Inflation expectations
at times of high and low inflation

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Subjective inflation expectations

☐ Subjective inflation expectations of households ($\pi^e_{i,t|t+1}$) are the rate at which people expect prices to rise in the future.

☐ During the last decade, the influx of data on individual inflation perceptions and expectations has improved our understanding of π^e_t.

☐ Growing empirical evidence shows that most households' decisions depend on π^e_t:

▶ consumption/savings (inter alia Crump et al., 2022; D'Acunto et al., 2022; Andrade et al., 2023; Dräger and Nghiem, 2021),

▶ mortgage uptaking and mortgage type (Malmendier and Nagel, 2015),

▶ stock market participation (Das, Kuhnen and Nagel, 2019),

▶ wage bargaining, etc.

☐ Recent summaries of the literature: D'Acunto, Malmendier and Weber (Handbook of Economic Expectations, 2022), Weber, D'Acunto, Gorodnichenko, Coibion (Journal of Economic Perspectives, 2022)

Yet evidence prevails primarily for times of low and stable inflation
D'Acunto, Hoang and Weber (2022), Andrade, Mengus and Gautier (2023), this work
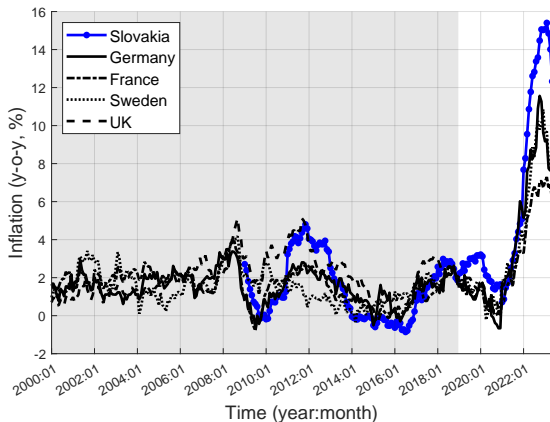
Notes: The gray shaded area highlights sample periods covered by other studies on inflation expectations using the European Commission harmonized consumer survey. In particular, the sample period of January 2000 until February 2016 corresponds to the study of D'Acunto, Hoang and Weber (2022) for Germany, France, Sweden and the UK and the sample period of January 2004 until December 2018 to Andrade, Mengus and Gautier (2023) for France. The Slovak data used in this paper start in January 2009 and end in May 2023. All inflation rates are the monthly HICP y-o-y inflation rates in %.

This work

☐ relies on a novel rich micro data from the EC consumer survey for Slovakia,

☐ focuses on properties and implications of π^e for economic decisions (propensity for durable consumption) at times of both low & stable vs high & surging inflation,

☐ compares the findings with the existing literature:

     ✓ π^e are upward biased, dispersed and volatile,

     ✓ they differ systematically across socio-demographic groups,

     ✓ they significantly affect the propensity to consume.

☐ Two novel findings from studying times of deflation and surging inflation:

     1 The strength of the positive π^e impact is state-dependent, in particular it is higher during times of high inflation and not significant or even negative during deflationary times,

     2 outside of the low and stable inflation region (2-3%), the intensive and not the extensive margin drives the variance of π^e,

     but it is still the extensive margin or expecting higher inflation that drives the readiness to consume durables also at times of high and surging inflation
(this extends the evidence from Andrade et al. (2023) to times of high inflation).

☐ One general observation:

     ▶ it matters which measure of inflation expectations we look at.

Data

Dataset description

☐ European Commission Consumer Survey

☐ regular harmonised survey in national languages conducted for all the European Union economies and the applicant countries

☐ monthly survey of repeated cross sections (in SK 1,200 households)

☐ data collected by national institutions, in SK it is the Statistical office SR

☐ aggregated answers are publicly available at the country level starting from 1985

☐ quantitative expectations elicited since 2003 but publicly available only as an aggregate for all countries together

☐ common use in the literature

  ▶ D'Acunto, Hoang and Weber (2022): DEU, UK, SWE, FRA

  ▶ Andrade, Gautier and Mengus (2023): FRA

  ▶ D'Acunto, Hoang, Paloviita and Weber (2021): FI

☐ sample period using micro data in this paper: 2009:01 - 2023:05

Survey questions

1. How has the **financial situation of your household** changed over the last 12 months?
2. How do you expect the financial position of your household to change over the next 12 months?
3. How do you think the **general economic situation in Slovakia** has changed over the past 12 months?
4. How do you expect the general economic situation in Slovakia to develop over the next 12 months?
5. How do you think **consumer prices** have developed over the last 12 months?
6. In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months?
7. How do you expect the **number of people unemployed** in this country will change over the next 12 months?
8. 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**?
9. Compared to the last 12 months, do you **expect to spend more or less** money on major purchases such as furniture and electrical goods?
10. In view of the general economic situation, do you think that now is **good time to save**?
11. Over the next 12 months, how likely will you be to save any money?
12. Which of these statements best describes the current **financial situation of your household**? (from saving a lot up to running into debt)
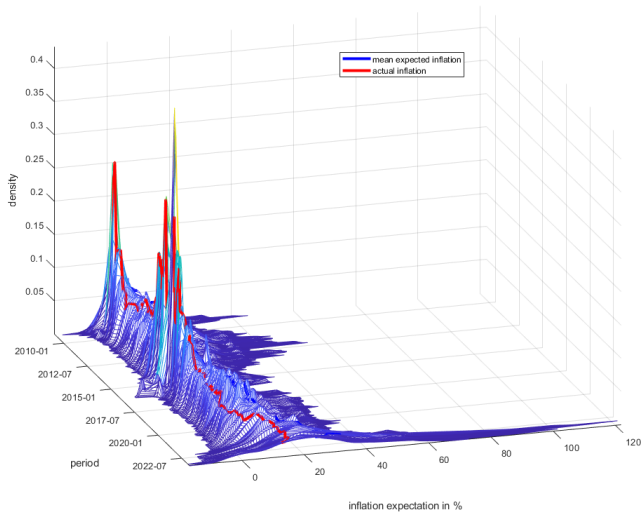
Survey questions

5. How do you think **consumer prices** have developed over the last 12 months?
6. In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months?

8. 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**?

Key survey questions for this work

Q5 How do you think **consumer prices have developed over the last 12 months**? They have
- ► Risen a lot; Risen moderately; Risen slightly; Stayed about the same; Fallen; Don't Know
- ⇒ if the answer it not "about the same" or "don't know," the respondent will be asked about a point estimate
- Q51 *By how many per cent have consumer prices risen or fallen over the last 12 months?*

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
- ⇒ 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

Distribution of $\pi^e_{i,t}$ over time

Durable consumption decisions

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

— real consumption growth (y-o-y)
- - durable cons. growth (y-o-y)
—●— right time to purchase durables (share)
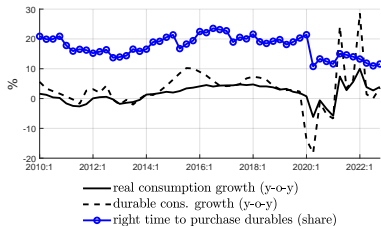
☐ Correlations

|	right time to purchase durable goods	
	2010-2019	2010-2023
overall cons. growth	**0.72**	**0.37**
durable cons. growth	0.58	0.22

Some descriptive statistics for different samples

☐ Is the impact of inflation expectations on consumers' decisions time-varying?

☐ To address this question we split the sample (January 2009 - May 2023) into the following sub-periods: surge June 2021 - December 2022, deflationary times January 2014 - December 2016, drop January 2023 - May 2023 and the remaining periods.

☐ data cleaning: discard observations with "I do not know" replies to Q2, Q4, Q6, Q7, Q8, Q9, Q10, Q12 and no income data

|	whole sample	surge	defl. times	drop	remains
	(1)	(2)	(3)	(4)	(5)
time sample	2009:01-2023:05	2021:06-2022:12	2014:01-2016:12	2023:01-2023:05	all other periods
no. obs.	122,163	10,772	25,389	2,826	83,176
Measures of inflation expectations and readiness to spend					
readiness to buy durables (Q8)	18.9%	14.3%	21.5%	11.5%	19.0%
share inflation will increase more rapidly	27.4%	51.3%	13.3%	32.4%	28.4%
share $\pi^e_{i,t} > 0$	78.8%	90.5%	61.9%	89.4%	82.1%
average π^e conditionally on $\pi^e_{i,t} > 0$	11.0%	19.0%	6.9%	30.0%	10.1%
Macro variables					
average headline HICP π_t, y-o-y	2.7%	9.1%	-0.3%	14.3%	2.1%
average households' nom. i_t	4.8%	2.4%	5.1%	4.8%	5.1%

Time series moments

Distributional moments of π_t^e in Slovakia over time
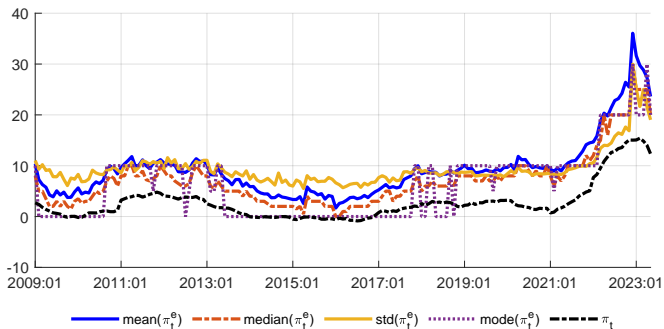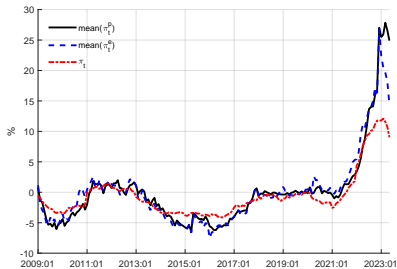
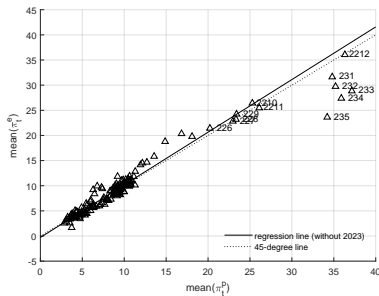# Distribution of $\pi_{i,t}^e$ over time

Kernel density estimation
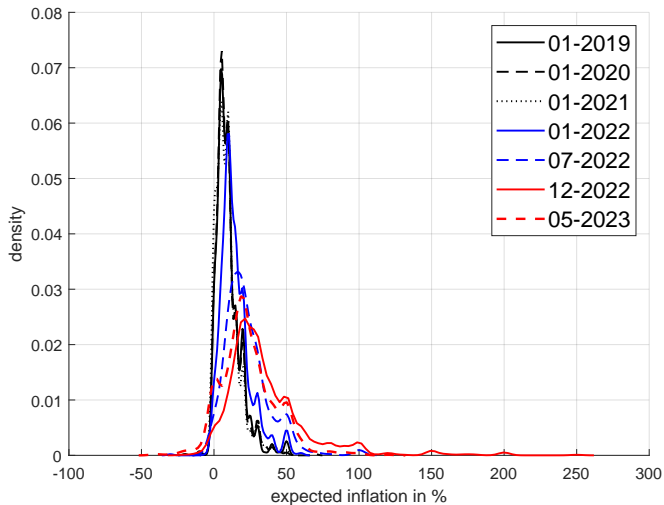
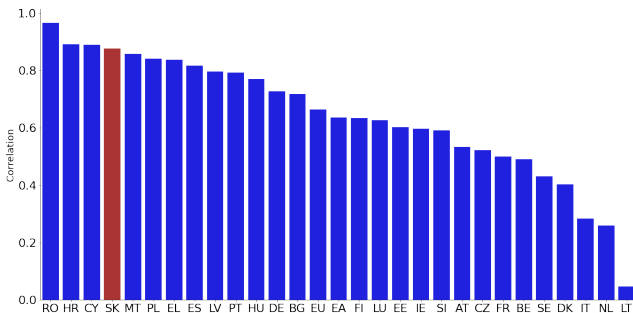## Co-movement of perceptions and expectations

de-meaned

until the end of 2022 almost 1:1 relationship

Cross country evidence on co-movement of *qualitative* inflation perceptions and expectations

time sample 2003:05 - 2022:12

☐ quite heterogeneous evidence across countries

Extensive vs. intensive margin
Andrade, Gautier and Mengus, JME, 2023

- ☐ Question: What drives inflation expectations, how many people expect non-zero inflation or conditional on expecting a non-zero inflation, how high the inflation is expected to be?

- ☐ This study uses the decomposition suggested in Klenow and Kryvtsov (QJE, 2018) to decompose the quantitative inflation expectations into the extensive and the intensive margin.

- ☐ EC consumer survey data for France, 2004-2018

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

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

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

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

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

Variance decomposition of π^e
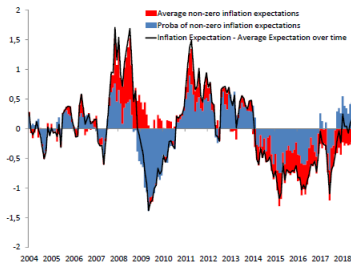
France
75% extensive margin

Slovakia
35% extensive margin

Variance decomposition of π^e
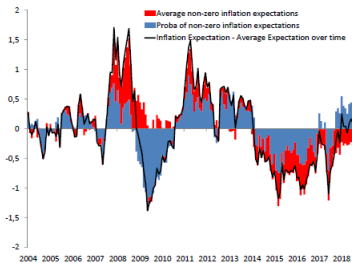
France
75% extensive margin

Slovakia
35% extensive margin
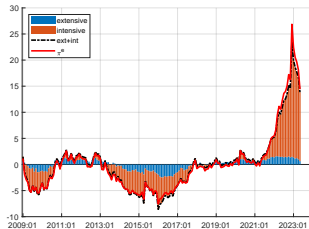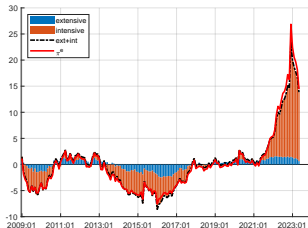
☐ At times of high and particularly low inflation, i.e. outside of the low and stable inflation region (2-3%), it is the intensive margin which tends to drive the aggregate fluctuations of quantitative π^e.

☐ But what about the consumption decisions - does the extensive margin still matter?

It is about positive inflation expectations

☐ share of people expecting non-zero inflation is basically the share of people expecting positive inflation

☐ consider another decomposition proposed by Klenow and Kryvtsov (QJE, 2018)

$$\pi_t^e = fr_t^{e+} \, dp_t^{e+} - fr_t^{e-} \, dp_t^{e-},$$

$$var(\pi_t^e) = \underbrace{var(fr_t^{e+} \, dp_t^{e+}) - cov(fr_t^{e+} \, dp_t^{e+}, fr_t^{e-} \, dp_t^{e-})}_{\text{POS term}} + \underbrace{var(fr_t^{e-} \, dp_t^{e-}) - cov(fr_t^{e+} \, dp_t^{e+}, fr_t^{e-} \, dp_t^{e-})}_{\text{NEG term}}.$$

☐ the POS term accounts for 98% of the $var(\pi_t^e)$
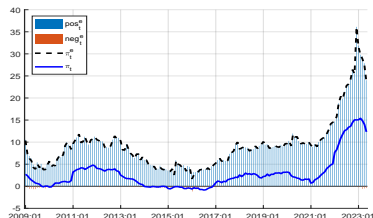
<u>Notes:</u> fr_t^e = the share of individuals expecting non-zero inflation, fr_t^{e+} = the share expecting a positive inflation , fr_t^{e-} = the share expecting a negative inflation. dp_t^{e+} and dp_t^{e-} denote the average magnitudes of increases and decreases, respectively.

Consumption and savings

Intertemporal consumption choices

□ Ambiguous predictions of the economic theory on how higher π^e affect the consumption/savings trade-off.

□ Effect of higher π^e on consumption:

Euler equation	+
negative wealth and income effects	-
anticipating monetary policy reaction (Carvalho and Nechio, 2014)	-
precautionary savings motive	-
association of higher inflation with bad economic times (Coibion et al., 2019)	-

□ Literature stand inconclusive.

Consumption/savings trade-off at times times of high and low inflation

☐ Different measures of inflation expectations

  ▶ EM (fr_t^+) and IM (dp_t^+) à la Andrade, Gautier and Mengus (2023)

  ▶ following D'Acunto, Hoang, and Weber (2022) we exploit the qualitative answers as well

    a dummy variable equals one when households answered "Prices will increase more" to get a measure of higher expected inflation

☐ **logit regressions** - estimate *separately* the effect of different inflation expectations on the probability to indicate readiness to spend

☐ the random variable can take two values, $\{0, 1\}$: one denotes a good time to purchase durable goods, zero otherwise

☐ sample split to assess the impact of inflation expectations during times of high vs low inflation

  1 surge: June 2021 - December 2022

  2 deflationary times: January 2014 - December 2016

  3 drop: January 2023 - May 2023

  4 remaining periods

Regression results for the propensity to purchase durable goods

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

	whole sample	surge	defl. times	drop	remains
	(1)	(2)	(3)	(4)	(5)
average π_t	2.75%	9.06%	-0.31%	14.33%	2.14%
readiness to spend	17.4%	12.8%	20.2%	11.4%	17.6%
	Right time to purchase				
π^e_{DHW}	0.032***	0.041***	0.005	0.019	0.034***
	(0.093)	(0.085)	(0.111)	(0.095)	(0.087)
EM_{AGM}	−0.005	0.025***	−0.015***	0.043***	−0.004
	(0.092)	(0.081)	(0.112)	(0.098)	(0.085)
IM_{AGM}	−0.000	0.001***	−0.002***	0.001***	−0.001***
	(0.084)	(0.075)	(0.102)	(0.116)	(0.081)
	Controls				
Demographics	X	X	X	X	X
Expectations	X	X	X	X	X
π_t	X	X	X	X	X
i_t	X	X	X	X	X
No. obs.	122,163	10,772	25,389	2,826	83,176
No. obs. IM	95,904	9748	15,663	2,526	67,967

McFaddens' Pseudo-R^2 in parentheses.
Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: This table reports the estimated average marginal effects of a binomial logit regression evaluated at the sample mean. Households' readiness to purchase durables is the dependent variable. There are three measures of inflation expectations: a dummy variable that equals one if a household expects inflation to increase à la D'Acunto et al. (2022), a dummy if a person expects positive inflation (extensive margin) and the individual level of expected inflation (intensive margin) à la Andrade et al. (2023). Only one inflation expectations measure is employed in a regression at a time. We control for household demographics and household expectations as well as the level of inflation and nominal interest rates. Demographics include: gender, age, income category per capita, education, employment status. Expectations include: own financial situation, economic growth in Slovakia, unemployment, financial status and considering given time as the right time to save. Standard errors, even though not reported explicitly, are clustered at the quarter level.

"I do not know" inflation expectations

☐ hypothesis: people answering the question about evolution of consumer prices over the next 12 months with "I do not know" do not follow the Euler-equation rationale

☐ I introduce a dummy variable which equals one when households answered "I do not know" to the question on qualitative π^e

	whole sample	surge	defl. times	drop	remains
	(1)	(2)	(3)	(4)	(5)
	Right time to purchase				
π^e_{DHW}	0.032***	0.041***	0.005	0.019	0.034***
	(0.093)	(0.085)	(0.111)	(0.095)	(0.087)
$\pi^e_{Don't\ know}$	−0.028***	−0.052***	−0.004	−0.029***	−0.030***
	(0.094)	(0.082)	(0.117)	(0.097)	(0.087)
	Controls				
Demographics	X	X	X	X	X
Expectations	X	X	X	X	X
π_t	X	X	X	X	X
i_t	X	X	X	X	X
No. obs.	125,777	11,372	26,196	2,984	85,225

McFaddens' Pseudo-R^2 in parentheses.
Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

☐ people with no inflation expectations tend to *decrease* their readiness to purchase durables and much more so during periods of high inflation

Various measures of inflation expectations and actual inflation
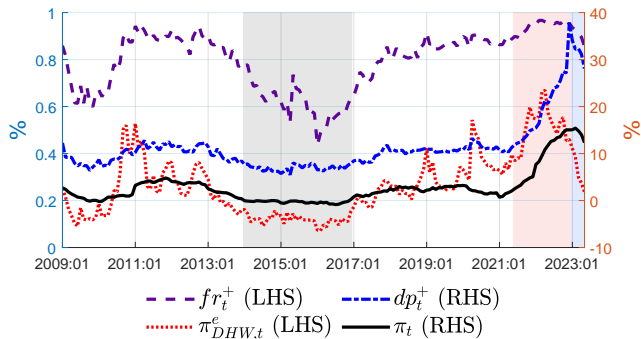
Predictive power of various indicators of π^e in relation to actual inflation

	Effect on current inflation			
	(1)	(2)	(3)	(4)
π_{t-1}	0.911***	0.968***	0.969***	1.0238***
	(0.035)	(0.085)	(0.010)	(0.033)
π_t^e	0.065***			
	(0.022)			
$EM_{AGM,t}$		0.724**		−1.889***
		(0.339)		(0.044)
$IM_{AGM,t}$		0.020		−0.029
		(0.023)		(0.021)
$\pi_{DHW,t}^e$			1.869***	3.204***
			(0.276)	(0.409)
R^2	0.987	0.986	0.989	0.990
No. obs.	172	172	172	172

Standard errors in parentheses.
Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

<u>Notes:</u> This table shows the result of OLS regressions of the Slovak HICP y-o-y inflation at date t on its own lag, π_{t-1}, and time series variables constructed from micro data of the household survey. The time period comprises the whole sample period between January 2009 and May 2023. In column (1), the regressor is the average of all inflation expectations measured at date t, π_t^e. In column (2), the explanatory variables are the share of households expecting positive inflation and the average inflation expectation calculated among households expecting positive inflation, i.e. the extensive and the intensive margin of inflation expectations à la Andrade et al. (2023), respectively. In column (3), the regressor is the share of households expecting higher inflation than during past 12 months, i.e. the expectations measure of D'Acunto et al. (2022). In column (4), all inflation expectations measures are used in parallel.

Conclusion

☐ Evidence on π^e from a novel rich micro data from the EC consumer survey for Slovakia for both times of high and low inflation.

☐ Two main novel findings:

1. The strength of the π^e impact is state-dependent and is higher during times of high and surging inflation and not significant or even negative during periods of deflation,

2. outside of the low and stable inflation region (2-3%), the intensive and not the extensive margin drives the variance of aggregate π^e,

   but it is still the qualitative decision to expect higher inflation or positive inflation (extensive margin) which drives the propensity to consume durables.

☐ Hence, these results

▶ confirm the evidence in D'Acunto et al. (2022) and Andrade et al. (2023),

▶ extend it for periods of deflation and surging inflation.

Thank you for your attention!

References

Andrade, P., E. Gautier, and E. Mengus (2023). What matters in households' inflation expectations? *Journal of Monetary Economics, forthcoming.*

Crump, R. K., S. Eusepi, A. Tambalotti, and G. Topa (2022). Subjective intertemporal substitution. *Journal of Monetary Economics 126, 118-133.*

D'Acunto, F., D. Hoang, and M. Weber (2022). Managing Households' Expectations with Unconventional Policies. *The Review of Financial Studies 35 (4), 1597-1642.*

Dräger, L. and G. Nghiem (2021). Are Consumers' Spending Decisions in Line with A Euler Equation? *The Review of Economics and Statistics 103 (3), 580-596.*

Socio-demographic differences between the pool of people expecting higher inflation and the pool of people with no inflation expectations

during the surge period 2021:06-2022:12

		higher inflation	don't know
no. obs.		5,523	600
readiness to buy durables (Q8)		15.6%	8.8%
Household demographics			
gender	male	46.1%	50.2%
	female	53.9%	49.8%
age	16-29	17.7%	19.3%
	30-49	39.7%	37.0%
	50-64	27.4%	28.0%
	65+	15.2%	15.7%
education	primary	13.1%	14.2%
	secondary	67.3%	68.8%
	further	19.6%	17.0%
income category	1st (lowest) quartile	9.0%	6.2%
	2nd quartile	26.6%	20.0%
	3rd quartile	27.3%	29.7%
	4th quartile	37.0%	44.2%
employment status	active	60.9%	56.5%
	not active	39.1%	43.5%
Household expectations and perceptions			
current financial situation	save a lot	4.1%	6.3%
	save little	49.1%	40.5%
	don't save	33.9%	39.7%
	dissave	6.5%	5.8%
	take on debt	6.4%	7.7%
financial outlook	improves substantially	0.6%	1.3%
	improves somewhat	7.8%	6.7%
	identical	57.3%	66.5%
	worsens somewhat	24.4%	17.2%
	worsens substantially	10.0%	8.3%
savings good times	yes	26.9	24.5%
economic outlook	improves substantially	0.6%	0.7%
	improves somewhat	5.1%	7.2%
	identical	18.3%	25.5%
	worsens somewhat	37.8%	40.3%
	worsens a lot	38.1%	26.3%
expected unemployment rate	increases substantially	21.0%	16.3%
	increases somewhat	39.7%	35.5%
	identical	27.8%	36.8%
	decreases somewhat	10.7%	10.2%
	decreases a lot	0.8%	1.2%