importantly, we also show that realized inflation rates significantly shape inflation perceptions and short-term inflation expectations but 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.

Finally, to highlight the impact of personal inflation rates on expenditure inequality, we compute the interquartile range (IQR) of real total expenditures, deflated using both the headline HICP and personal price levels.[7] Figure 7 presents

[7]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.

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 for real expenditures deflated by personal price levels becomes steeper, suggesting that expenditure inequality intensifies when personal inflation rates are taken into account.

Our findings underscore the need for more targeted monetary policy communication, recognizing the role of individual experiences in inflation perceptions and real spending. Policymakers should consider heterogeneity in inflation burdens when designing economic policies, as inflationary pressures do not affect all households equally. Future research could explore how central bank communication strategies might mitigate the inflation perception gap and whether targeted interventions can help stabilize inflation expectations among the most affected groups.

References

Anesti, N., V. Esady, and M. Naylor (2024, August). Food prices matter most: Sensitive household inflation expectations. Discussion Papers 2434, Centre for Macroeconomics (CFM).

Bańkowska, K., A. M. Borlescu, E. Charalambakis, A. D. D. Silva, D. D. Laurea, M. Dossche, D. Georgarakos, J. Honkkila, N. Kennedy, G. Kenny, A. Kolndrekaj, J. Meyer, D. Rusinova, F. Teppa, and V.-M. Törmälehto (2021, December). Ecb consumer expectations survey: an overview and first evaluation. ECB Occasional Paper Series No 287.

Coibion, O. and Y. Gorodnichenko (2015, January). Is the phillips curve alive and well after all? inflation expectations and the missing disinflation. *American Economic Journal: Macroeconomics 7*(1), 197–232.

D'Acunto, F., U. Malmendier, J. Ospina, and M. Weber (2021). Exposure to grocery prices and inflation expectations. *Journal of Political Economy 129*(5), 1615–1639.

Dräger, L. and G. Nghiem (2025). Inflation Literacy, Inflation Expectations, and Trust in the Central Bank: A Survey Experiment. *The Review of Economics and Statistics, forthcoming*.

Georgarakos, D. and G. Kenny (2022). Household spending and fiscal support during the covid-19 pandemic: Insights from a new consumer survey. *Journal of Monetary Economics 129*, S1–S14.

Kaplan, G. and S. Schulhofer-Wohl (2017). Inflation at the household level. *Journal of Monetary Economics 91*, 19–38. The Swiss National Bank/Study Center Gerzensee Special Issue: "Modern Macroeconomics: Study Center Gerzensee Conference in Honor of Robert G. King" Sponsored by the Swiss National Bank and the Study Center Gerzensee.

Malmendier, U. and S. Nagel (2016, 10). Learning from Inflation Experiences *. *The Quarterly Journal of Economics 131*(1), 53–87.

Pallotti, F., G. Paz-Pardo, J. Slacalek, O. Tristani, and G. L. Violante (2024). Who bears the costs of inflation? euro area households and the 2021–2023 shock. *Journal of Monetary Economics 148*, 103671. Inflation in the COVID Era and Beyond.

Weber, M., B. Candia, T. Ropele, R. Lluberas, S. Frache, B. H. Meyer, S. Kumar, Y. Gorodnichenko, D. Georgarakos, O. Coibion, G. Kenny, and J. Ponce (2025). Tell me something i don't already know: Learning in low and high-inflation settings. *Econometrica 1*(93), 229–264.

Weber, M., Y. Gorodnichenko, and O. Coibion (2022, January). The expected, perceived, and realized inflation of u.s. households before and during the covid19 pandemic. Working Paper 29640, National Bureau of Economic Research.

A COICOP classes for HICP-CES mapping

Table A1: 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

B HICP vs CES weights

Figure A1: HICP vs CES weights at the country level (Part I)

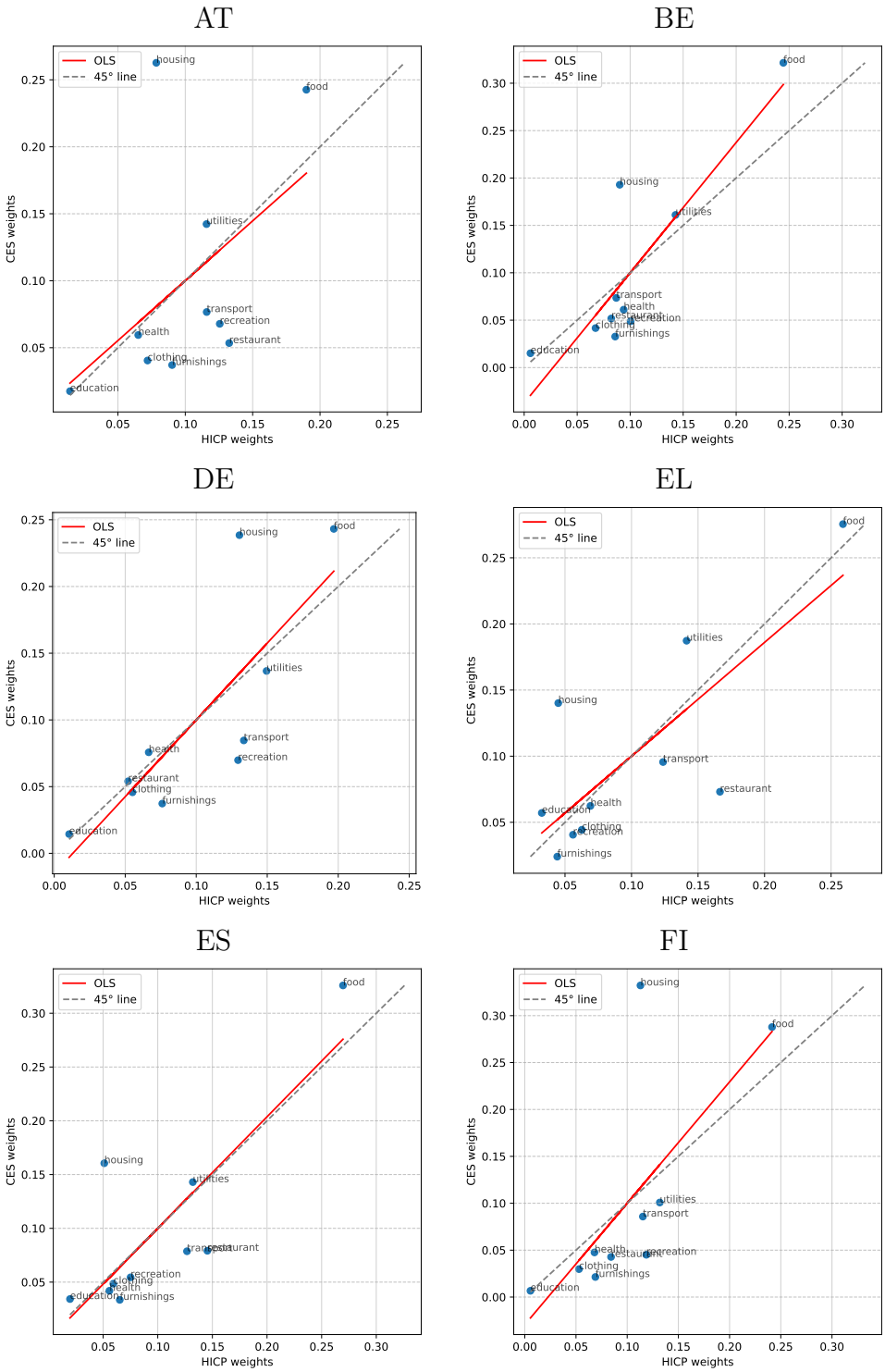
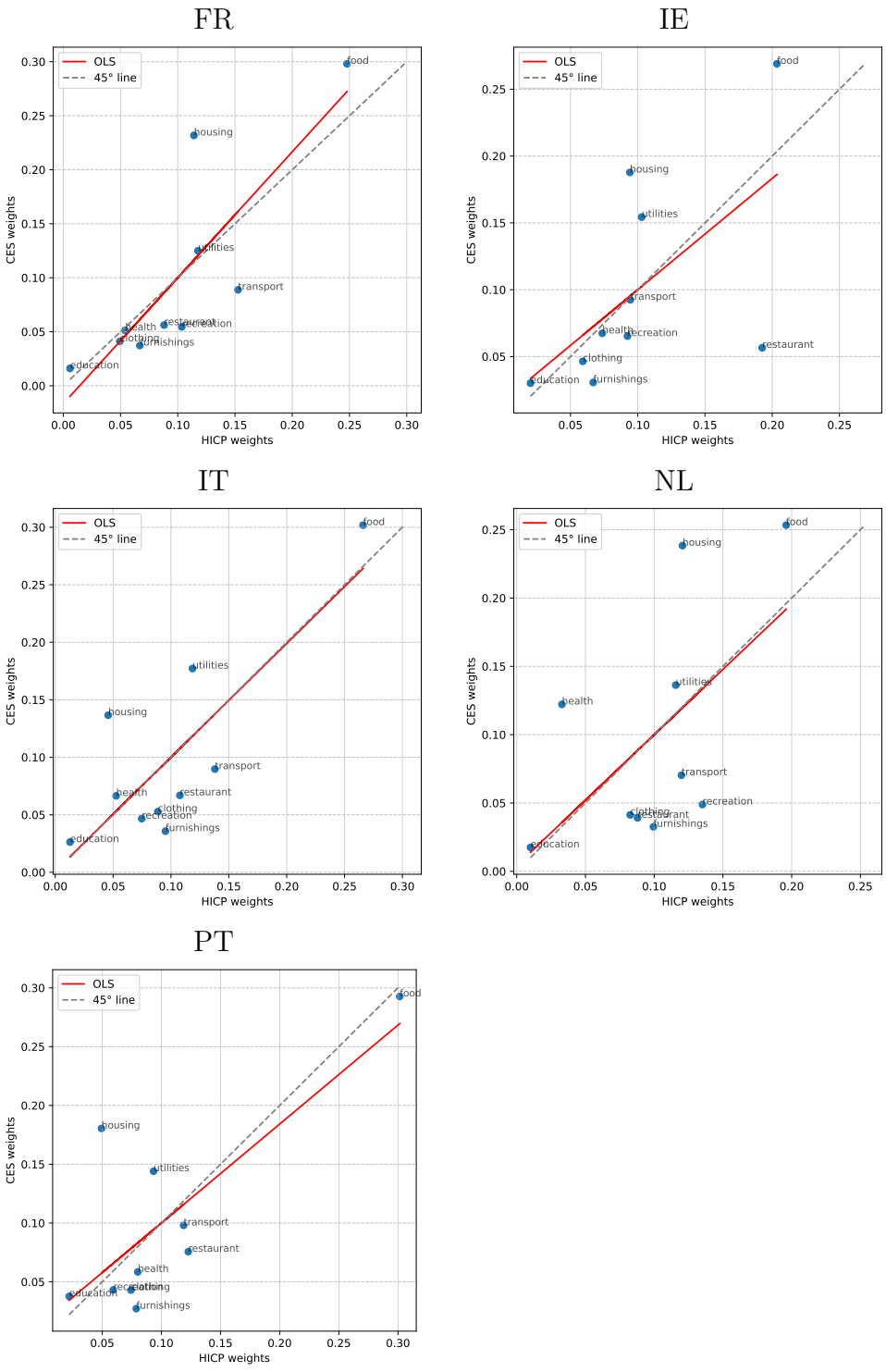


Figure A2: HICP vs CES weights at the country level (Part II)



C Main results - complete

Table A2: Determinants of Personal Inflation Rate

	(1) Whole sample 2020:04 - 2024:10	(2) Low inflation 2020:04 - 2021:04	(3) High inflation 2021:07 - 2023:10	(4) Sticky inflation 2024:01 - 2024:10
Owner with mortgage	0.51***	-0.18***	1.02***	-0.11***
	(0.022)	(0.012)	(0.036)	(0.016)
Owner without mortgage	0.65***	-0.17***	1.27***	-0.14***
	(0.022)	(0.012)	(0.035)	(0.015)
Income Q2	0.040	0.0025	0.034	0.056**
	(0.030)	(0.016)	(0.048)	(0.022)
Income Q3	-0.072**	0.017	-0.22***	0.10***
	(0.030)	(0.016)	(0.048)	(0.022)
Income Q4	-0.15***	0.032**	-0.28***	0.18***
	(0.031)	(0.016)	(0.049)	(0.022)
Income Q5	-0.26***	0.088***	-0.54***	0.21***
	(0.032)	(0.017)	(0.051)	(0.023)
Age 35-49	0.097***	-0.031**	0.17***	-0.028
	(0.027)	(0.015)	(0.043)	(0.018)
Age 50-70	0.17***	-0.047***	0.29***	-0.025
	(0.028)	(0.015)	(0.045)	(0.019)
Age 71+	0.17***	-0.050**	0.23***	-0.0065
	(0.040)	(0.021)	(0.064)	(0.025)
Middle education	-0.019	0.038**	-0.059	-0.041**
	(0.030)	(0.015)	(0.048)	(0.021)
High education	-0.15***	0.042***	-0.29***	0.010
	(0.027)	(0.014)	(0.044)	(0.019)
Financial literacy	-0.059***	0.014	-0.11***	-0.0064
	(0.018)	(0.010)	(0.029)	(0.012)
Female	-0.015	-0.013	0.0077	-0.054***
	(0.017)	(0.010)	(0.028)	(0.012)
HH size	0.087***	-0.0016	0.15***	-0.033***
	(0.012)	(0.006)	(0.019)	(0.009)
Number of children	-0.094***	0.016**	-0.20***	0.077***
	(0.016)	(0.008)	(0.025)	(0.011)
With partner	-0.037*	-0.0013	-0.100***	0.020
	(0.022)	(0.012)	(0.035)	(0.016)
Trust people	-0.0020	0.0017	-0.017***	0.0081***
	(0.004)	(0.002)	(0.006)	(0.002)
R^2	0.546	0.323	0.416	0.470
N observations	246260	49933	135806	60521

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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Determinants of Personal Inflation Rates: Times of High Inflation

	(1)	(2)
	Times of high inflation: 2021:07 - 2023:10	
	Inflation surge 2021:07-2022:10	Disinflationary phase 2023:01 - 2023:10
Owner with mortgage	1.39***	0.33***
	(0.049)	(0.040)
Owner without mortgage	1.72***	0.51***
	(0.047)	(0.035)
Income Q2	-0.083	0.074
	(0.064)	(0.049)
Income Q3	-0.43***	0.042
	(0.064)	(0.051)
Income Q4	-0.63***	0.087*
	(0.065)	(0.052)
Income Q5	-1.06***	0.066
	(0.069)	(0.056)
Age 35-49	0.26***	0.023
	(0.060)	(0.050)
Age 50-70	0.37***	0.089*
	(0.063)	(0.050)
Age 71+	0.36***	0.0016
	(0.087)	(0.066)
Middle education	-0.062	0.055
	(0.065)	(0.051)
High education	-0.35***	-0.041
	(0.059)	(0.048)
Financial literacy	-0.21***	-0.015
	(0.040)	(0.031)
Female	0.061	-0.14***
	(0.038)	(0.030)
HH size	0.16***	0.13***
	(0.026)	(0.020)
Number of children	-0.28***	-0.040
	(0.034)	(0.029)
With partner	-0.15***	0.087**
	(0.048)	(0.036)
Trust people	-0.020**	0.0051
	(0.008)	(0.006)
R^2	0.482	0.453
N observations	80958	54848

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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4: 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$