Inflation Expectations and Household Consumption

CNB Workshop on Households' Inflation Expectations

"Measuring Households' Inflation Expectations:
Theory, Practice, Implications"

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Household consumption in light of higher future prices

- In theory, inflation expectations are a key driver of household C decisions.
- Yet ambiguous predictions about how consumption may behave.
- It is an empirical mission to find out.
- Surveys on inflation expectations are imperative.
- Growing empirical evidence that households' π_t^e affect their spending decisions:
  - see among others Andrade et al. (2023), D'Acunto et al. (2022), Crump et al. (2022), Burke and Ozdagli (2023), Dräger and Nghiem (2021), Vellekoop and Wiederholt (2019), Bachmann et al. (2015), Ichiue and Nishiguchi (2015) or Coibion et al. (2023).

Euler-equation effect

Response of current consumption vs consumption growth

- Consider a log-linear approximation of a standard consumption Euler equation

$$E_t^i \left[\Delta c_{t+1}^i \right] = \sigma \log \beta^i + \sigma \left(i_t - E_t^i \pi_{t+1} \right) + o_{i,t}.$$

- **Higher anticipated inflation leads to a drop in consumption growth** given fixed nominal interest rate and strictly positive elasticity of intertemporal substitution (EIS), $\sigma > 0$.
- However, knowing the EIS is not sufficient to deduce the response of **current consumption** to changes in expected inflation.
- For monetary policy, both the strength of intertemporal substitution and the responsiveness of current consumption matter.

Reminder of this talk

1. Does the Euler-equation hold in the euro area? What do we know about the EIS?

   Joint work with Giang Nghiem (Leibniz University Hannover).

2. Do inflation expectations matter for contemporaneous consumption differently over time, based on levels and dynamics of underlying inflation?

   Evidence from Slovakia.

Marencak and Nghiem (2024)

Elastictity of intertemporal substitution in the euro area

The aim of this paper

- EIS is challenging to estimate + lack of evidence for the **euro area** and its country members.
- Crump et al. (2022) propose to use survey data from the NY FED Survey of Consumer Expectations for direct inference:
  - find EIS at 0.7-0.8 (baseline),
  - find EIS at 0.5 (after controlling for income expectations, evidence of excess sensitivity).
- This paper:
  - uses the public data from the ECB Consumer Expectations Survey (2020-2024),
  - finds EIS at 0.7-0.8 (baseline),
  - documents significant but economically not sizeable role of excess sensitivity,
  - excess sensitivity can explain the over time heterogeneity in the EIS for the euro area but not across countries,
  - illustrates the implications in the model for the euro area by Smets and Wouters (2003).
- Other papers using ECB CES to asses this question: Sciacchetano (2024), Quelhas (2024):
  - different focus, sample period, sample countries, analysis of determinants and implications.

Empirical strategy

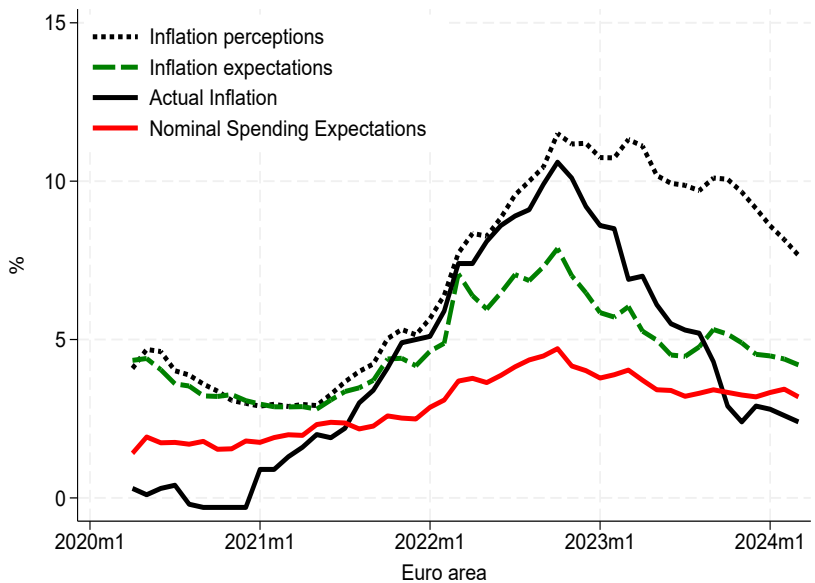
$$E_t \Delta c_{i,t+1} = \alpha + \beta E_t \pi_{i,t+1} + \eta_t + \mu_i + \upsilon_i + \gamma X_{it} + \epsilon_{it}, \quad (1)$$

- β: coefficient of interest (EIS $= -\beta$)
- η_t: time fixed effects
- μ_i: country fixed effects
- X_{it}: a vector of control variables (income, age, gender, education, household size, number of children, partnership)
- υ_i: individual fixed effects
- Cluster standard errors at individual level
- *Instrumental variable approach:* In the main results, we use *qualitative* inflation expectations for the next 12 months as an IV for *quantitative* inflation expectations in the next 12 months (Dräger and Nghiem, Restat 2021).
- *Default econometric approach:* panel random effects model to account for unobserved individual heterogeneity acknowledging the panel structure of the ECB CES dataset

Summary statistics

- Upper and lower 2.5% of individual quantitative expectations for each variable of interest are removed as outliers per country and per survey round.

	Mean	Median	Std.Dev.	Min.	Max.	Obs.
Exp. Inflation, Point Estimate (pp)	4.63	3.00	5.79	-10.00	50.50	627,797
Nom. Exp. Spending Growth (pp)	3.01	2.00	5.62	-30.00	38.00	627,797
Real Exp. Spending Growth (pp)	-1.61	0.00	6.65	-70.00	40.00	627,797
Obs. per Country	137,101 (IT)	133,524 (FR)	132,604 (ES)	128,645 (DE)	48,833 (BE)	47,090 (NL)



Country evidence.

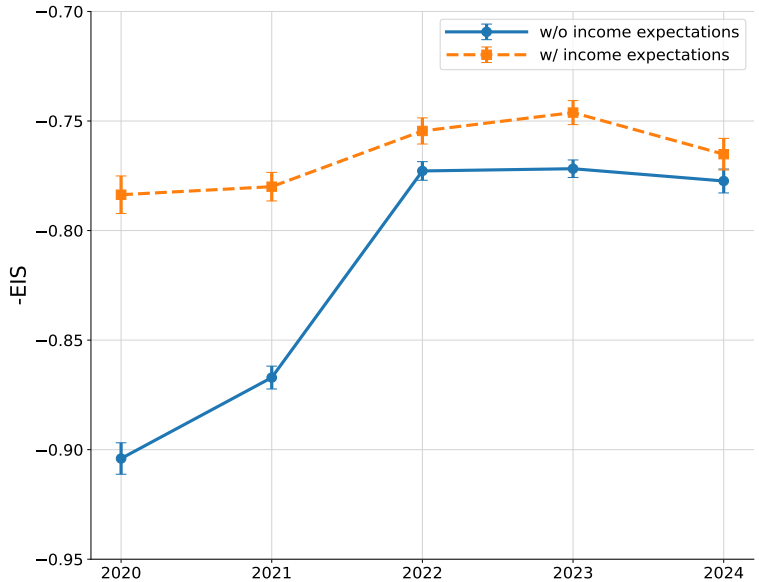
Result 1: The Estimated EIS

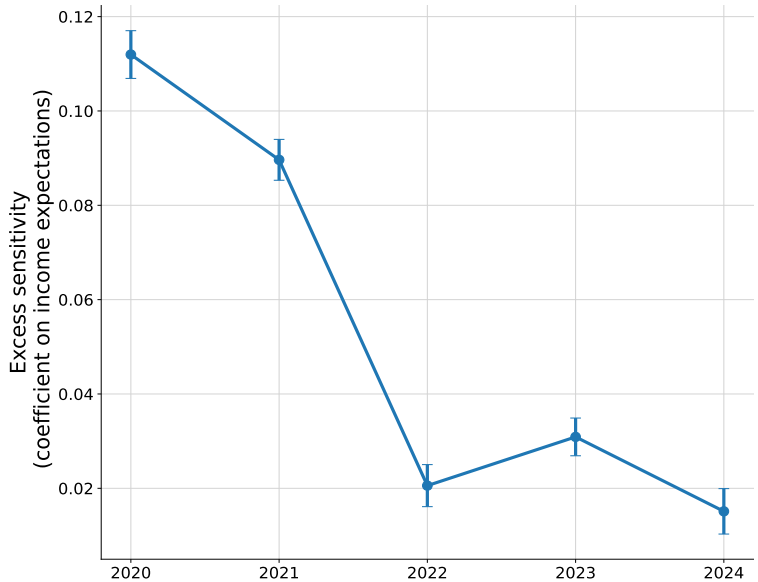
	Dependent variable: Real Spending growth expectations					
	Baseline Models			Models with Excessive Sensitivity		
	(1)	(2)	(3)	(4)	(5)	(6)
Infl. Exp.	-0.80***	-0.80***	-0.83***	-0.74***	-0.74***	-0.77***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Real Inc. Exp.				0.059***	0.060***	0.062***
				(0.002)	(0.002)	(0.003)
R^2	0.370	0.371	0.364	0.375	0.377	0.369
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Demo. Controls	No	Yes	Yes	No	Yes	Yes
Ind. FE	No	No	Yes	No	No	Yes
N observations	627797	627797	627797	608869	608869	608869

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

- Expected change in income vs change in expected income.
- According to the PIH, consumption responds only to the latter.

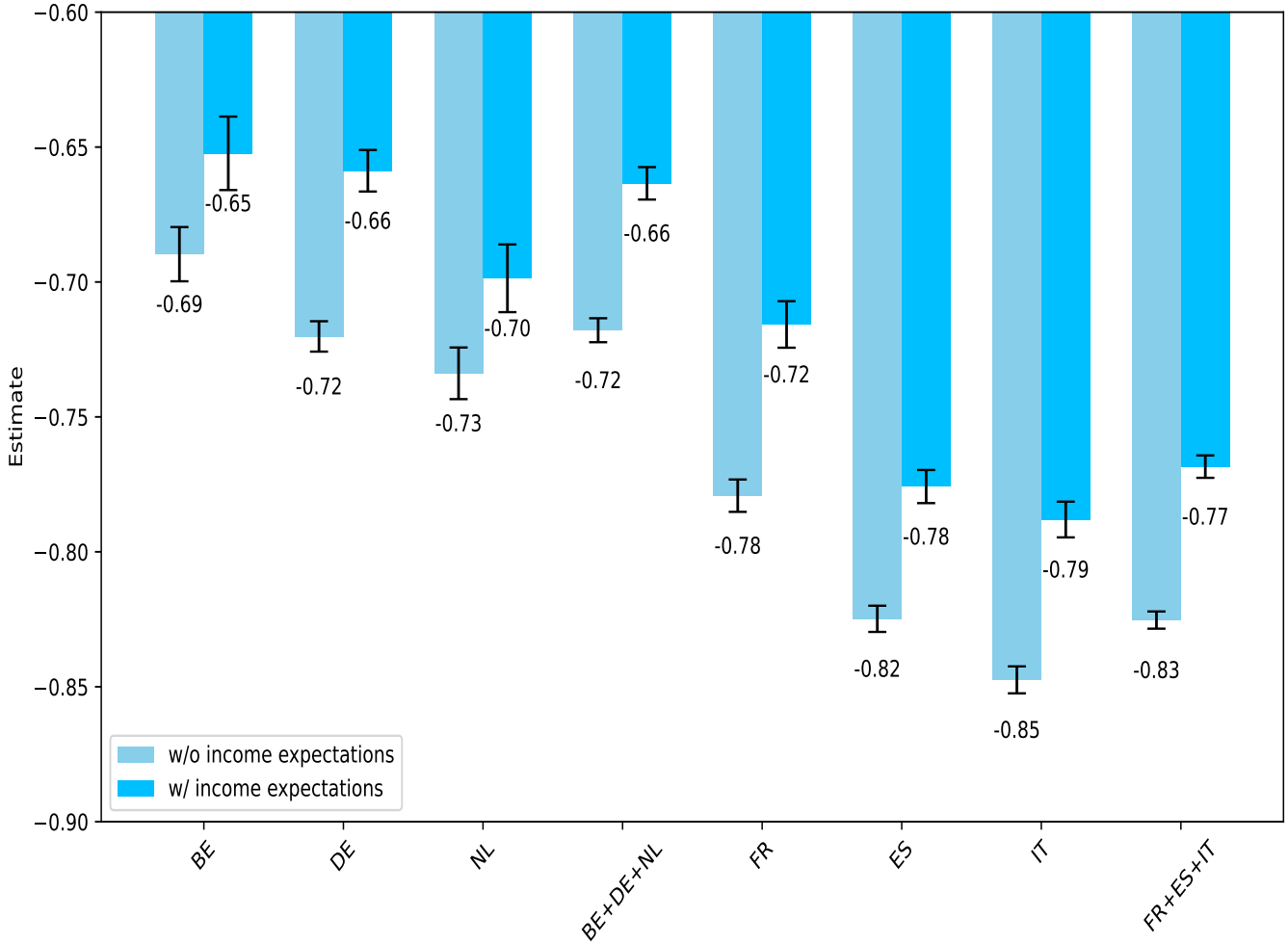
Result 2: Heterogeneity over time in the euro area





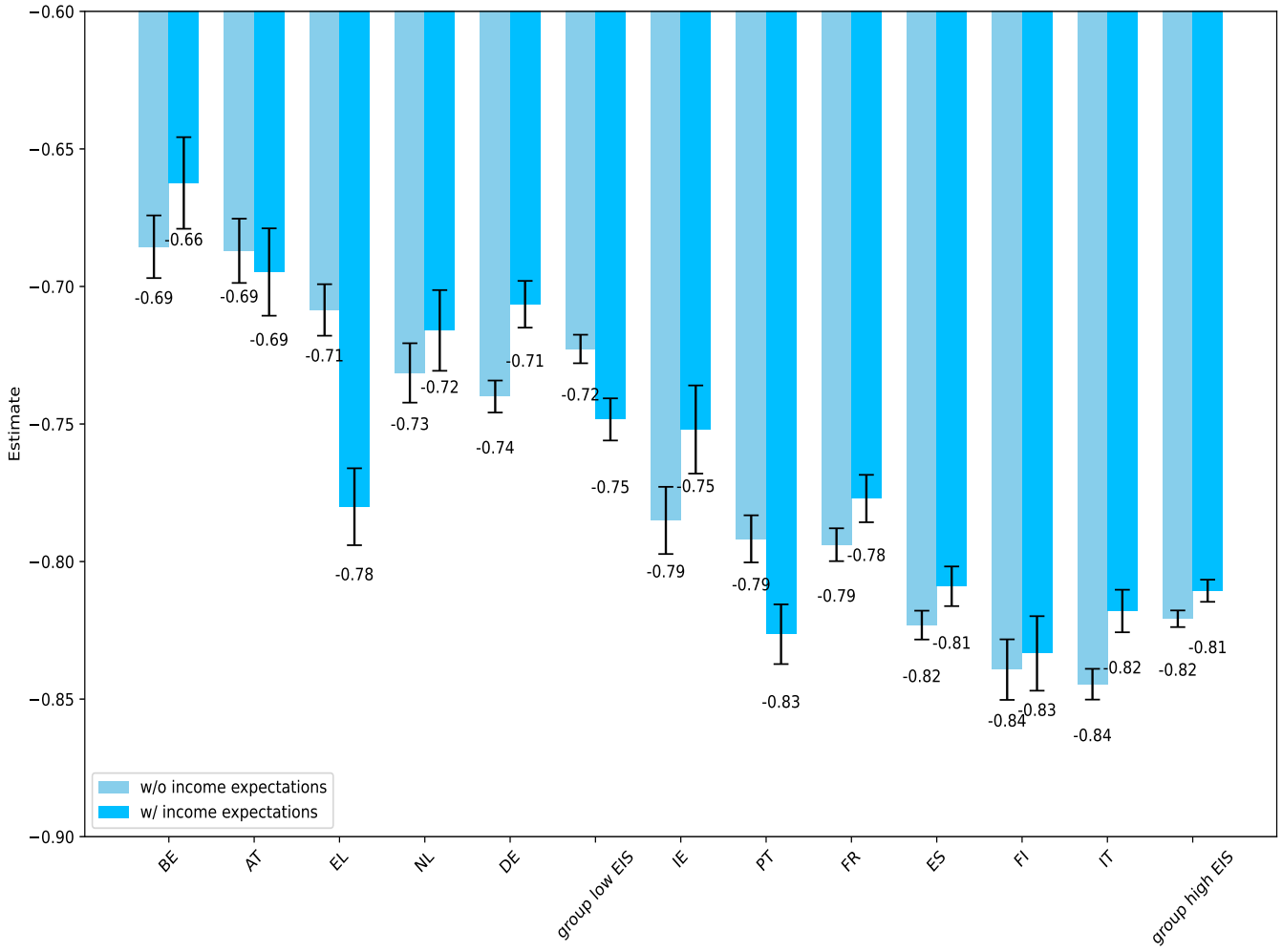
- Excess sensitivity explains the observed decline in the EIS in the euro area since the pandemic.

Result 3a: EIS heterogeneity across original six countries



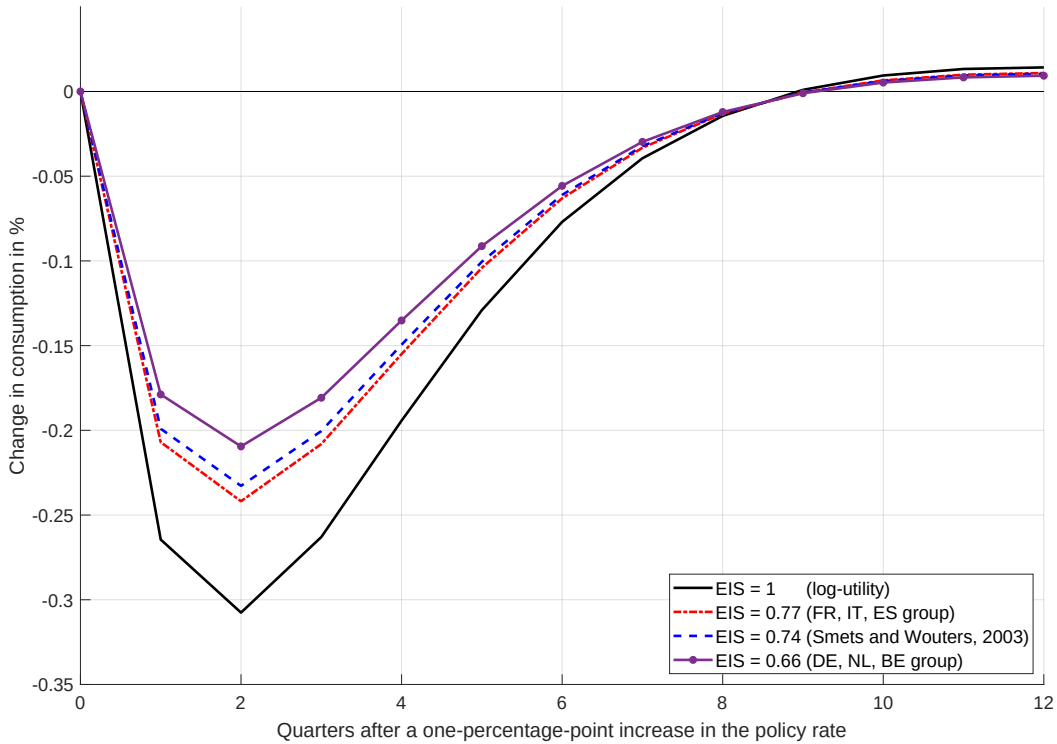
Result 3b: EIS heterogeneity across all 11 countries

Extended scope of the CES since April 2022



Result 3c: IRFs of Consumption to a 1 Percent Positive Monetary Policy Shock

- To illustrate the implications of different values of the EIS, consider the mode of Smets and Wouters (2003).



- Cumulated difference between low and high EIS groups in %: -12.75.

Interim conclusion

- Euler equation is alive in the euro area.
- EIS for consumption of the euro area is about 0.7-0.8.
- Significant but economically mild role of excess sensitivity of consumption growth expectations to anticipated changes in income.
- Yet excess sensitivity can explain the over time heterogeneity in the EIS for the euro area but not across countries.
- Biggest difference to the US: excess sensitivity is present but not substantial; EIS does not decrease as much as in the US.

State-dependent inflation expectations and contemporaneous consumption choices

Two motivating observations

1. Growing empirical evidence that households' π_t^e affect their spending decisions:
   - see among others Andrade et al. (2023), D'Acunto et al. (2022), Crump et al. (2022), Burke and Ozdagli (2023), Dräger and Nghiem (2021), Vellekoop and Wiederholt (2019), Bachmann et al. (2015), Ichiue and Nishiguchi (2015) or Coibion et al. (2023).

   Yet this evidence stems primarily from times of stable and low inflation.

2. Also growing evidence that agents consider inflation differently depending on its level and dynamics:
   - See among others Cavallo et al. (2017), Weber et al. (2023), Korenok et al. (2023), Pfäuti (2023a), Pfäuti (2023b), or Bracha and Tang (2022).

☐ Research question: Do households' expectations of inflation and inflation uncertainty impact their spending decisions differently during periods of high and low inflation?

This paper

- studies various measures of households' subjective inflation expectations, π^e, and their impact on the propensity to consume:
  1. expectation of qualitatively higher inflation (D'Acunto et al., 2022), π^e_{DHW},
  2. expectation of positive inflation (Andrade et al., 2023), EM_{AGM},
  3. expected level of inflation (Bachmann et al., 2015), π^e_{BBS}.
- Variation over time: normal times, deflation, high inflation period (surge vs disinflation).
- Four observations:
  1. In normal times, there is a positive association between all three measures of households' inflation expectations and their willingness to purchase durable goods.
  2. However, the strength of the relationship varies with the level of inflation and also change in inflation. Relatively to normal times,
     - π^e_{DHW} matter more during the surge period but are insignificant during deflation and disinflation,
     - π^e_{BBS} matter more during deflation and surge, insignificant during disinflation.
  3. State-dependency during the surge period holds particularly for wealthy and saving households.
  4. Inflation uncertainty is negatively associated with inflation, particularly during the surge period, and is insignificant during deflation.

EC Harmonized Consumer Survey

Key questions

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

- Increase more rapidly; Increase at the same rate; Increase at a slower rate; Stay about the same; Fall; Don't Know

$\Rightarrow$ if the answer it not "about the same" or "don't know," the respondent will be asked about a point estimate

Q61 *By how many per cent will consumer prices rise or fall in the next 12 months?*

Q8 In view of the general economic situation, do you think now is **the right time for people to make major purchases such as furniture or electrical goods**?

- Yes, now is the right time; It is neither the right time nor the wrong time; No, it is the wrong time; Don't Know

Data cleaning & descriptive statistics

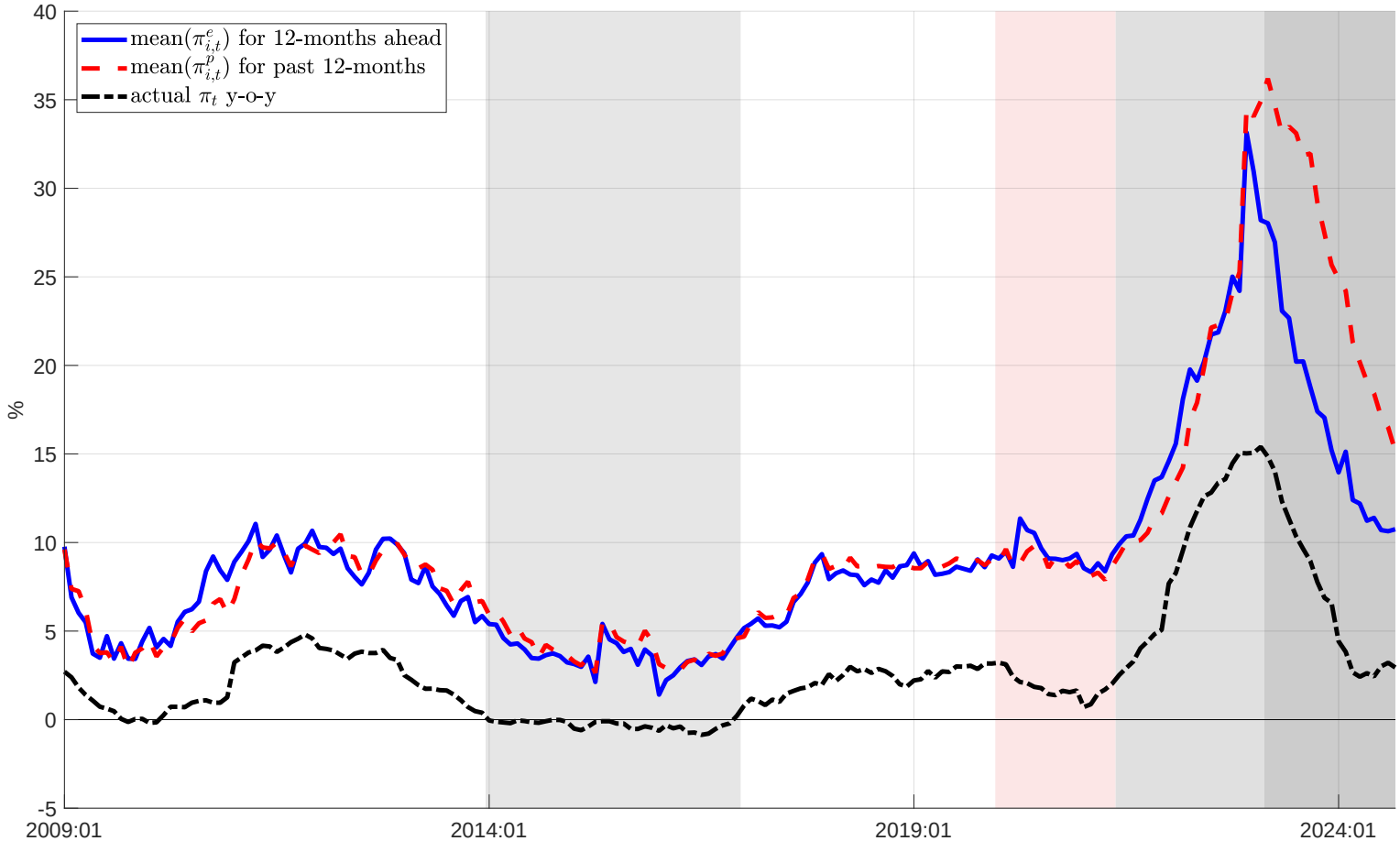
- data cleaning: 204,490 $\rightarrow$ 115,900 observations
  - neglect Covid months 2020:01 - 2024:05
  - discarding invalid "zero" π^e observations
  - discarding 2.5% of individual quantitative inflation expectations and perceptions per survey round
  - discarding obs. due to missing Q1, Q2, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q12 and no income data

- Splitting the sample (January 2009 - September 2024) into three main sub-periods:
  1. when inflation is very low (zero) and stable: January 2014 - December 2016
  2. when inflation is low and stable: remaining periods without the Covid period (normal times)
  3. when inflation is high: June 2021 - September 2024
     a) when inflation goes from low to high: June 2021 - February 2023
     b) when inflation goes from high to low: March 2023 - September 2024

Variable	All Periods	Normal Times	Deflation	High Inflation	Inflation Surge	Inflation Persistence
no. obs.	115,900	70,934	23,922	21,044	10,930	10,114
Purchases (Good Times)	0.189	0.195	0.214	0.139	0.144	0.133
Higher Inflation Dummy π^e_{DHW}	0.255	0.272	0.133	0.337	0.509	0.152
Positive Inflation Dummy EM_{AGM}	0.802	0.828	0.634	0.903	0.953	0.850
Quantitative π^e_{BBS}	8.931	8.019	3.805	17.835	18.588	17.021
average headline HICP π_t, y-o-y	2.98	2.27	-0.31	8.32	9.65	6.85
mean($\pi^e_{i,t}$)	9.17	7.64	3.66	17.88	18.91	16.74
average households' nom. i_t	4.80	5.57	5.08	3.82	2.62	5.15

Time series evidence

January 2009 - September 2024



Notes:

Extensive vs. intensive margin

Andrade, Gautier and Mengus, JME, 2023

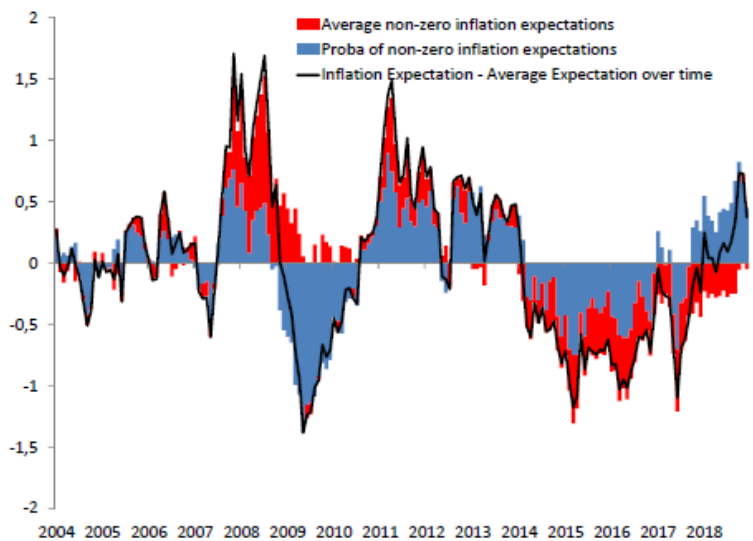
$$\pi^e_{t|t+1} = fr^e_{t|t+1} \cdot dp^e_{t|t+1}$$

$$em_t = (fr^e_t - \bar{fr}^e_t) \cdot \bar{dp}^e_t$$

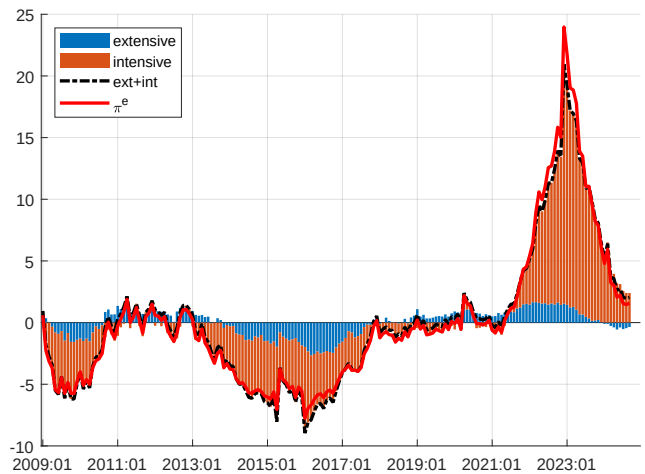
$$im_t = (dp^e_t - \bar{dp}^e_t) \cdot \bar{frp}^e_t$$

$$\pi^e_{t|t+1} - \bar{\pi}^e = em_t + im_t + \mathcal{O}_t$$

$$var(\pi^e_t) = \underbrace{var(dp^e_t)\overline{fr^e}^2}_{\text{IM term}} + \underbrace{var(fr^e_t)\overline{dp^e}^2 + 2\,\overline{fr^p}\;\overline{dp^e}\;cov(fr^p_t, dp^e_t)}_{\text{EM terms}} + \mathcal{O}_t$$



France (Andrade et al., 2023)
75% extensive margin



Slovakia
33% extensive margin

Regression results for the propensity to purchase durable goods

Only one inflation expectations measure is employed in a regression at a time.

	(1) All Periods	(2) Normal Times	(3) Deflation	(4) High Inflation	(5) Inflation Surge	(6) Disinflation
Higher Inflation Dummy π^e_{DHW}	0.032***	0.035***	0.011	0.032***	0.047***	-0.0050
	(0.003)	(0.004)	(0.008)	(0.006)	(0.006)	(0.010)
Positive Inflation Dummy EM_{AGM}	0.011***	0.012***	0.021***	-0.0081	0.018	-0.016*
	(0.003)	(0.004)	(0.006)	(0.008)	(0.015)	(0.009)
Quantitative π^e_{BBS}	0.00087***	0.0011***	0.0019***	0.00089***	0.0026***	-0.00022
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
N observations	115900	70934	23922	21044	10930	10114

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

Notes: This table reports the estimated average marginal effects of a binomial logit regression evaluated. We control for the quantitative perceived inflation in the regressions that use the quantitative inflation expectation questions and control for the qualitative inflation perception in the regressions using the qualitative inflation expectation measures.

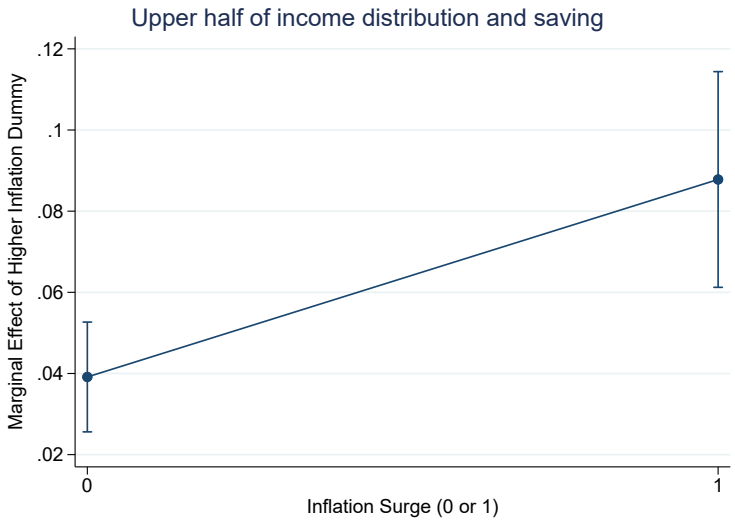
Interaction significance of inflation measure x dummy period

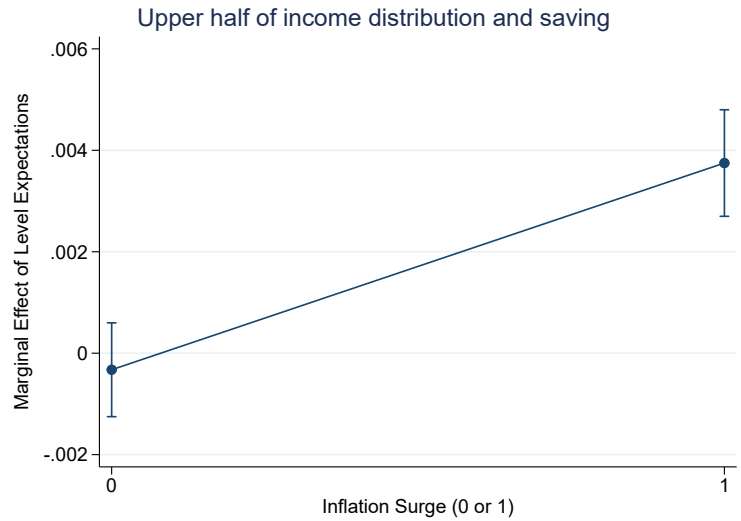
	(1) surge	(2) deflation	(3) disinflation
Higher Inflation Dummy	0.121**	-.189***	-.361***
π^e_{DHW}	(0.061)	(0.058)	(.098)
Positive Inflation Dummy	0.038	0.004	-0.264***
EM_{AGM}	(0.135)	(0.914)	(0.081)
Quantitative π^e_{BBS}	0.015***	-0.010***	0.004***
	(0.002)	(0.003)	(0.003)
N observations	115,900	115,900	115,900

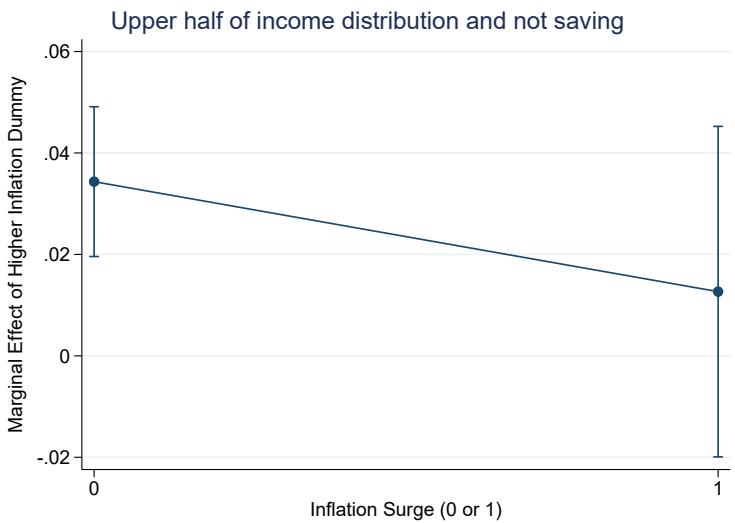
Standard errors in parentheses

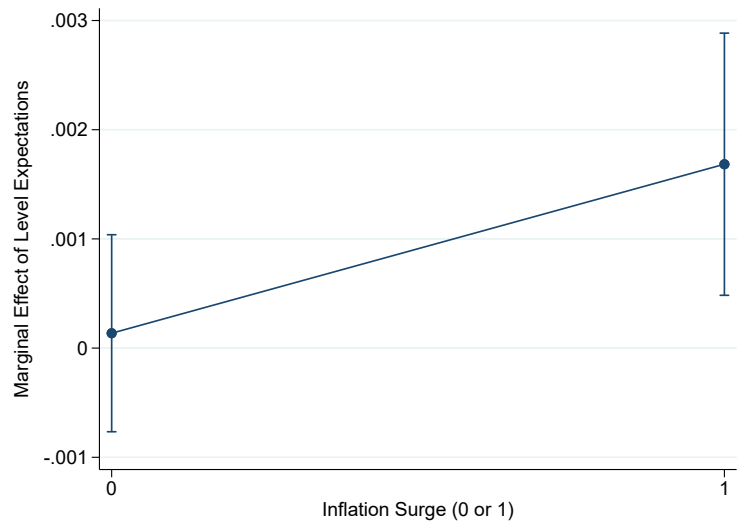
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Heterogeneity within socio-demographic groups









"I do not know" - DNK inflation expectations

Only one inflation expectations measure is employed in a regression at a time.

	(1) All Periods	(2) Normal Times	(3) Deflation	(4) High Inflation	(5) Inflation Surge	(6) Disinflation
Higher Inflation Dummy	0.032***	0.035***	0.011	0.035***	0.050***	-0.0031
π^e_{DHW}	(0.003)	(0.004)	(0.008)	(0.006)	(0.006)	(0.010)
Positive Inflation Dummy	0.013***	0.013***	0.020***	0.0048	0.034***	-0.0091
EM_{AGM}	(0.003)	(0.004)	(0.006)	(0.006)	(0.010)	(0.008)
Quantitative π^e_{BBS}	0.00087***	0.0011***	0.0019***	0.00089***	0.0026***	-0.00022
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
DNK Dummy	-0.026***	-0.023**	-0.014	-0.033***	-0.058***	-0.011
	(0.007)	(0.012)	(0.016)	(0.009)	(0.013)	(0.013)
N observations	120464	72622	24930	22912	11673	11239

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

Notes: This table reports the estimated average marginal effects of a binomial logit regression evaluated. We control for the quantitative perceived inflation in the regressions that use the quantitative inflation expectation questions and control for the qualitative inflation perception in the regressions using the qualitative inflation expectation measures.

Concluding discussion

- This work presented evidence on a state-dependent relationship between inflation expectations on private consumption.
- This state-dependency holds for both *quantitative (level)* and *qualitative (directional)* measures of inflation expectations.
- Distinguishing among qualitative expectations matters in all regimes but times of close to zero inflation/deflation (complementary to Andrade et al. (2023)).
- How do these results align with and add to the literature?
  - Not only do consumers pay more attention to inflation, but they also react more strongly to it.
  - Possible ways to model the state-dependency: models of learning or endogenous information acquisition.
  - **Does not imply necessarily that the slope of the Euler equation (EIS) moves over time though!**
- Implications for monetary policy
  - Timing of monetary policy measures matters.
  - People internalize the significance of inflation for propensity to consume durable goods conditional on its level and dynamics.

Thank you for your attention!

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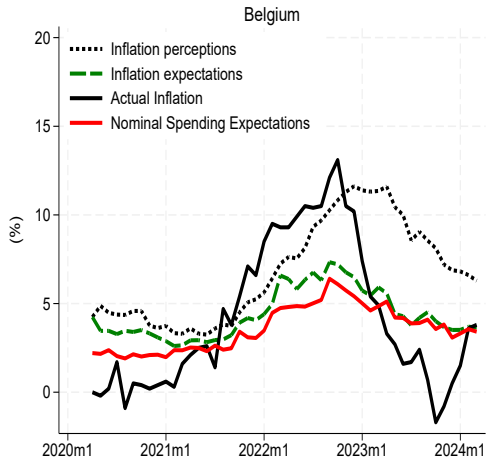
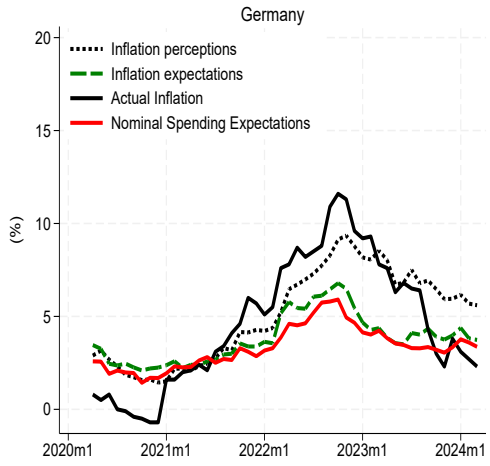
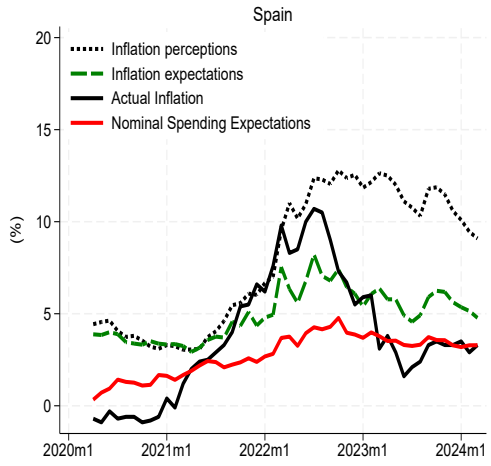
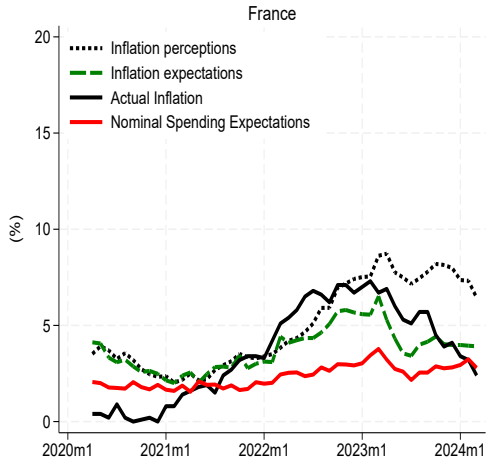
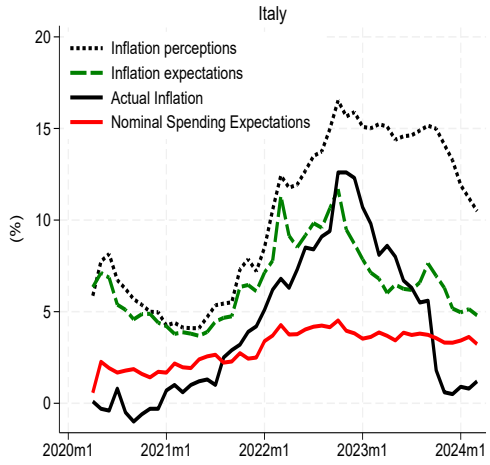
Time series evidence per country

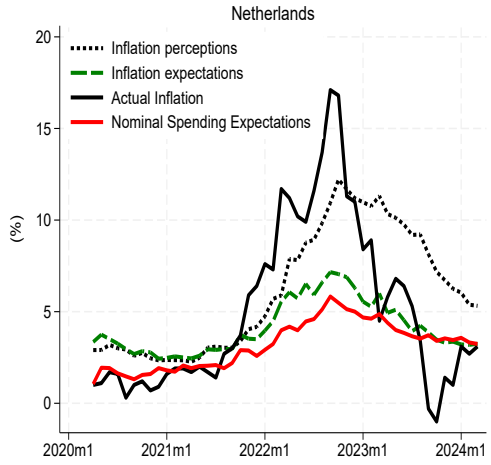












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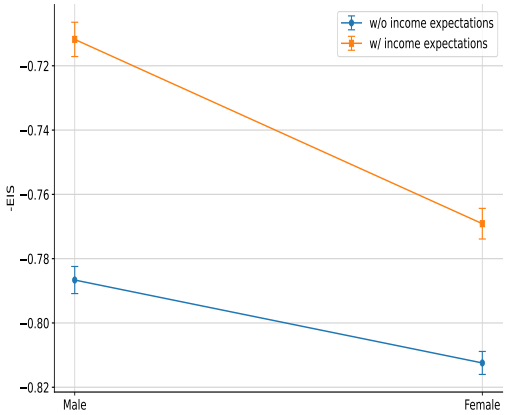
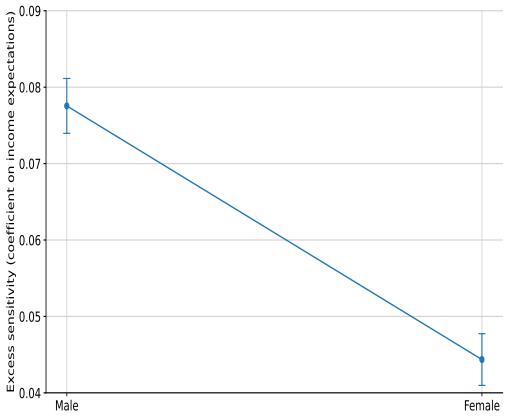
Main questions used

- **point inflation expectations**
  - $E_t\pi_{t+1}$: How much higher (lower) do you think prices in general will be 12 months from now in the country you currently live in? ...%
- **probabilistic inflation expectations**
  - Prices will be [-12% or less], [-12%; -8%], [-8%; -4%], [-4%; -2%], [-2%; 0%], [0%;2%], [2%;4%], [4%;8%], [8%;12%], and [12% or more]
  - We calculate the uncertainty of expectations as the weighted standard deviations.
- **qualitative inflation expectations**
  - What do you think will happen to prices in general over the 12-month period? [Prices will increase a lot; Prices will decrease a lot; Prices will increase a little; Prices will decrease a little; Prices will be exactly the same (that is 0% change)]
- **point nominal spending growth expectations**
  - $E_t\Delta c_{t+1}^{nominal}$: By what percent do you expect your household spending on all goods and services to change during the next 12 months compared with your spending in the past 12 months? ...%
- result: **real spending growth expectations**
  - $E_t\Delta c_{t+1} = E_t\Delta c_{t+1}^{nominal} - E_t\pi_{t+1}$
- **nominal income expectations**
  - By about what percent do you expect the total net income of your household to increase (decrease)? ...%
- **credit access expectations**
  - Do you think that 12 months from now it will generally be harder or easier for your household to obtain credit or loans than it is these days? [Much harder; Somewhat harder; Equally easy/hard; Somewhat easier; Much easier]

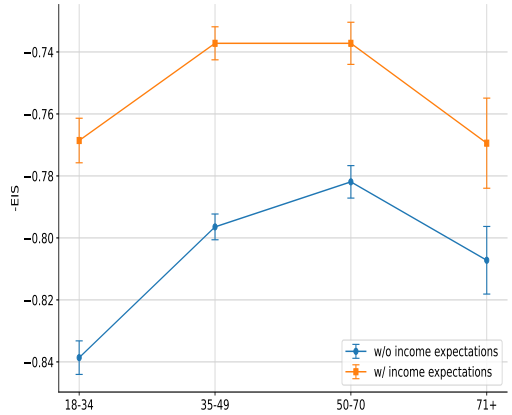
Heterogeneity across demographics

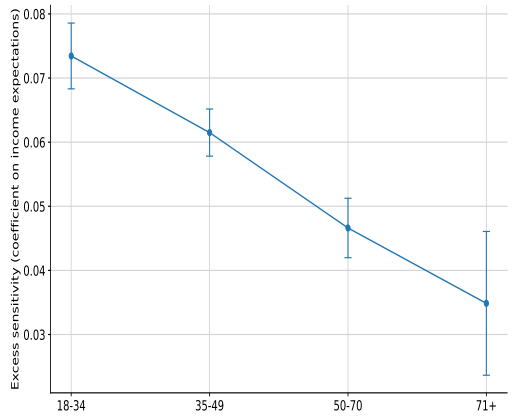
Gender



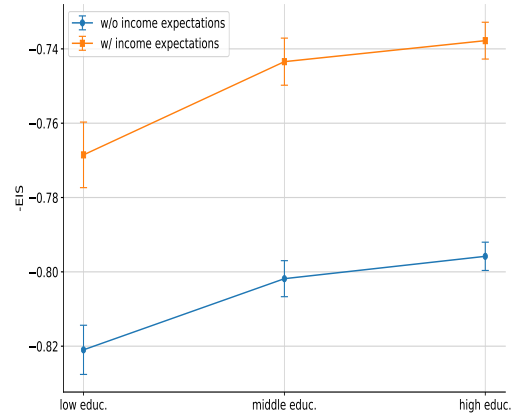


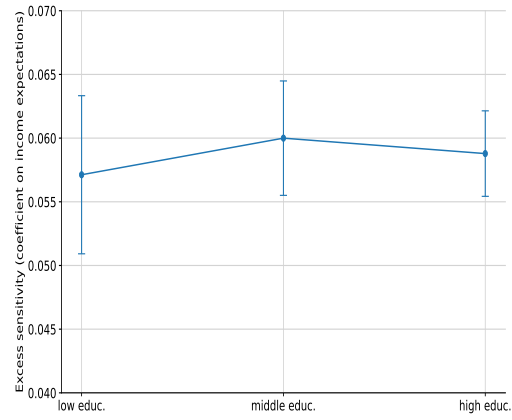
Age





Education





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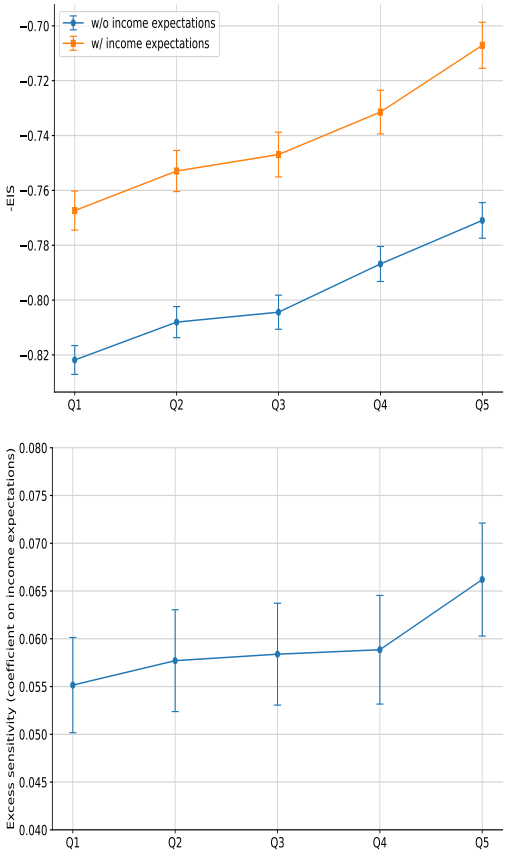
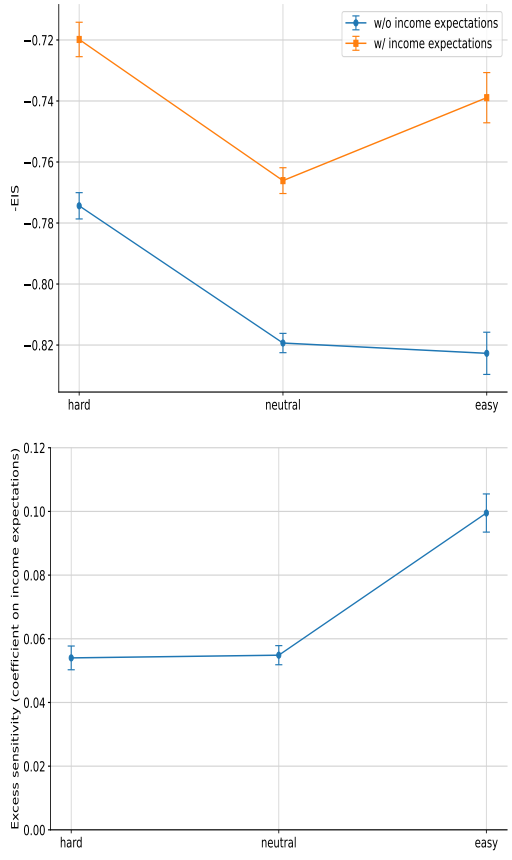
Heterogeneity across demographics - part II

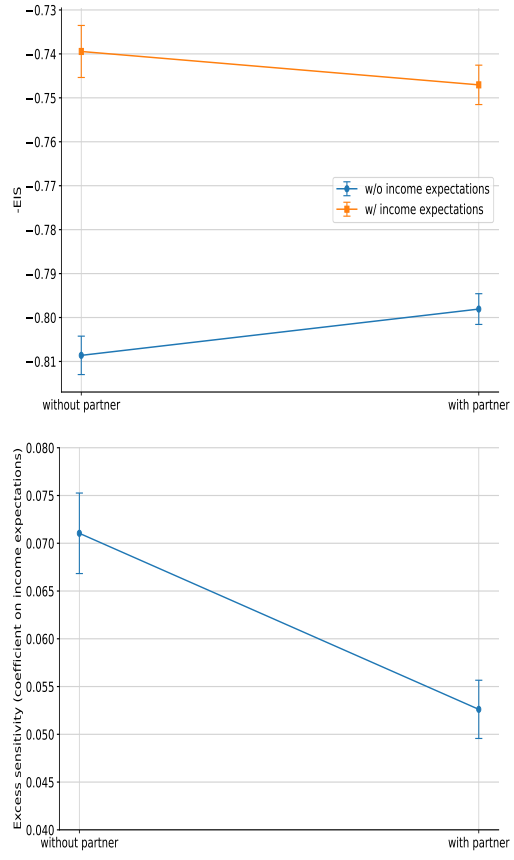
Income distr.



Credit



Partnership



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Interest rate expectations

Dependent variable: Real Spending growth exp. Panel regressions			
	(1)	(2)	(3)
Real Rate Exp.	0.71***	0.71***	0.72***
	(0.003)	(0.003)	(0.003)
R^2	0.317	0.321	0.308
Country FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Controls	No	Yes	Yes
Ind. FE	No	No	Yes
N	563761	563761	563761

Std. Err. in parentheses, *** $p < 0.01$.

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Pooled OLS with individual sample weights

	Dependent variable: Real Spending growth expectations			
	Pooled OLS		Pooled OLS with sample weights	
	(1)	(2)	(3)	(4)
Infl. Exp.	-0.70***	-0.70***	-0.71***	-0.71***
	(0.004)	(0.004)	(0.005)	(0.005)
R^2	0.371	0.373	0.372	0.374
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	No
N	627797	627797	627797	627797

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

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Results using density means as dependent variable

	Dependent variable: Real Spending growth expectations					
	Panel regressions			IV-Panel regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
Infl. Exp.	-0.79***	-0.79***	-0.82***	-0.61***	-0.62***	-0.68***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
R^2	0.180	0.181	0.173	0.180	0.181	0.172
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	No	Yes	Yes
Ind. FE	No	No	Yes	No	No	Yes
N	608249	608249	608249	608249	608249	608249

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

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Using density means and measures of second order moments

	Dependent variable: Real Spending growth expectations					
	Panel regressions			IV-Panel regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
Infl. Exp.	-0.77***	-0.77***	-0.82***	-0.61***	-0.61***	-0.68***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)
Infl. Exp. Variance	0.14***	0.15***	0.066***	0.22***	0.22***	0.11***
	(0.006)	(0.006)	(0.008)	(0.007)	(0.007)	(0.009)
R^2	0.186	0.187	0.176	0.188	0.190	0.178
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	No	Yes	Yes
Ind. FE	No	No	Yes	No	No	Yes
N	608249	608249	608249	608249	608249	608249

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

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Result 3: Deviations from the standard Euler equation

	Dependent variable: Real Spending growth expectations					
	(1)	(2)	(3)	(4)	(5)	(6)
Infl. Exp.	-0.73***	-0.76***	-0.81***	-0.68***	-0.71***	-0.76***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Real Inc. Exp.				0.052***	0.054***	0.050***
				(0.002)	(0.003)	(0.003)
Real Past Spending Growth	0.17***			0.16***		
	(0.002)			(0.002)		
Lag of Dependent var.		0.091***			0.087***	
		(0.002)			(0.002)	
Macro Expectations	No	No	Yes	No	No	Yes
GDP expectations			-0.0094***			-0.017***
			(0.003)			(0.003)
Home price expectations			0.074***			0.069***
			(0.003)			(0.003)
Umployment expectations			0.014***			0.016***
			(0.002)			(0.002)
Interest rate exp.			0.048***			0.047***
			(0.005)			(0.005)
R^2	0.426	0.383	0.358	0.432	0.387	0.365
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Demo. Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	No	No	No	No	No	No
N observations	593413	508538	519248	577477	495761	506571

Standard errors in parentheses

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

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Result 2: Excess sensitivity - Role of credit constraints

- conditional on question C7121: expected access to credit

	Dependent variable: Real Spending growth expectations					
	Panel regressions (Random effects)			Panel regressions (Fixed effects)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Expected Credit Access			Expected Credit Access		
	Hard	Neutral	Easy	Hard	Neutral	Easy
Infl. Exp.	-0.72***	-0.76***	-0.70***	-0.78***	-0.79***	-0.75***
	(0.006)	(0.004)	(0.009)	(0.007)	(0.005)	(0.011)
Real Inc. Exp.	0.045***	0.055***	0.10***	0.045***	0.056***	0.092***
	(0.004)	(0.003)	(0.006)	(0.004)	(0.003)	(0.008)
R^2	0.345	0.411	0.368	0.333	0.401	0.355
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	No	No	No	Yes	Yes	Yes
N observations	164956	374242	64410	164956	374242	64410

Standard errors in parentheses

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

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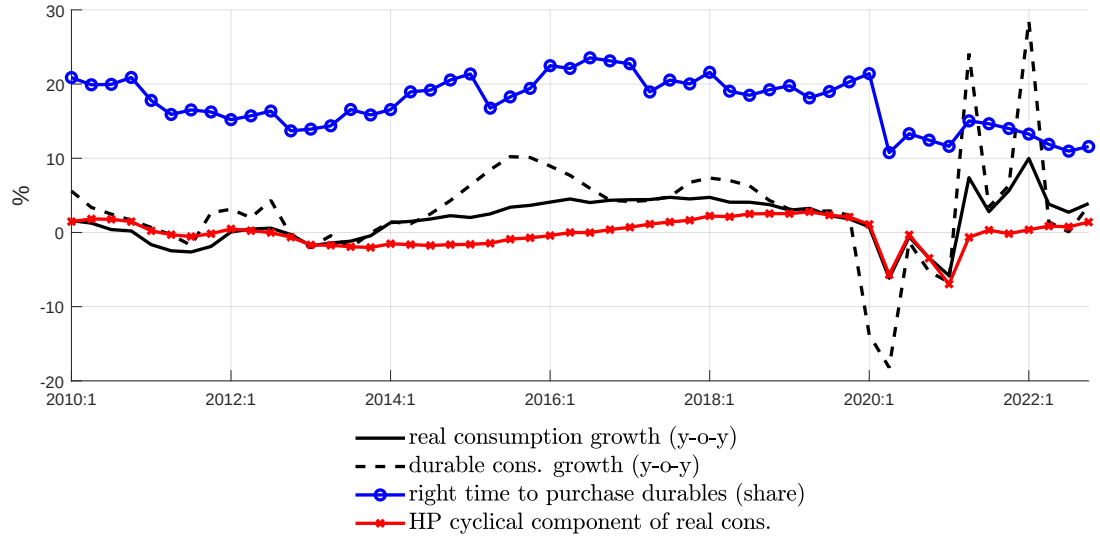
Durable consumption decisions

- Is the survey evidence a relevant indicator of actual consumption in Slovakia?



- Correlations

	right time to purchase durable goods	
	2010-2019	2010-2022
overall cons. growth	**0.72**	**0.37**
durable cons. growth	0.58	0.22
overall cons. HP-cyclical component	0.37	0.45

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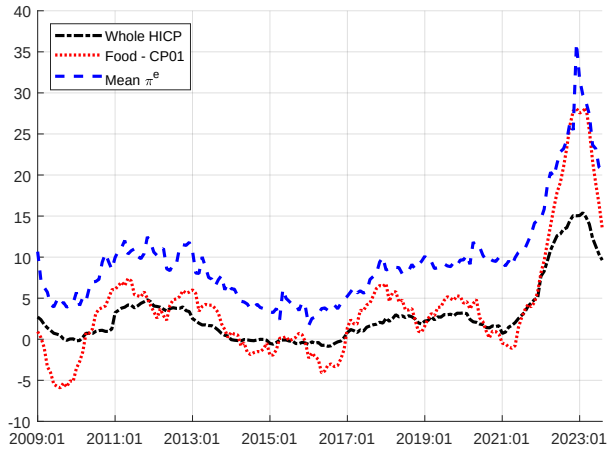
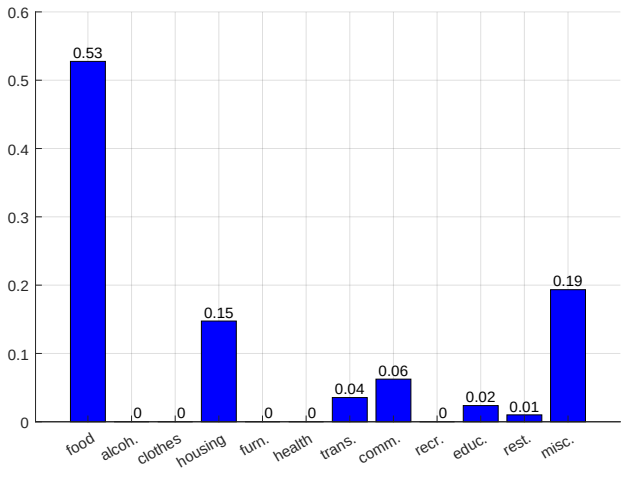
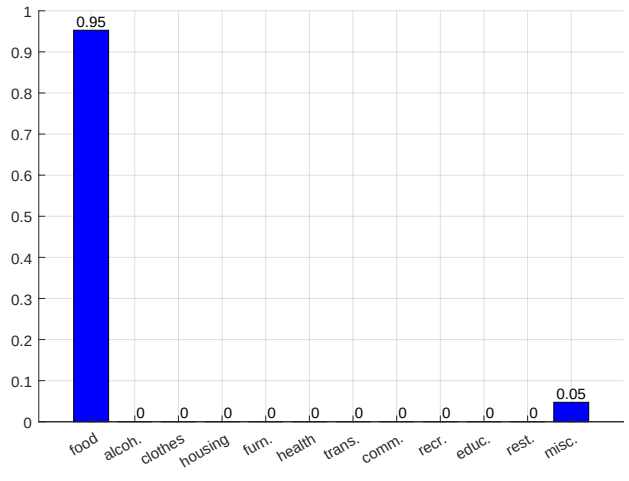
Attention to food prices explains the rise in the upward bias



- Variance decomposition of fitted π^e fluctuations based on LASSO estimation



pre-inflation surge period



surge period

Potential identification & endogeneity issues

- Identification relies on cross-sectional variation in households' inflation expectations. Is this variation sufficient?
- Reverse causality: households that purchased durables may tend to perceive that prices increased and thus expect a positive inflation rate.
- Estimates might also suffer from an endogeneity bias resulting from omitted time-varying variables.
- Missing panel data $\rightarrow$ no observation of changes in expected level of inflation.

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