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# MEASURING INFLATION EXPECTATIONS OF HOUSEHOLDS IN EURO AREA : THE EFFECT OF PANEL CONDITIONING

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*EEA*
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# NEW HOUSEHOLD SURVEYS & METHODOLOGICAL ISSUES

- **Many new household expectations surveys over the last 15 years:**
  - Developed by central banks: FRB NY-SCE (2012), Bank of Canada (2015), ECB-CES (2020)…
  - Household expectations matter for their decisions + monitoring CB credibility among households (& communication issues)

- **Households are less attentive and accurate** on inflation than firms or professional forecasters

- Raising a lot of « new » **methodological issues** (Armentier et al. 2013)
  - How to design questionnaires (« price » vs. « inflation », probabilistic questions…)
  - How to incentivize households to answer,…

# A MUCH LONGER PANEL DIMENSION

- **Repeated participation to the survey**:
  - Existing surveys (Michigan, EC surveys) interview households at maximum three times
  - The « new » generation of households surveys have a longer panel dimension (interviewing households more than 12 times)

*« Respondents participate in the panel for up to twelve months, with a roughly equal number rotating in and out of the panel each month.* ***Unlike comparable surveys based on repeated cross-sections with a different set of respondents in each wave, our panel enables us to observe the changes in expectations and behavior of the same individuals over time****." (FRB NY- SCE publications)*

  - In the ECB-CES, the maximum tenure is even longer (24 months)

- However, **repeated participation** in surveys can also affect households' answers ("panel conditioning") (Kim & Binder 2023)
  - Answers on inflation are very sensitive to the survey framing
  - Repeated participation = more attention, better forecasts
  - Less spontaneous answers, possibly less representative of the general population

# MAIN FINDINGS

- **Sizeable panel conditioning effects (= tenure effect)**
  - 2pp after 12 months for 1-year expectations (larger for perceptions)
  - Strongly affects level of aggregate variables but not their evolution

- Much stronger **tenure effects** when households **initially less attentive to inflation** but **also be partly related to survey fatigue**

- **Panel conditioning effects** are also strong for macro variables in general less for household-level variables such as their own income or consumption

# CONSUMER EXPECTATION SURVEY

- **Consumer Expectations Survey (launched in 2020)**
  - Benchmark indicators of inflation expectations of households in the euro area which are regularly used for policy speeches and monitored by ECB watchers

- **Main features**
  - 20,000 households interviewed online each month in 11 countries
  - Covers the full 2020-24 inflation cycle
  - Rotating panel: ECB targets ”maximum participation” of 24 survey waves (while some respondents exceed 36 months)
  - Perceptions + quantitative expectations covering country-specific inflation, unemployment but also personal income or consumption expentitures

# THREE QUESTIONS TO LOOK AT INFLATION EXPECTATIONS

**Qualitative** *The next few questions are about future changes in **prices in general** in France. Looking ahead to 12 months from now, what do you think will happen to prices in general? We are interested in even very small changes.*

1. *They will increase a lot*
2. *They will go down a lot*
3. *They will increase a little*
4. *They will drop a little*
5. *They will be exactly the same (i.e. a change close to 0%)*

**Quantitative** *How much do you think prices in general will be 12 months from now in France? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place. ___%*

**Probabilistic** *Below you see 10 possible ways in which prices could change. Please distribute 100 points among them, to indicate how likely you think it is that each price change will happen. The sum of the points you allocate should total to 100.*

*Percent Change*

*Increase by 12% or more ___%*
*…….*
*Increase by 0% to less than 2% ___%*
*…….*

*Decrease by 2% to less than 4% ___%*
*….*
*Decrease by 12% or more ___%*

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# ESTIMATION OF THE PANEL CONDITIONING ("TENURE EFFECT")

- **Estimation of the tenure effect β** on inflation expectations ***y***.
- ***τ*** is a dummy variable for the **tenure *s***

$$y_{it} = \sum_{s=1}^{24} \beta_s \tau_s + \gamma X_i + \lambda_t + \mu_c + \lambda_t * \mu_c + \varepsilon_{it}$$

- **Benchmark specification**
  - Time fixed effects ($\lambda_t$) x Country dummy ($\mu_c$) (control for country-specific macro evolutions like inflation)
  - Controls for observable households characteristics (gender, age, eductation, income quintile…) ($X_i$)
  - Robustness checks with alternative specifications
  - Estimation period: April 2020 - December 2024

$\beta_s$ as the systematic deviation of the answer given after *s* participations to the survey (from the initial answer given at *s=1*)

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# SAMPLE SELECTION

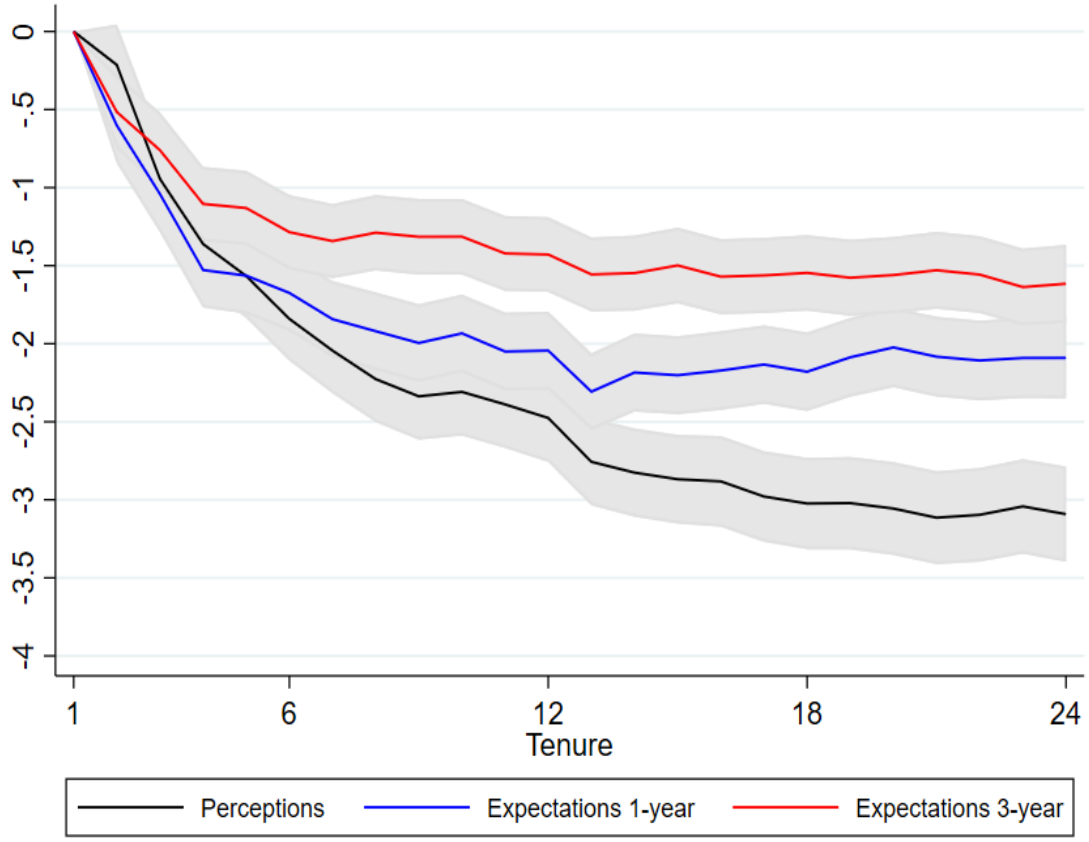
- **Attrition bias**: **restriction to respondents who participate in the survey for 24 waves** (similar strategy proposed by Kim and Binder, 2023) ("non-attriters")

- **Outliers: observations winsorized** at the 2nd and 98th percentiles of each survey round.

- N=200,000 obs. ~= **10% of respondents who participated in the survey during our sample period**

# TENURE EFFECT

## Average tenure effects in the euro area
(in pp)




Source : ECB-CES

- Short-run inflation expectations display greater tenure effects than long-run
- Large revisions after some months, the effect is then close to its maximum after a tenure of 12
- Some heterogeneity across households

# IMPACT ON AGGREGATE INFLATION EXPECTATION VARIABLES

- We compute a corrected series accounting for the panel conditioning
- For every individual with tenure s in our sample, we calculate a counterfactual inflation expectation *y*

$$\tilde{y}_{i(s)t} = y_{i(s)t} + \hat{\beta}_s$$

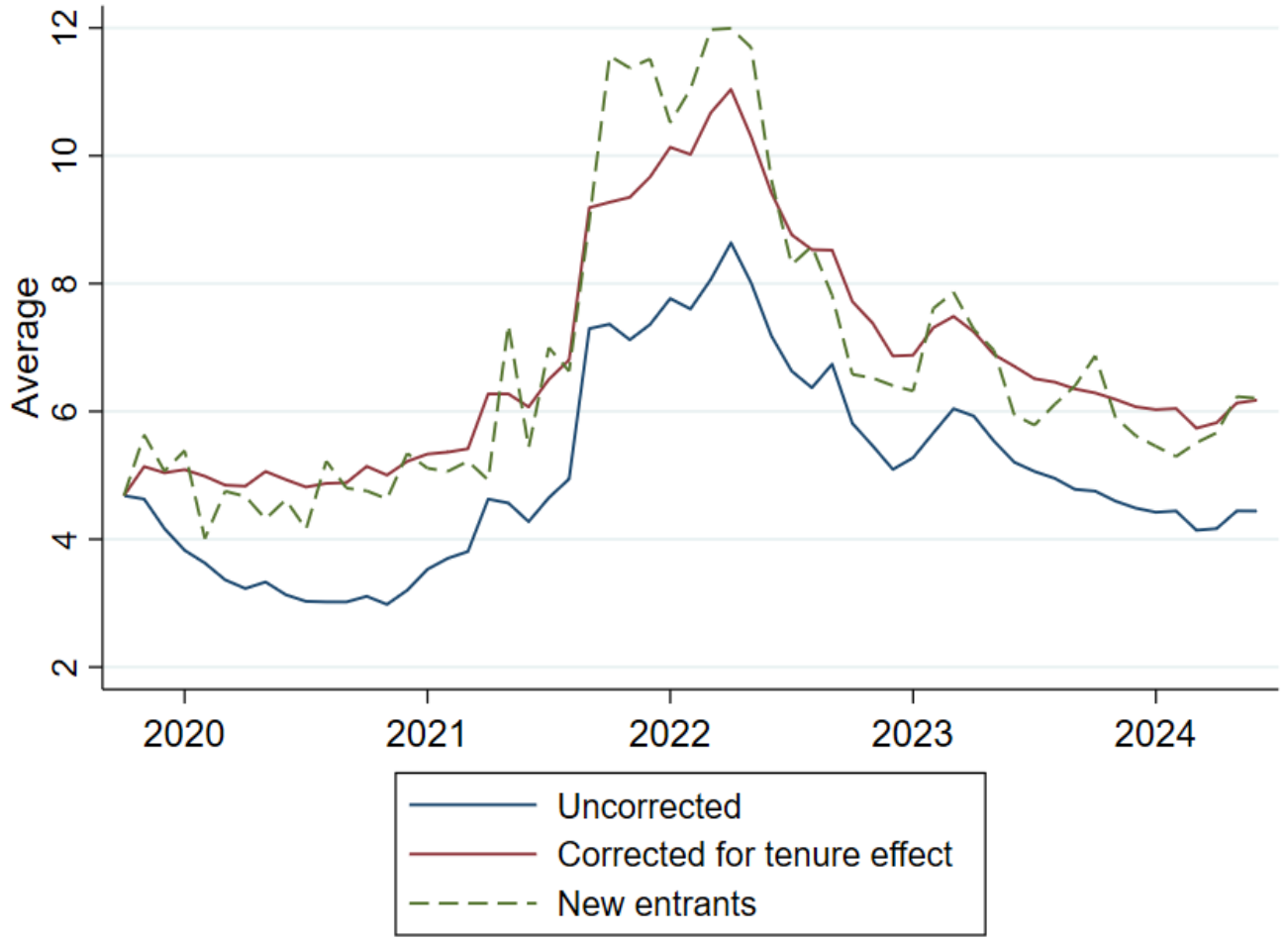
$s = 1,\ldots,24$

- Compare this measure taking into account tenure effects with the average of answers given by « new entrants » in the survey

# CORRECTING FROM PANEL CONDITIONING

## Systematic gap between the corrected and uncorrected series

**Mean inflation expectations** (in %, EA)



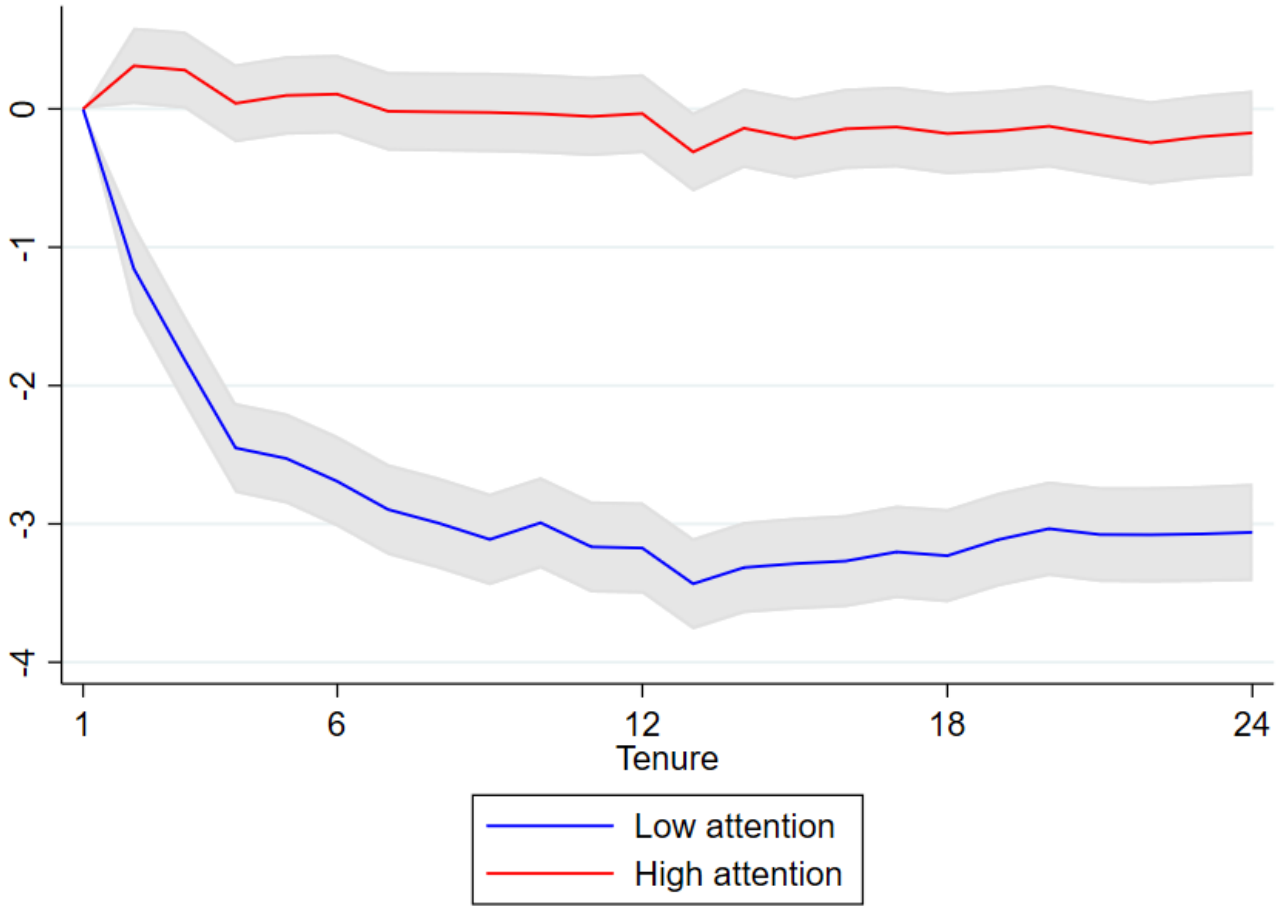

Source : ECB-CES

# INVESTIGATING POSSIBLE DETERMINANTS OF TENURE EFFECTS

- Several mechanisms contribute to the tenure effects:
  - Households with initially high expectations become more attentive or engage in a greater search for information (**Attention effect)**
  - Households may become better at forecasting inflation **(Improve accuracy without additional information)**
  - Households may become more certain but less devoted (**Fatigue effect)**

# MECHANISMS : INATTENTION TO INFLATION (YES)

**Effect of tenure on the distribution of expectations** (in pp, EA)
by initial level of attention

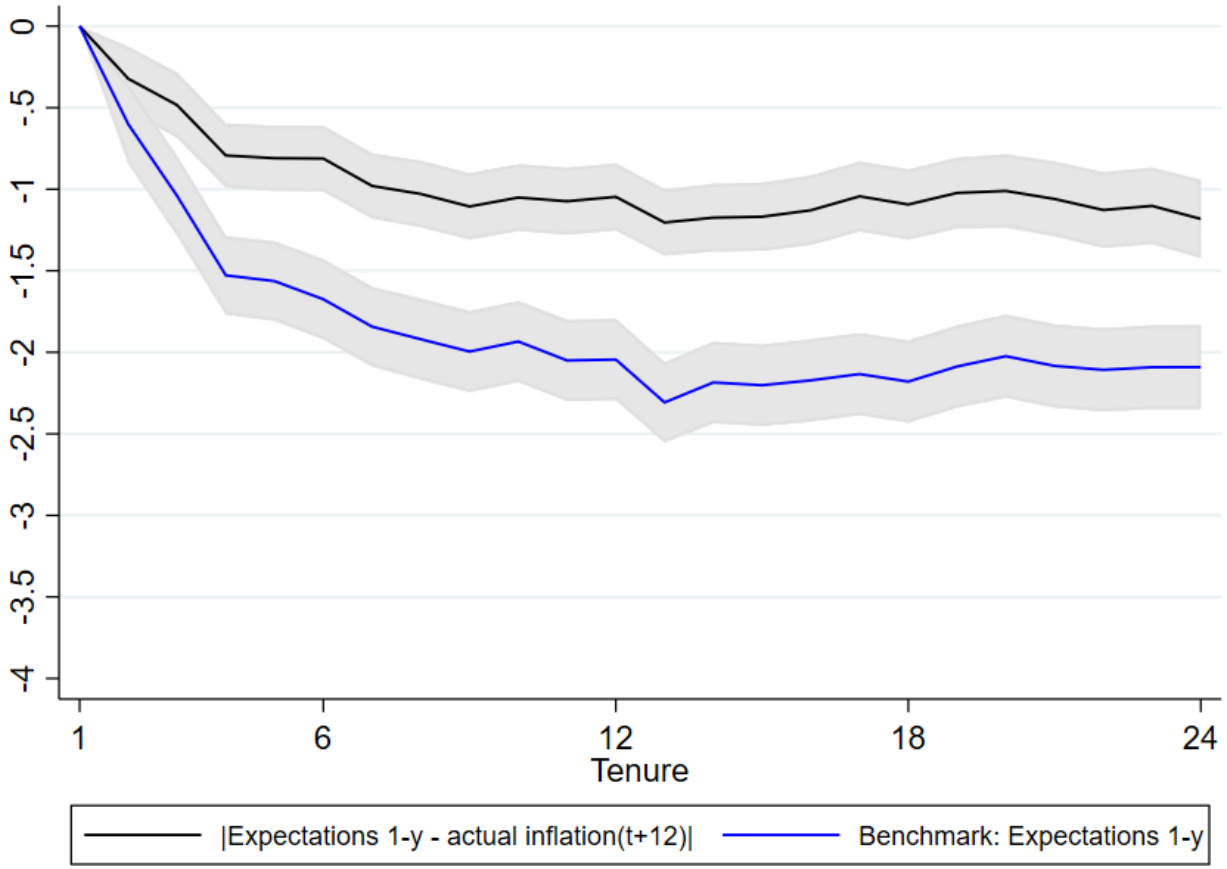



Attention is defined as the distance between initial inflation perception and actual country inflation

# MECHANISMS: ATTENTION, ARE HOUSEHOLDS BETTER FORECASTER? (NOT FULLY)

## Tenure effects estimated on 1-year inflation forecast error

(in pp)




- Tenure effects can reflect better forecast ability. Test whether tenure effects = smaller forecast error
- Tenure effects exceed forecast errors in absolute values

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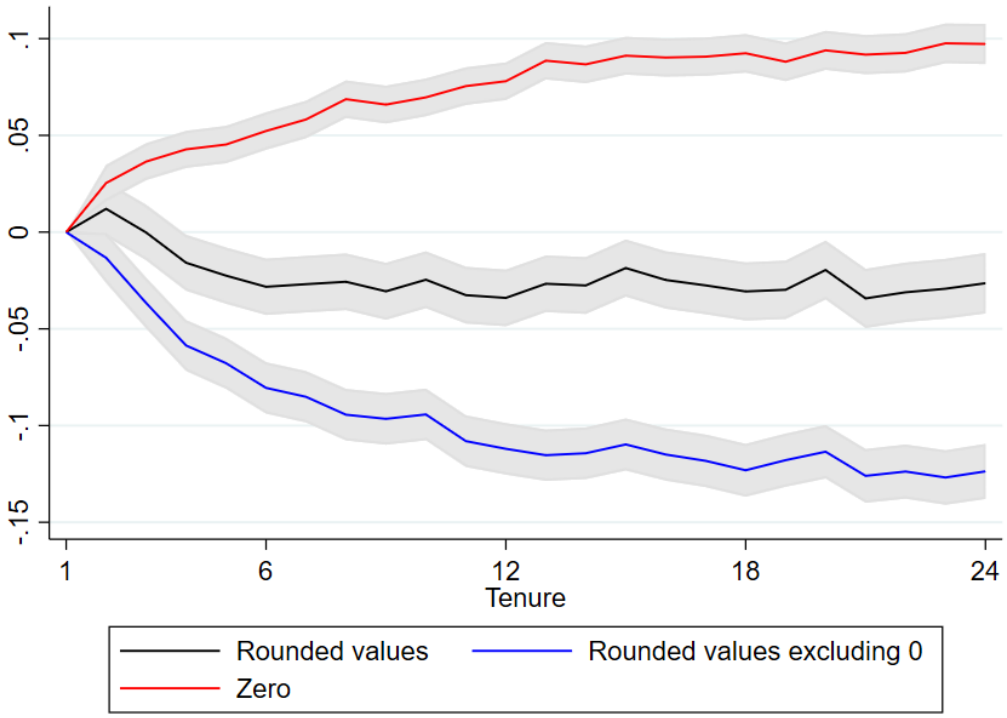
# MECHANISMS: UNCERTAINTY VS. SURVEY FATIGUE? (BOTH)

A rounding number is often associated with more uncertainty.
Test whether tenure means less uncertain answers

**Effect of tenure on round numbers**
(change in probability, in pp)




- Households are less likely to provide a rounded answer

BUT:

- Households are more likely to provide a "0" answer (= qualitative question prices will remain “exactly the same”) (speed through)

- Households are less likely to answer inflation expect 5%, 10%, 15%, 20%

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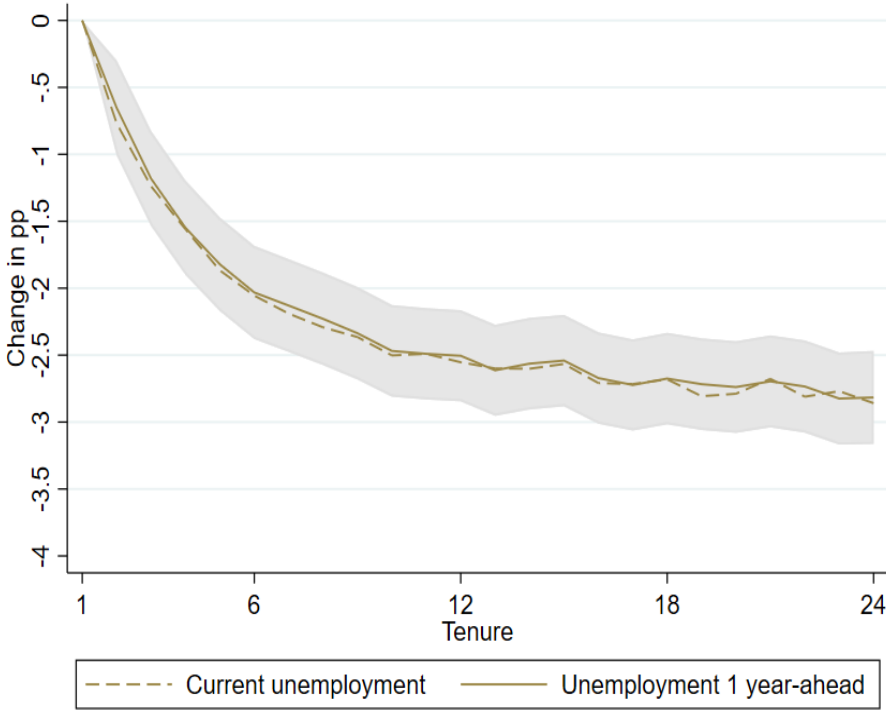
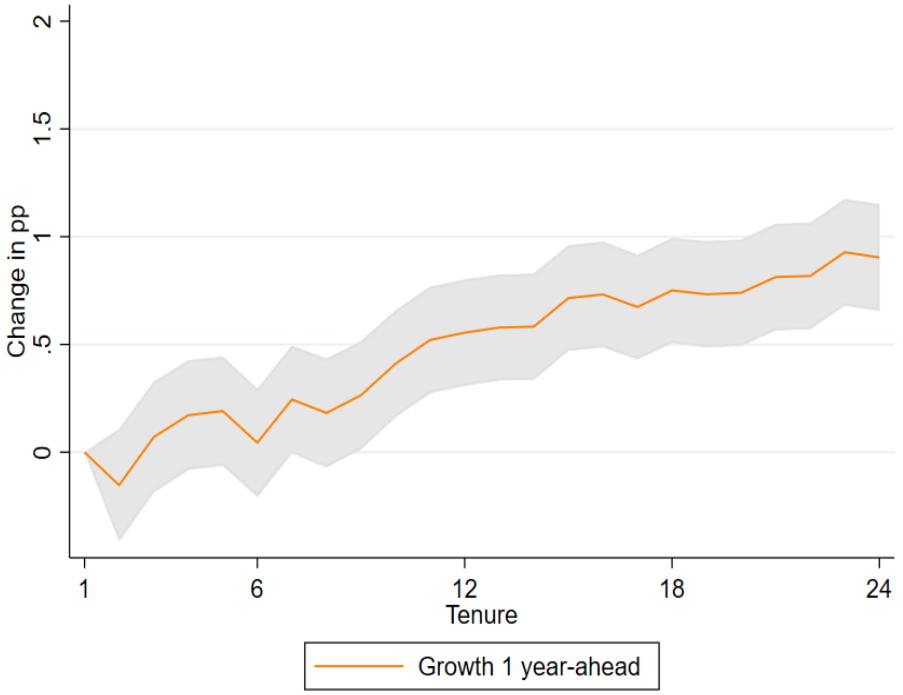
# PANEL CONDITIONING ON OTHER MACRO EXPECTATIONS

More optimistic views on the real economy when they participate several times in the survey

**Effect of tenure on unemployment expectations**
(in pp, EA)




**Effect of tenure on growth expectations**
(in pp, EA)

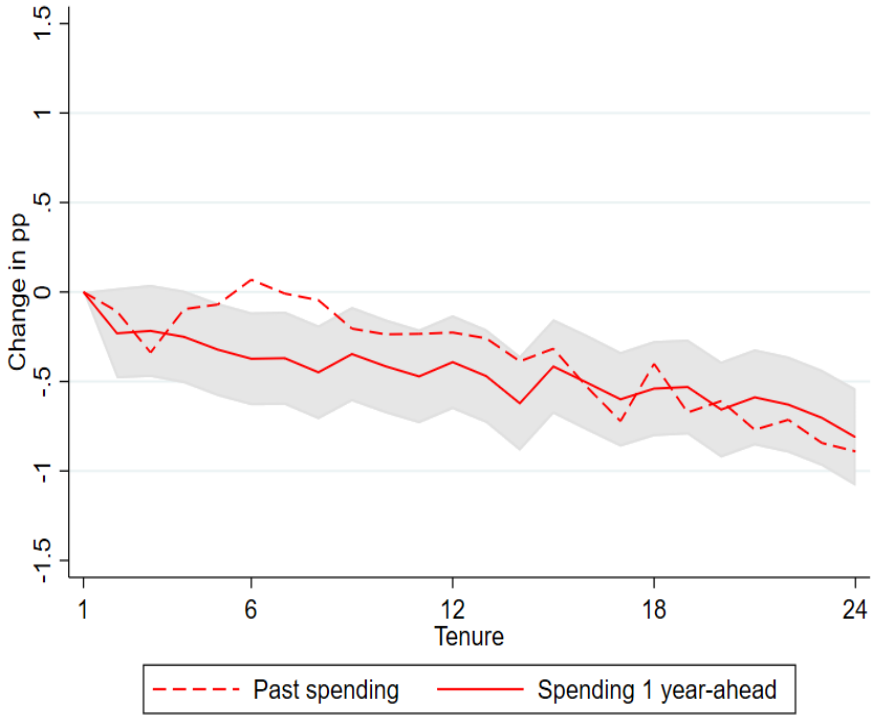



Source : ECB-CES

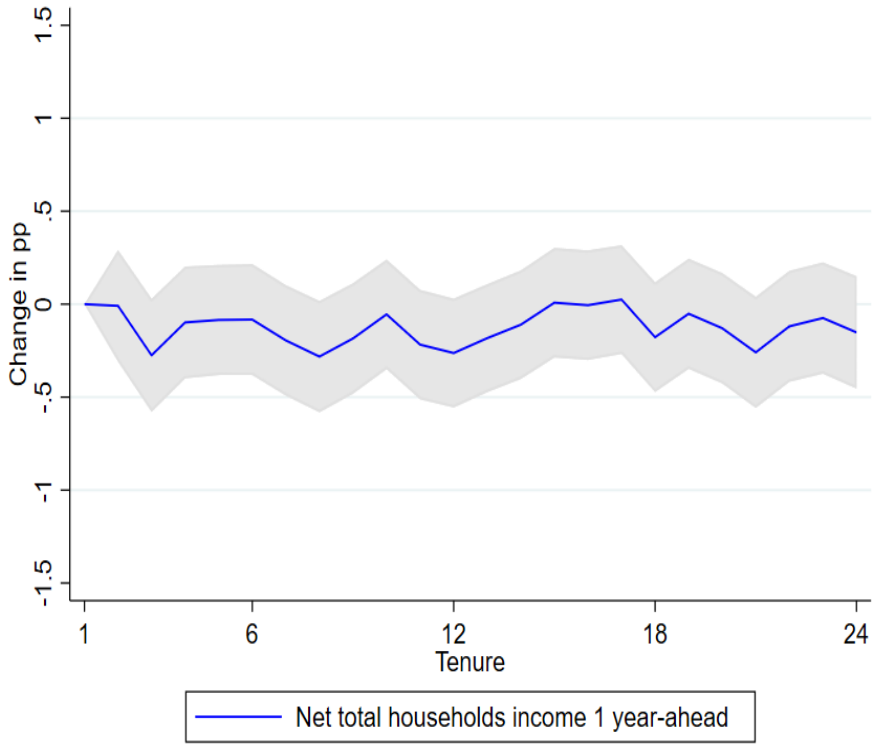
# TENURE EFFECTS ON HOUSEHOLDS OWN VARIABLES

Households are more attentive or informed about their own situation than about the macro variables

**Effect of tenure on consumption expectations**
(in pp, EA)




**Effect of tenure on personal income expectations**
(in pp, EA)




*Source : ECB-CES*

# CONCLUSION

- **Large and significant tenure effects in the ECB-CES**
- **Leading to a higher level of aggregate inflation expectation** but developments would be similar
- **Increased attention improves accuracy** by aligning expectations with new information
- **The tenure effect is crucial when comparing different surveys**: ECB-CES vs EC survey or FRBNY-SCE vs Michigan Survey of Consumers (Coibion & Gorodnichenko 2025)

# BACKGROUND

# WHAT DO WE DO?

1. **We estimate of panel conditioning effects** on inflation expectations for the **euro area** ECB-CES survey

2. **We investigate possible determinants** for panel conditioning effects (attention? survey fatigue?)

3. We extend the analysis of panel conditioning effects **to unemployment, economic activity, personal income expectations**

# LITERATURE REVIEW AND CONTRIBUTIONS

- Tenure effects are mainly documented :
  - For the FRB-NY-SCE

    Kim and Binder (2023), Mitchell et al. (2024)

    ***New evidence on the main euro area survey (larger, more countries covered, high/low inflation periods…)***
  - For inflation expectations

    ECB-CES covers several more quantitative questions like unemployment or own income…

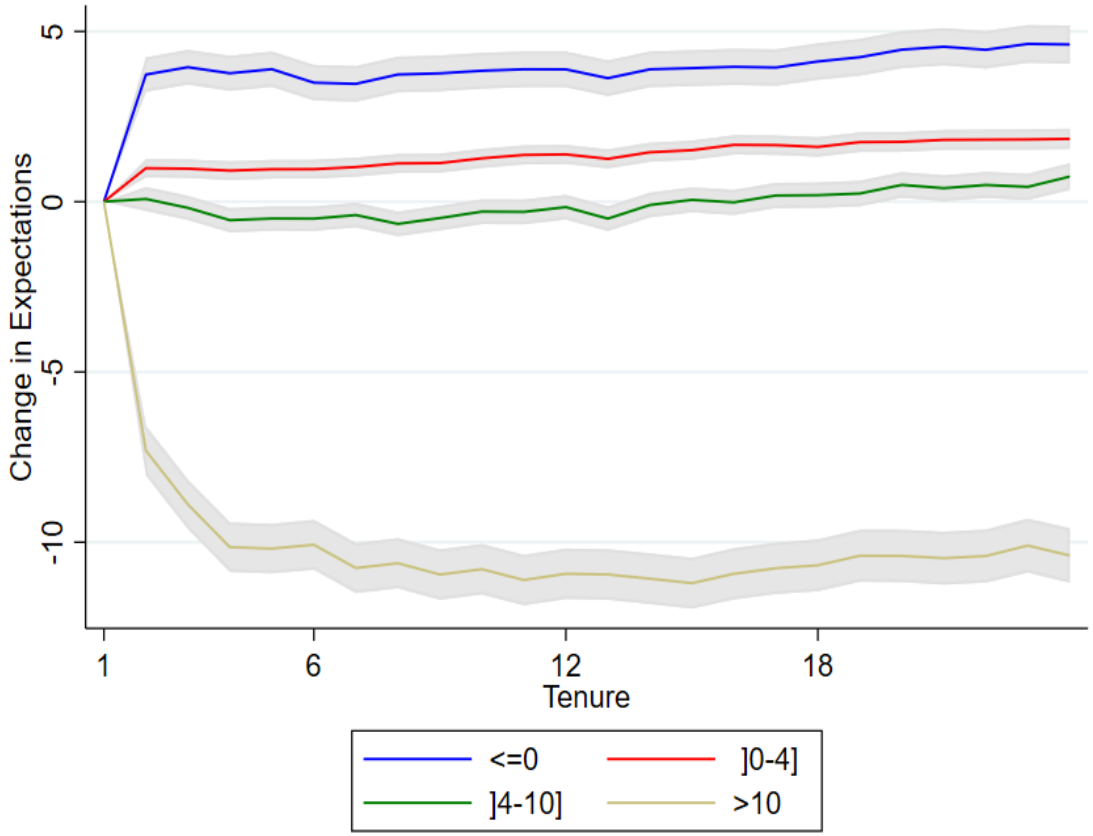
    ***New results and a comparison with other macro / micro variables than inflation***
- Tenure effects are often associated with better attention or better forecast abilities

  ***Better forecasting ability can not fully explain tenure effects***

# HETEROGENEITY OF THE TENURE EFFECT ALONG THE DISTRIBUTION OF ANSWERS

Most of the average tenure effect is driven by households entering the survey with high inflation expectations

**Effect of tenure on the distribution of expectations** (in pp, EA)
by initial point estimate

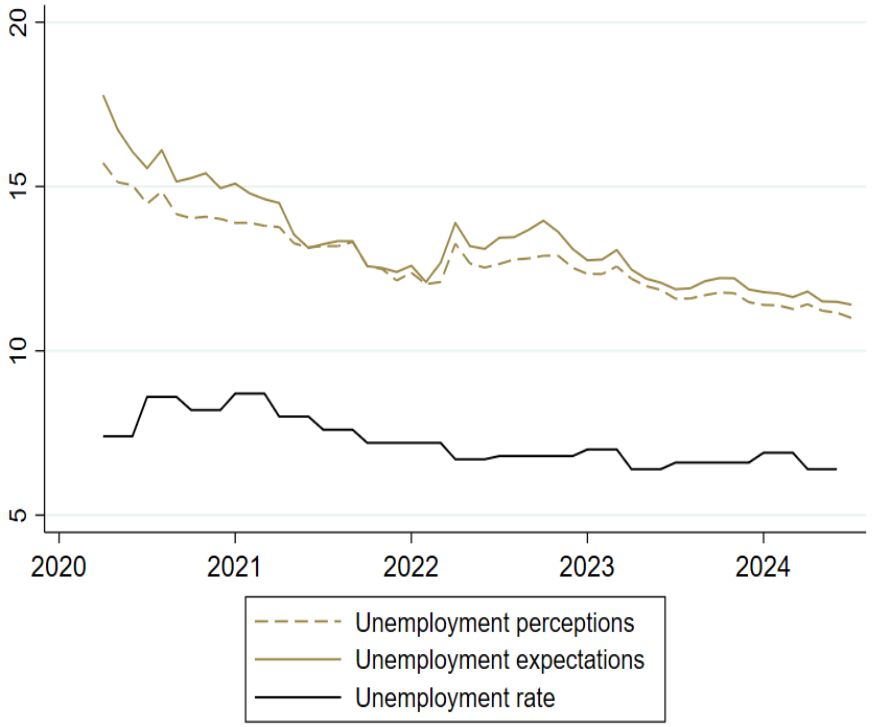



Source : ECB-CES

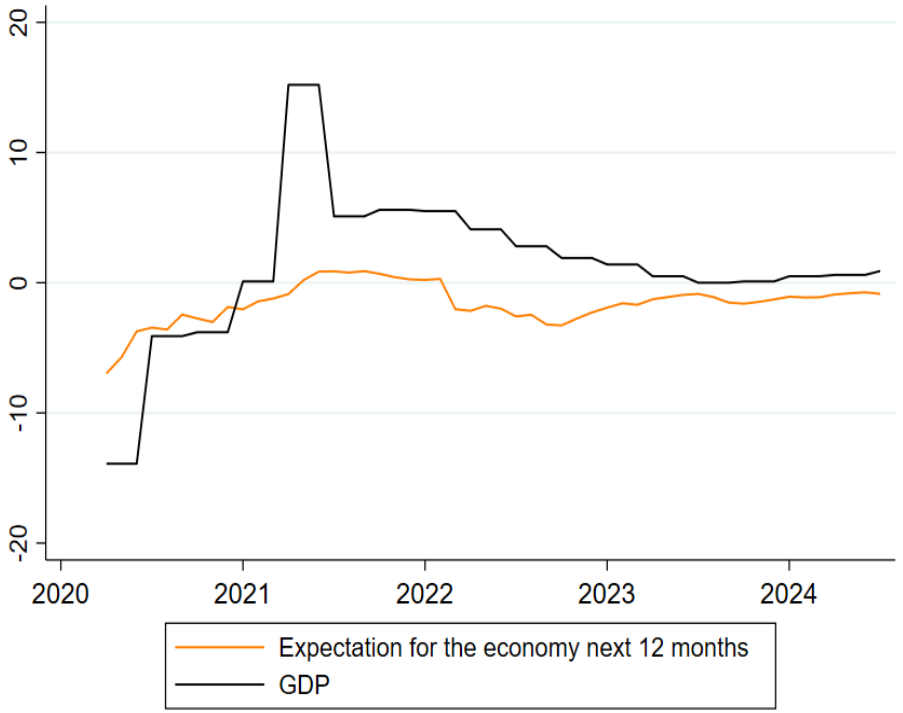
# INVESTIGATING OTHER MACRO VARIABLES

Expectations vs. aggregate statistics: households tend to overestimate the unemployment rate and to underestimate economic growth

**Unemployment rate** (in %)




**Economic activity** (y-o-y growth rate, in %)

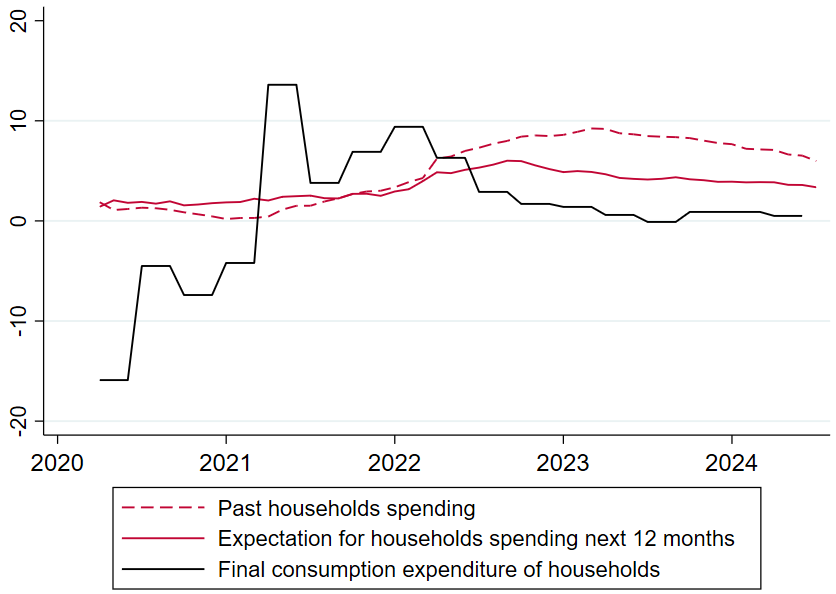



Source : ECB-CES

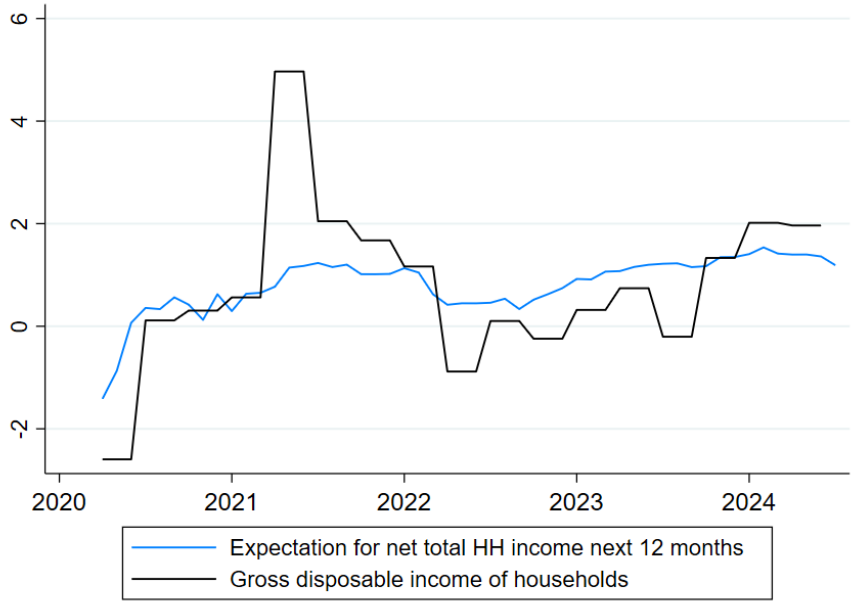
# HOUSEHOLDS OWN VARIABLES

No systematic bias but also weaker correlation between actual and perceived variables

**Perceived and 1-year expected growth of spending consumption**
(y-o-y growth rate, in %)




**Household net income**
(y-o-y growth rate, in %)

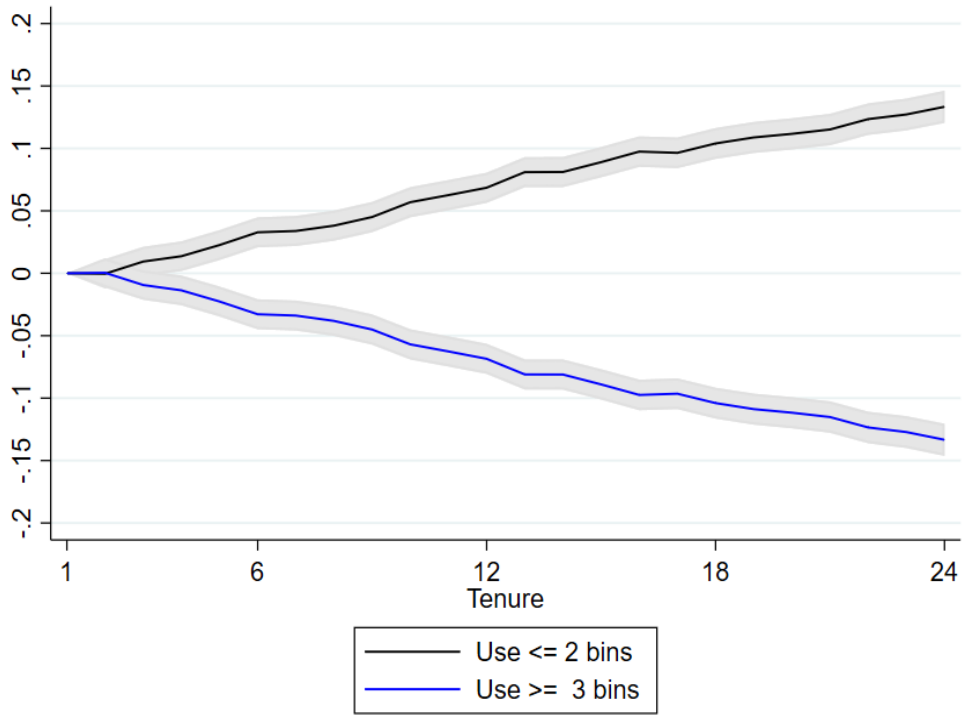



Source : ECB-CES

# MECHANISM: UNCERTAINTY VS. SURVEY FATIGUE (BOTH)

The share of respondents filling 2 or less bins increases with tenure (Mitchell et al., 2024)

**Effect of tenure on the use of bins** in probabilistic questions (in pp)



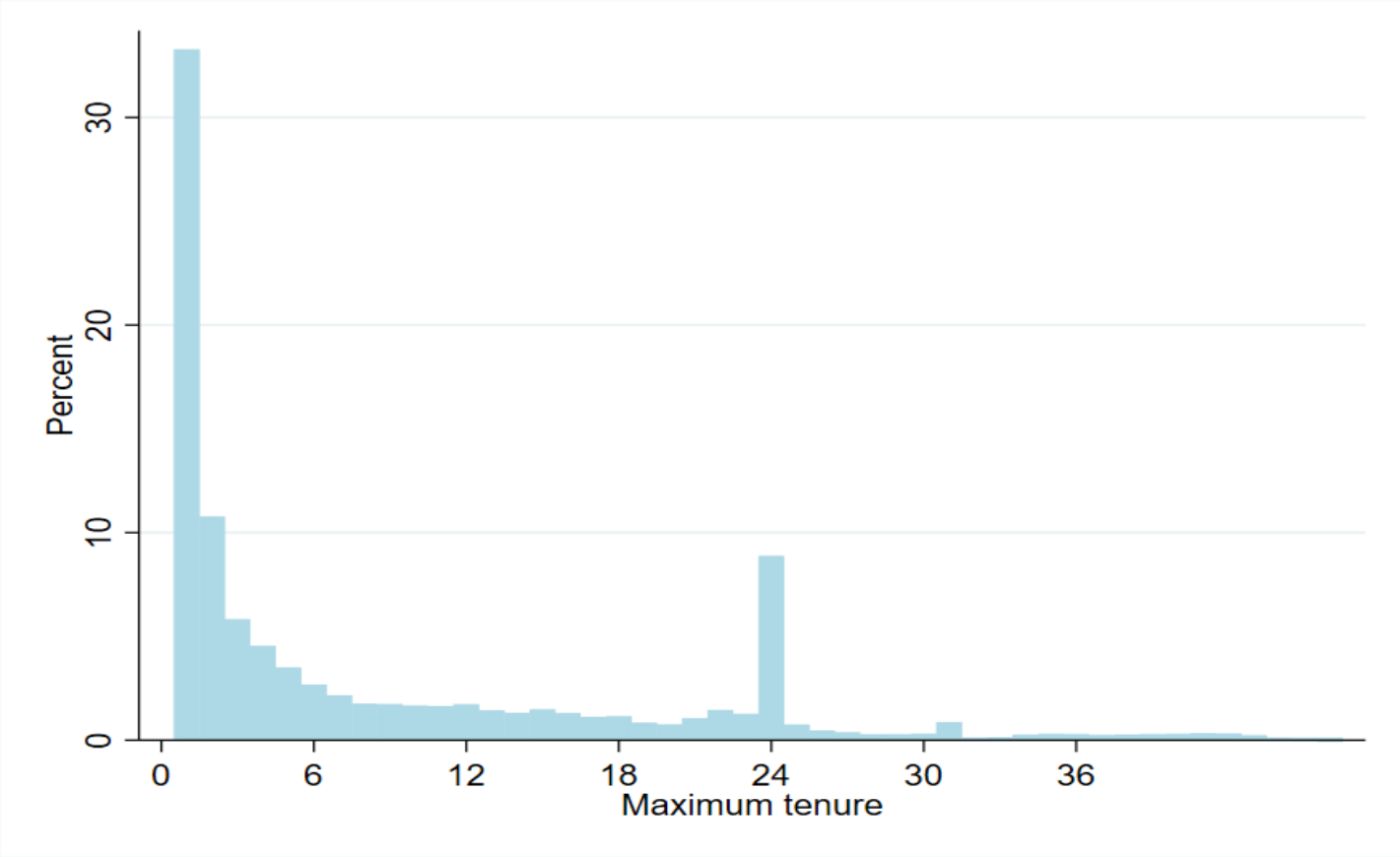

Increasing survey fatigue when respondents participate repeatedly in the survey (speed-through" behavior)

Disentangling genuine learning effects from the confounding effects of survey fatigue is rather difficult in our context

# DISTRIBUTION OF MAXIMUM TENURE

"Maximum tenure" refers to the number of past survey participation (including the current survey wave)

**% of respondents by maximum Tenure**




Source : ECB-CES, Full sample, all waves pooled

# DETERMINANTS OF ATTRITION

Table A.1: Respondent Characteristics by Tenure (in %)

| Tenure (months) | 1 | 6 | 12 | 18 | 24 |
|---|---|---|---|---|---|
| **Gender** | | | | | |
| Men | 46.3 | 50.3 | 51.3 | 50.7 | 49.8 |
| Women | 53.7 | 49.6 | 48.7 | 49.3 | 50.2 |
| **Age** | | | | | |
| 18-34 years | 30.1 | 21.3 | 21.0 | 20.8 | 19.8 |
| 35-49 years | 41.3 | 44.1 | 44.8 | 45.7 | 46.2 |
| + 50 years | 28.6 | 34.6 | 34.2 | 33.5 | 34.00 |
| **Education** | | | | | |
| Primary | 11.9 | 11.6 | 11.5 | 11.4 | 11.2 |
| Secondary | 34.7 | 32.6 | 32.9 | 33.2 | 32.7 |
| Tertiary | 53.4 | 55.8 | 55.6 | 55.4 | 56.1 |
| **Income** | | | | | |
| Quintile 1 | 20.7 | 19.6 | 20.4 | 21.3 | 22.4 |
| Quintile 2 | 19.7 | 19.5 | 20.2 | 19.9 | 20.7 |
| Quintile 3 | 18.7 | 19.4 | 20.1 | 20.5 | 20.4 |
| Quintile 4 | 19.4 | 20.4 | 19.7 | 19.2 | 18.8 |
| Quintile 5 | 21.5 | 21.2 | 19.7 | 19.1 | 17.7 |

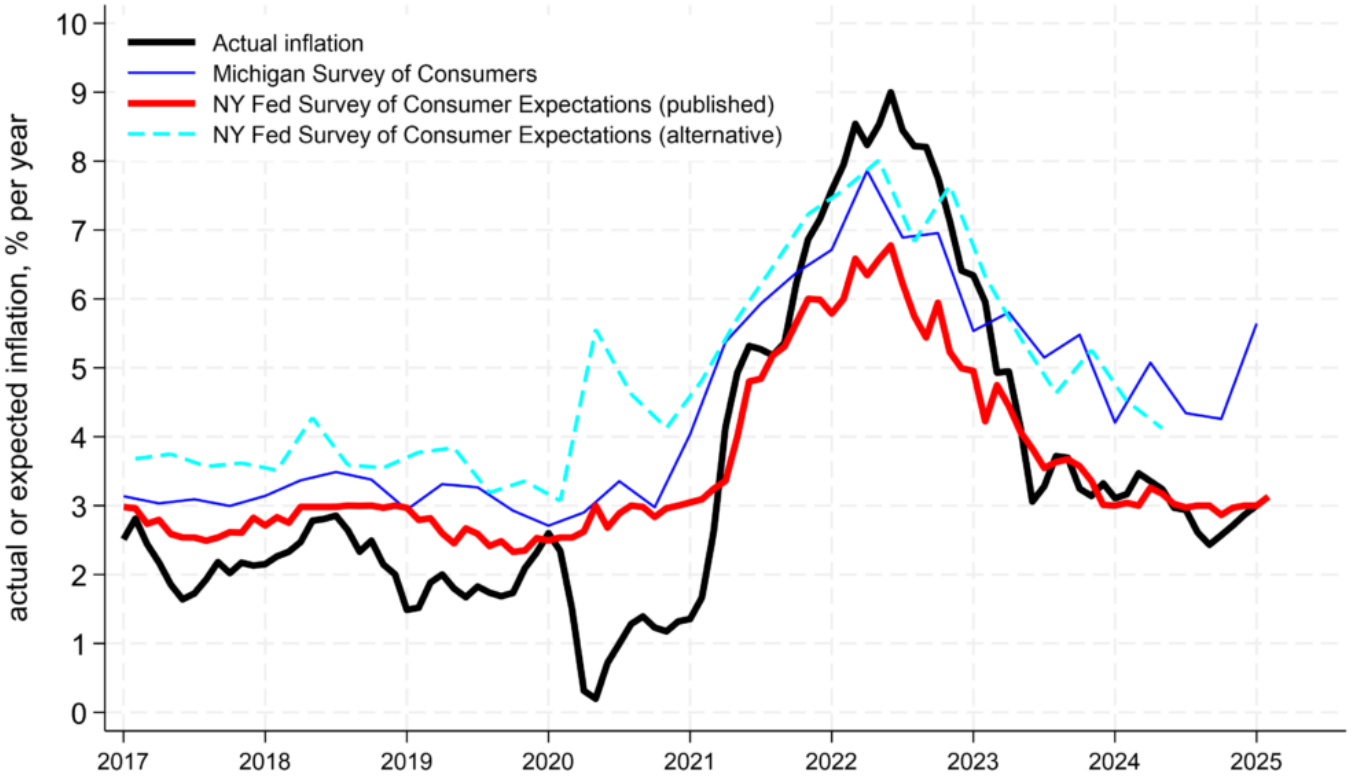
Notes: Percentages across gender, age, education and income categories. Sample restricted to 1-24 tenure

Source: ECB Consumer Expectations Survey, authors' calculation.

- Male, older participants, lower-income respondents are more likely to stay longer in the survey panel
- Participation rate of 18-34 years declines between the 1st and 24th wave by 10 pp

# GORODNICHENKO AND COIBION (2025)

## Uncorrected and Corrected NY Fed Survey Expectations vs. Michigan Consumer Survey



# RANDOM RAW DATA (1)

*Quantitative question*

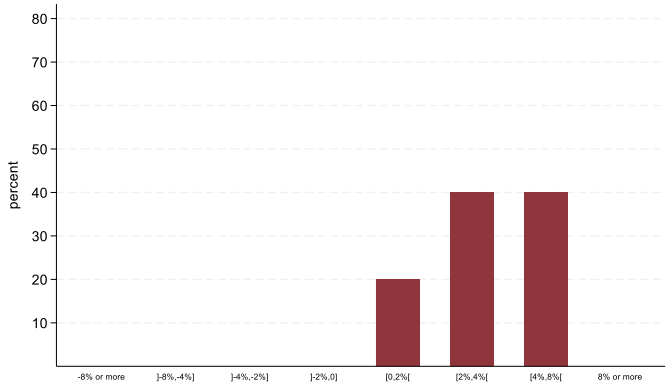
Random example

| Tenure (months) | Inflation expectation (%) |
|---|---|
| 1 | 5 |
| 2 | 4 |
| 3 | 3 |
| 4 | 4 |
| 5 | 2 |
| 6 | 2 |
| 7 | 3 |
| 8 | 3 |
| 9 | 3 |
| 10 | 3 |
| 11 | 3 |
| 12 | 1 |
| 18 | 0 |
| 24 | 3 |

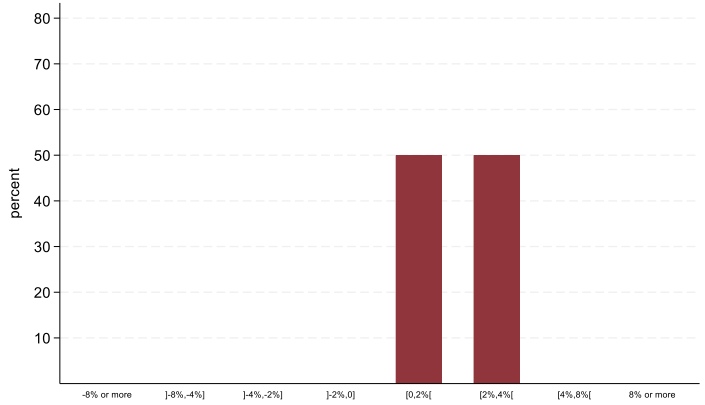
*Probabilistic question*

Distribution of individual expectations (%)

wave 1




wave 24

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# RANDOM RAW DATA (2)

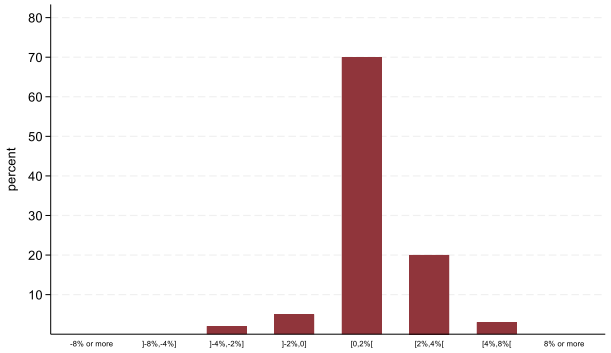
*Quantitative question*

| Tenure | Quantitative expectations |
|---|---|
| 1 | 10 |
| 2 | 5 |
| 3 | 3 |
| 4 | 3 |
| 5 | 4 |
| 6 | 3 |
| 7 | 4 |
| 8 | 4 |
| 9 | 8 |
| 10 | 5 |
| 11 | 3 |
| 12 | 4 |
| 18 | 2 |
| 24 | 1.4 |

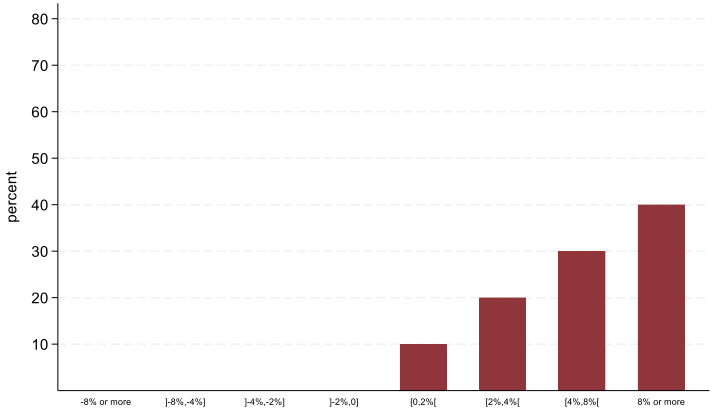
*Probabilistic question*

Individual expectations by bin (%)

wave 1




wave 24



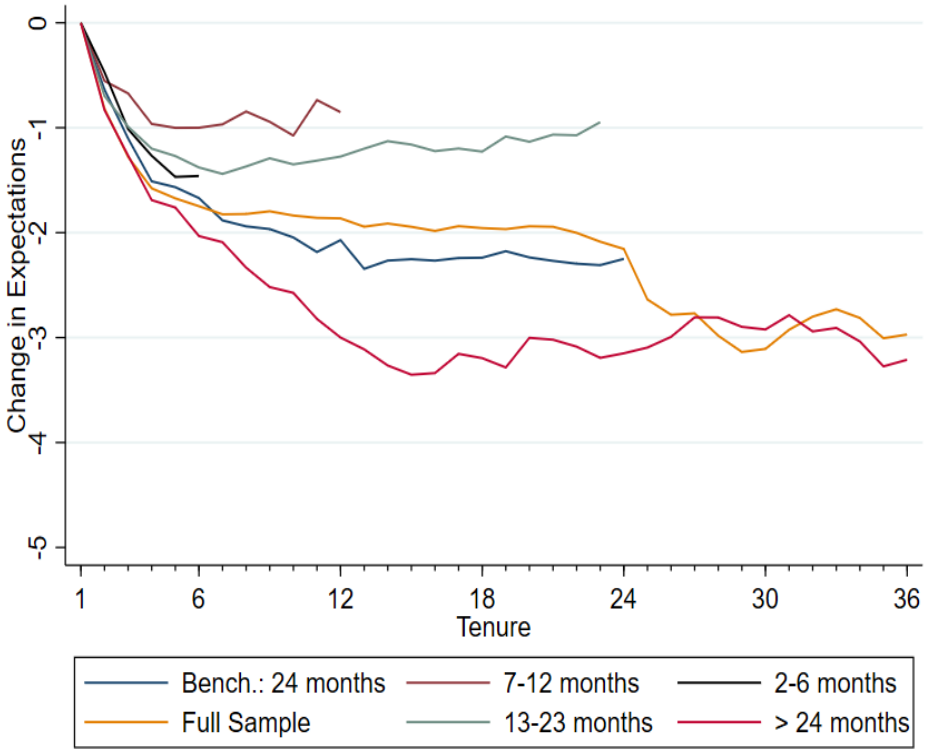

Source : ECB-CES

# ROBUSTNESS CHECKS

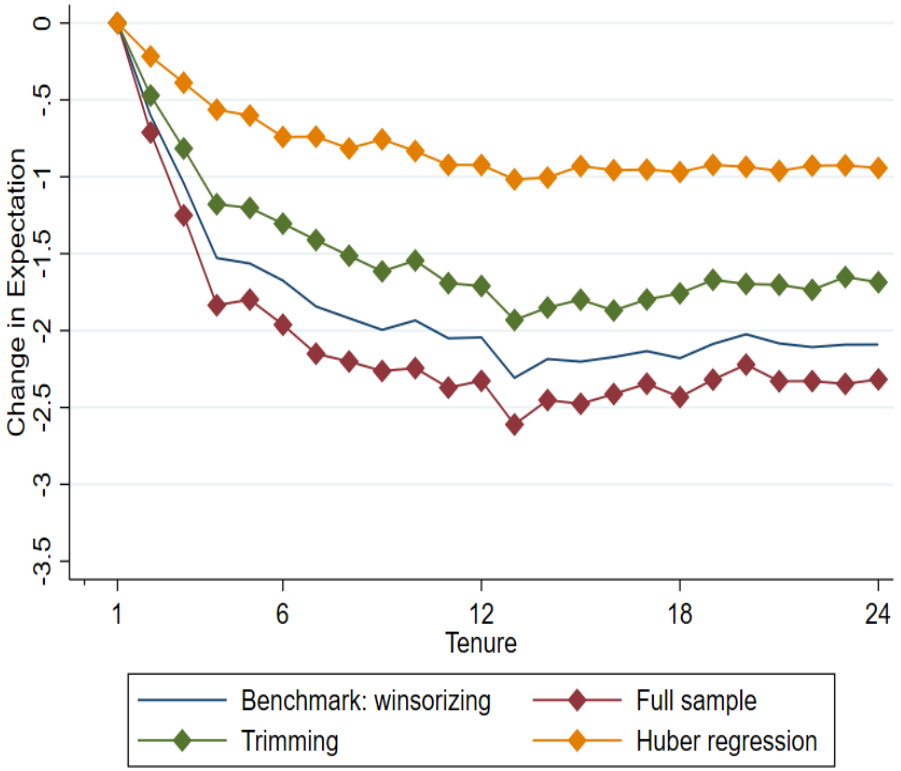
## Similar results are obtained for different sampling rules

### Effect of tenure on 1-year ahead inflation expectations (in pp, EA)

Sample selection: maximum tenure




Sample selection: outliers



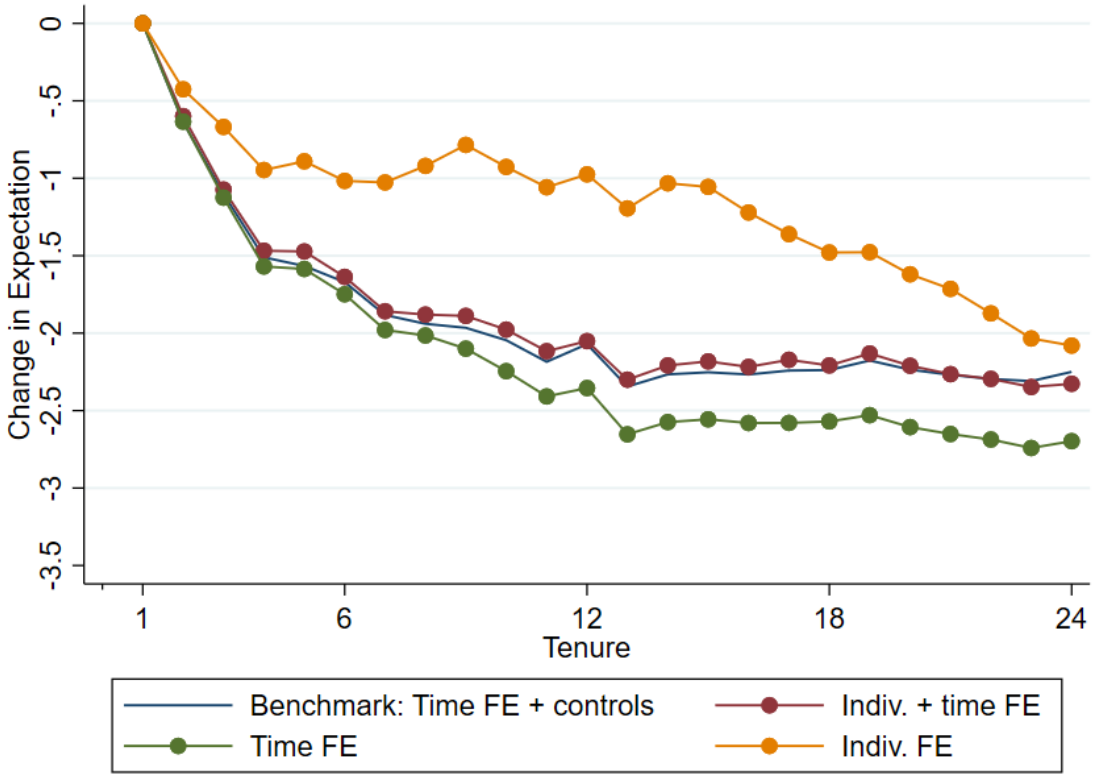

*Source : ECB-CES*

# ROBUSTNESS CHECKS

Similar results are obtained for different specifications

**Effect of tenure on 1-year ahead inflation expectations (in pp, EA)**

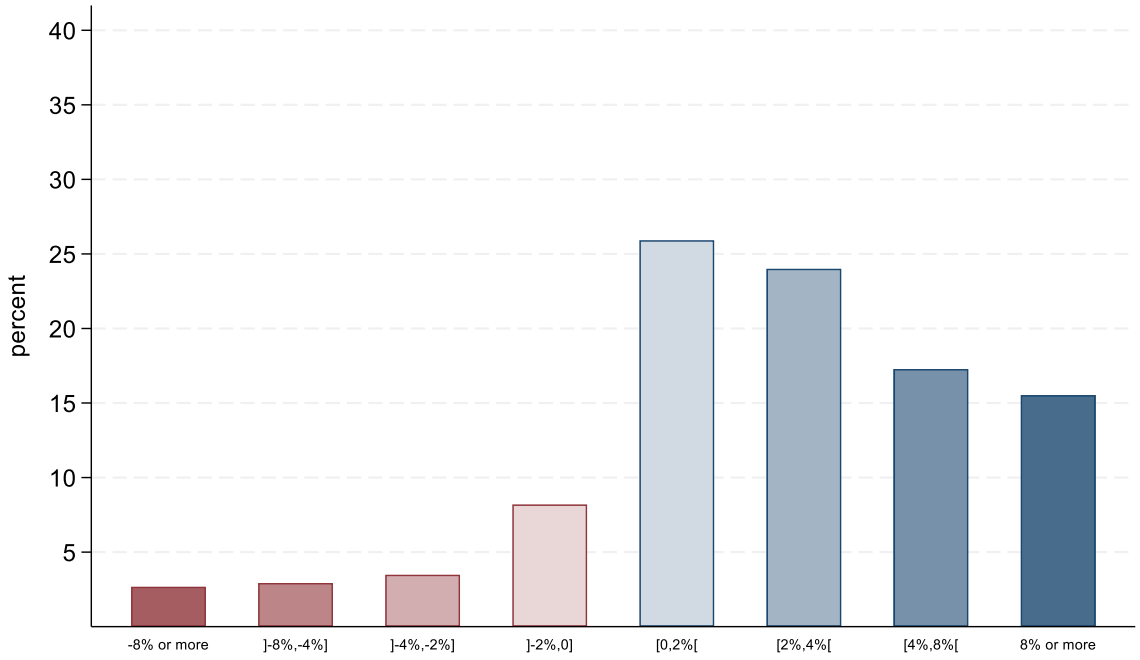
Alternative specifications




Source : ECB-CES

# AGREGATE PROBABILISTIC QUESTIONS

## Mean of individual distribution of expectations (in %)

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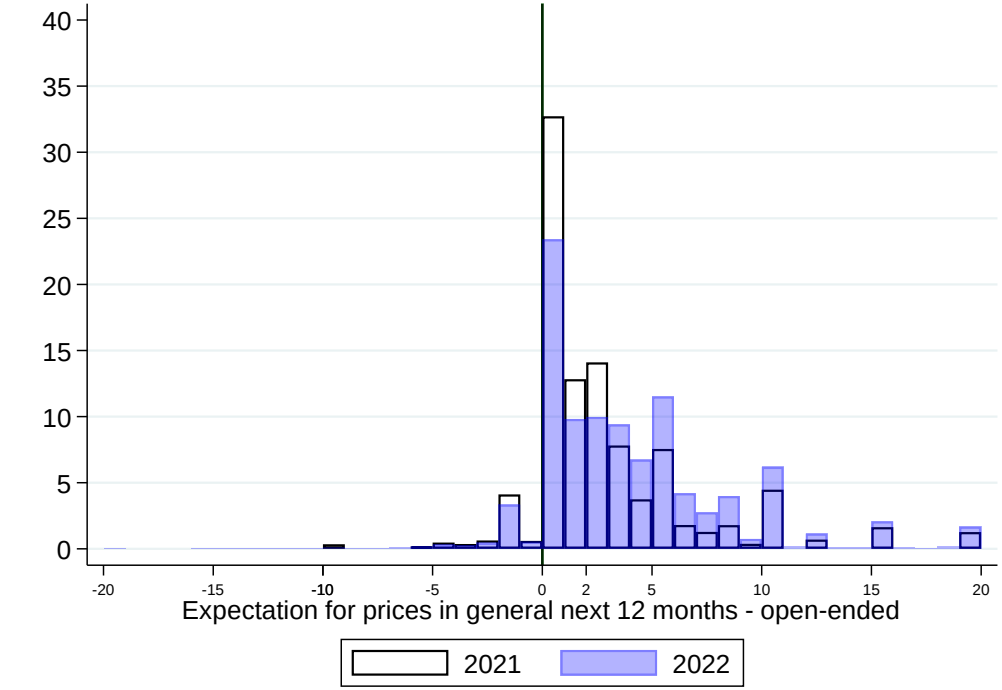
# AGREGATE QUANTITATIVE QUESTIONS

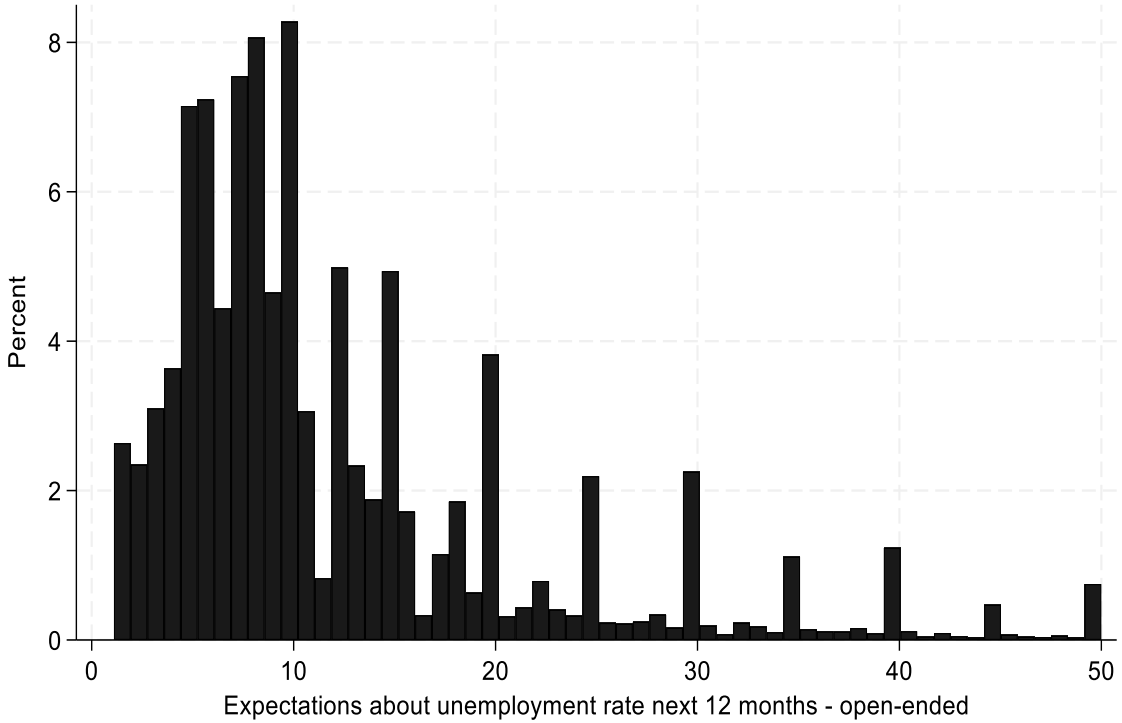
## Distribution of expectations (% of respondents)



# UNEMPLOYMENT RATE EXPECTATIONS

## Expectations on unemployment are also influenced by panel conditioning

Distribution of unemployment expectations (in %)



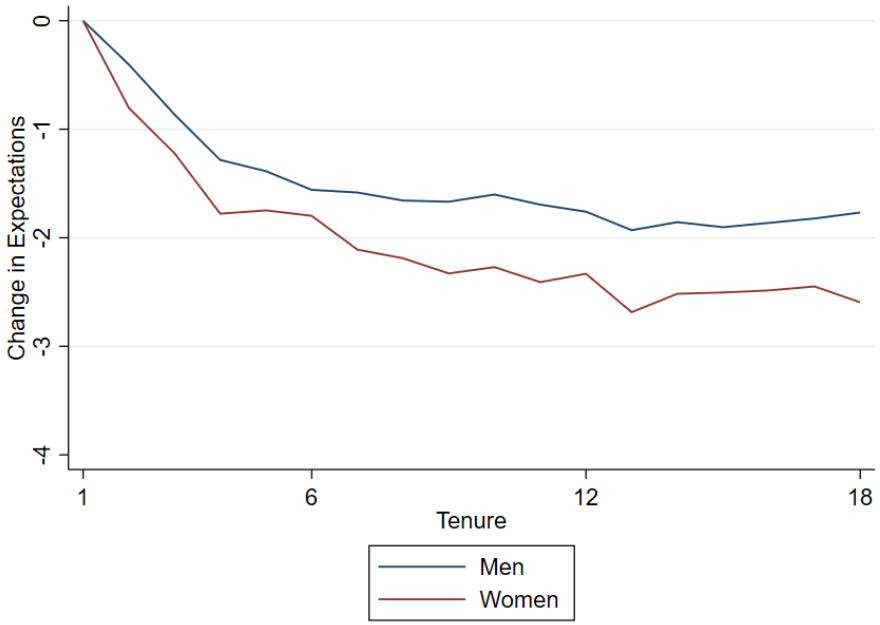

Source : ECB-CES

# PANEL CONDITIONING: HETEROGENEITY

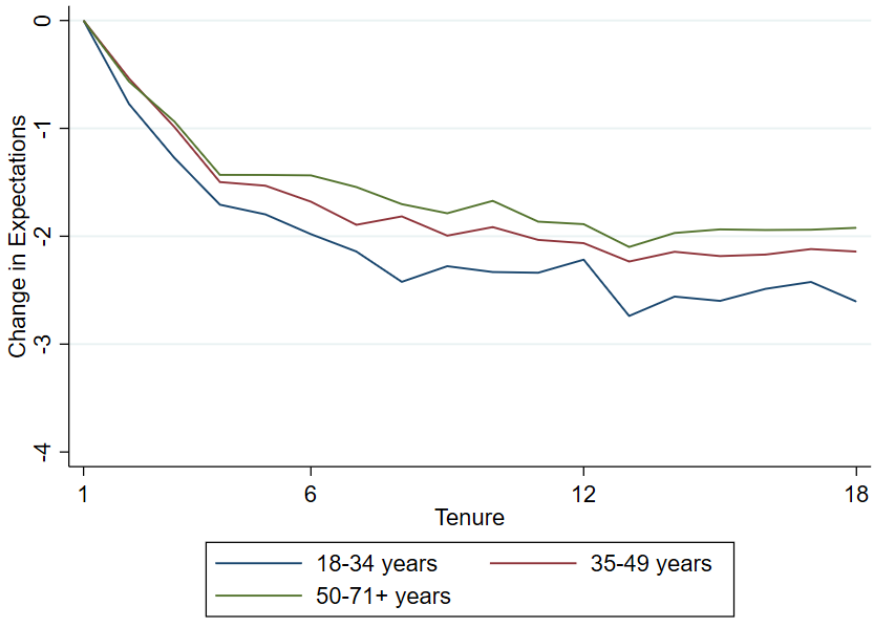
**The tenure effect is more pronounced for younger households and women.**

Effect of tenure on 1-year ahead inflation expectations (in pp, EA)

by gender




by age



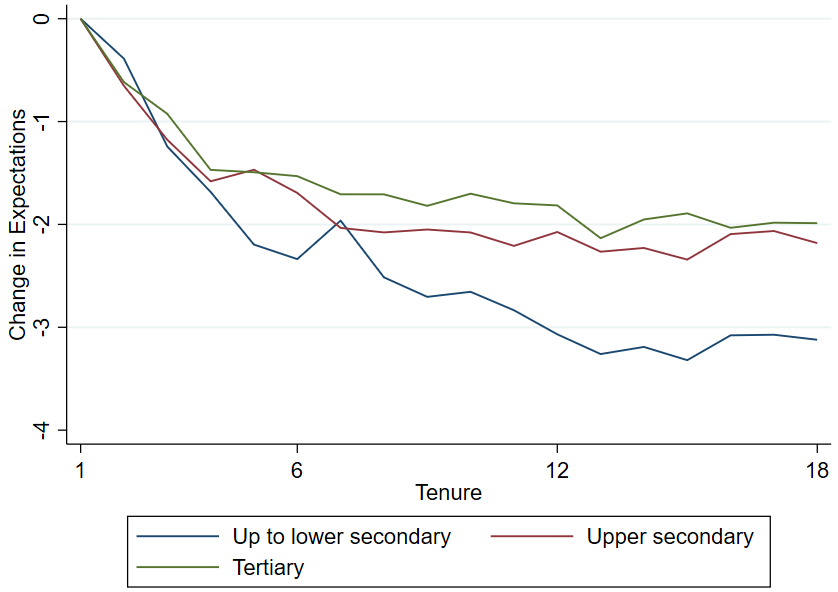

Source : ECB-CES

# PANEL CONDITIONING: HETEROGENEITY

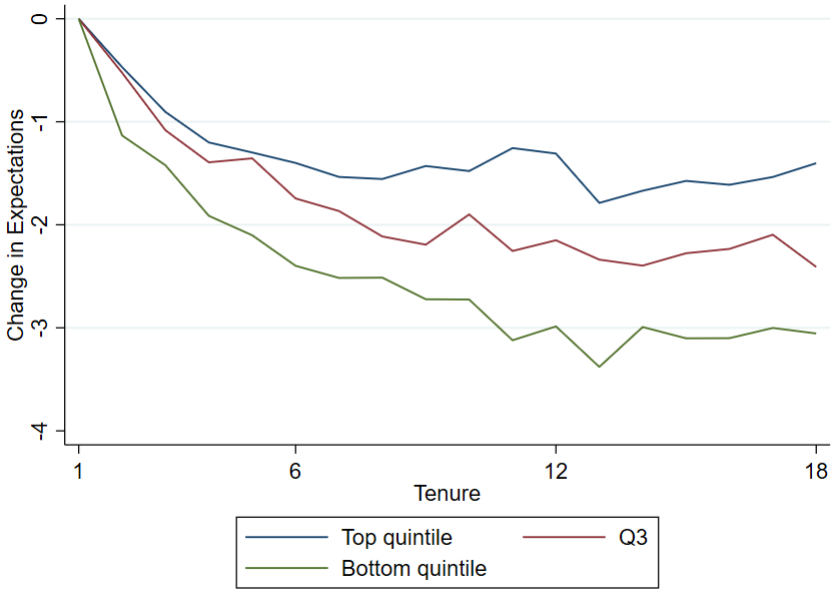
## Learning effects are smaller for highly educated or high-income households

Effect of tenure on 1-year ahead inflation expectations (in pp, EA)

by education level




by income level

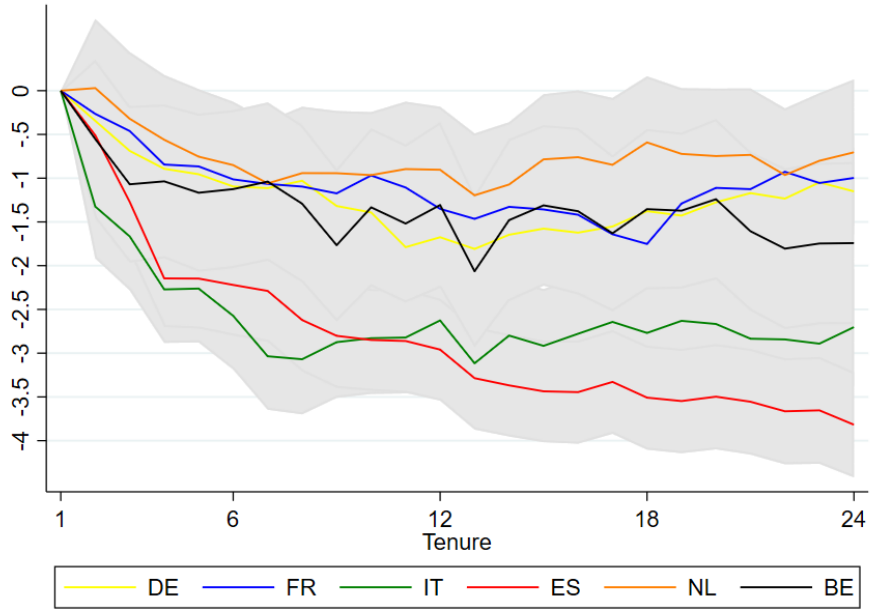


# PANEL CONDITIONING: HETEROGENITY

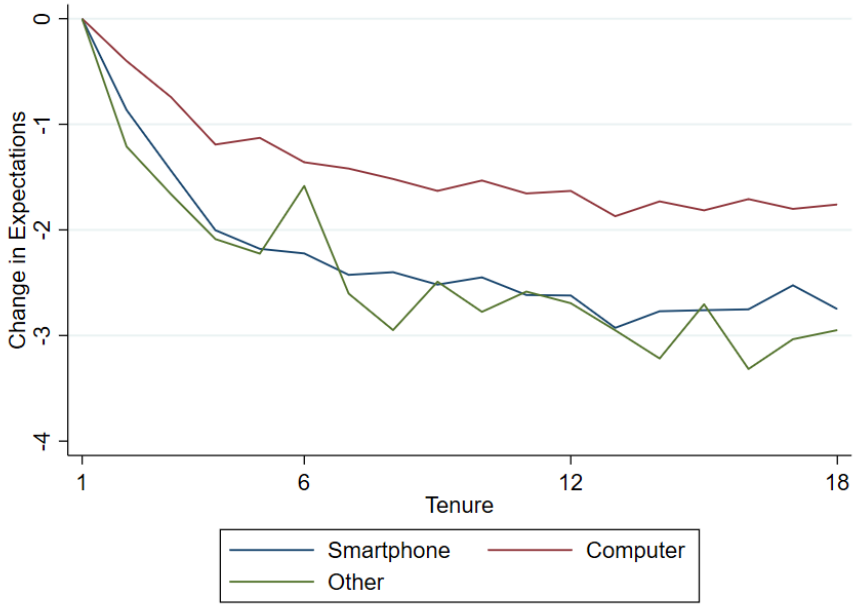
**The device used (smartphone vs. computer) can affect HHs attention/information**

Effect of tenure on 1-year ahead inflation expectations (in pp, EA)

by country

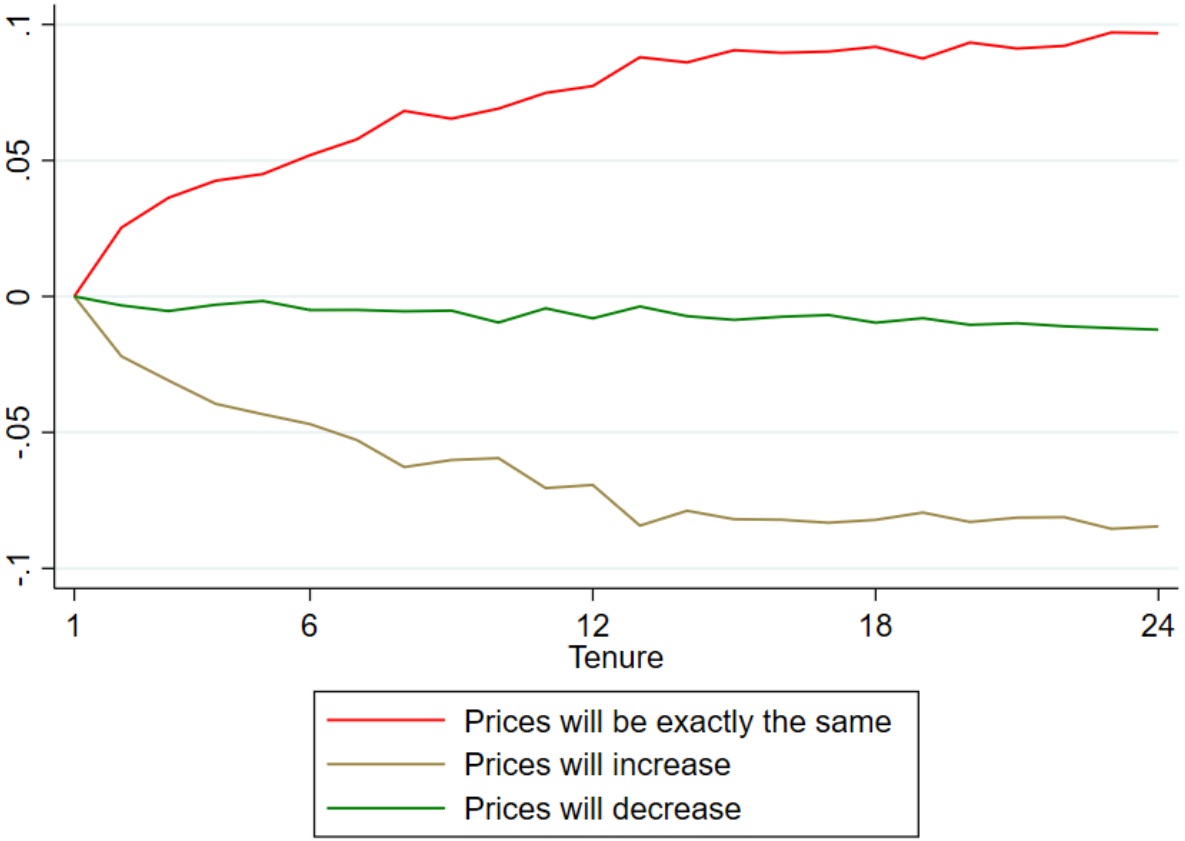



by device




Source : ECB-CES

# EFFECT OF TENURE ON THE PROBABILITY OF ANSWERING

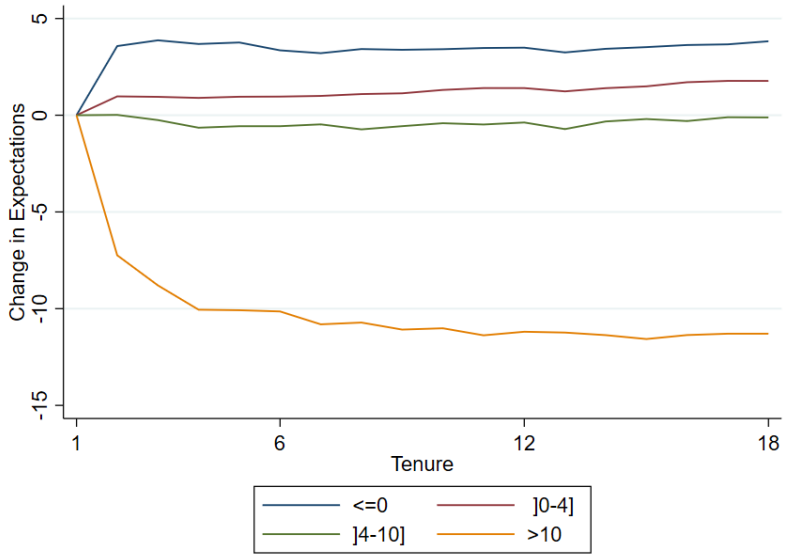


# HETEROGENEITY OF THE TENURE EFFECT ALONG THE DISTRIBUTION OF ANSWERS

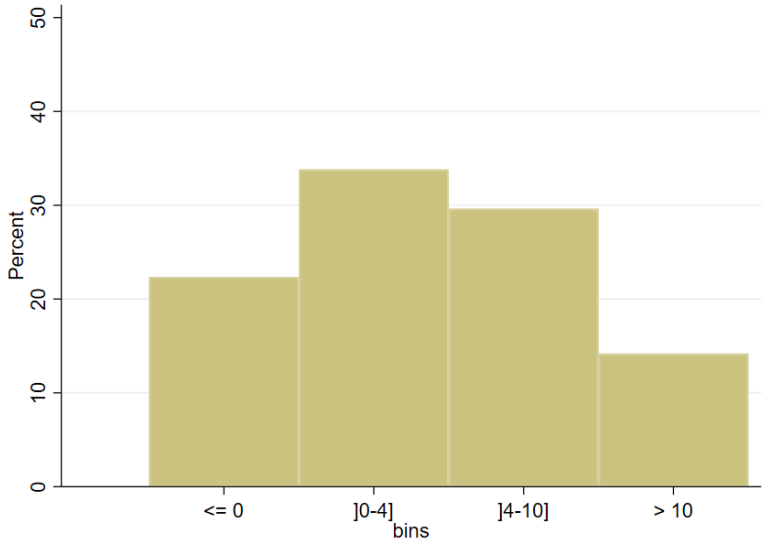
Respondents who initially entered the survey with a high level of inflation show a stronger tenure effect

Effect of tenure on the distribution of expectations (in pp, EA)

By initial inflation expectations




Initial inflation expectations distribution



# REFERENCES


- Armentier et al. (2017) An Overview of the Survey of Consumer Expectations Federal Reserve Bank of New York Economic Policy Review, Volume 23 Number 2

- Bańkowska, K., Borlescu, A., Charalambakis, E., Dias da Silva, A., Di Laurea, D., Dossche, M., ... & Törmälehto, V. M. (2021). ECB Consumer Expectations Survey: an overview and first evaluation. ECB Occasional Paper, (2021/287).

- Kim, G., & Binder, C. (2023). Learning-through-survey in inflation expectations. American Economic Journal: Macroeconomics, 15(2), 254-278.?