Inflation Expectations and Consumption Decisions

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Motivations

- Management of inflation expectations is key for central banks
- Even more so at ZLB: CB can still affect inflation expectations via communication (Eggertsson-Woodford 2003)
- Standard Euler equation in macro models Details

$$c_t = E_t\left(c_{t+1}\right) - \sigma^{-1}\left(i_t - E_t\left(\pi_{t+1}\right)\right)$$

- Theory delivers a channel that is too strong compared to empirical evidence (FG puzzle)

- Two questions:
  - How do households form their inflation expectations?
  - How these expectations affect their consumption decisions?

What do we do in this paper

This paper: Use individual data from HH survey and focus on non-linearities in inflation expectations and consumption decisions

- Today: Focus on French data
- Extension to US data (on-going)

Main results:

- Formation of inflation expectations is non-linear
  - Extensive margin contributes the most to time variations of aggregate inflation expectations
  - Very large values of expectations contribute only little to aggregate variations
- Inflation expectations do matter for households consumption decisions
  - Mainly coming from the extensive margin of inflation expectations
  - Large cross section heterogeneity
  - Only a little larger effect at the ZLB

Contribution and Related Literature

Heterogeneity in inflation expectations

- Professional forecasters: Mankiw et al. 2003, Coibion and Gorodnichenko 2012, Andrade and Le Bihan 2013
- Households: Carroll 2003, Coibion and Gorodnichenko 2015, Andrade et al. 2018, Vellekoop and Wiederholt 2018
- We here emphasize the relevance of the extensive margin

Empirical debate on whether inflation expectations affect HHs decisions

- Bachmann et al. 2015: no effect ; Coibion et al. 2019: negative
- Ichiue and Nishiguchi 2015, D'Acunto et al. 2018, Crump et al. 2018, Duca et al. 2018, D'Acunto et al. 2019: positive effect
- We provide evidence of a non-linear relationship btw inflation expectations and durable consumption decision

What is the "good" measure of consumption decision?

- Right time for people to consume (Bachmann et al. 2015, Duca et al. 2018)
- Personal decision to buy durables (Drager et al. 2019)
- We find a larger correlation using "personal decision" rather than "right time" variable

Household Survey Data

Enquête mensuelle de conjoncture auprès des ménages (Insee)

- 2 000 households per month, phone interview (Jan 2004 - Dec. 2017)
- 300 000 individual observations
- About 20 questions (mostly qualitative) Questionnaire
- Direct link btw inflation expectations and actual decisions at the HH level

Questions - Inflation expectations and consumption:

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 / – at the same rate / – at a slower rate / Stay about the same / Fall

By how many % do you think consumer prices will go up/down over the next 12 months? XX.X%

Have you made any major purchases over the last 12 months? (washing machine, refrigerator, furniture, dishwasher, ...)

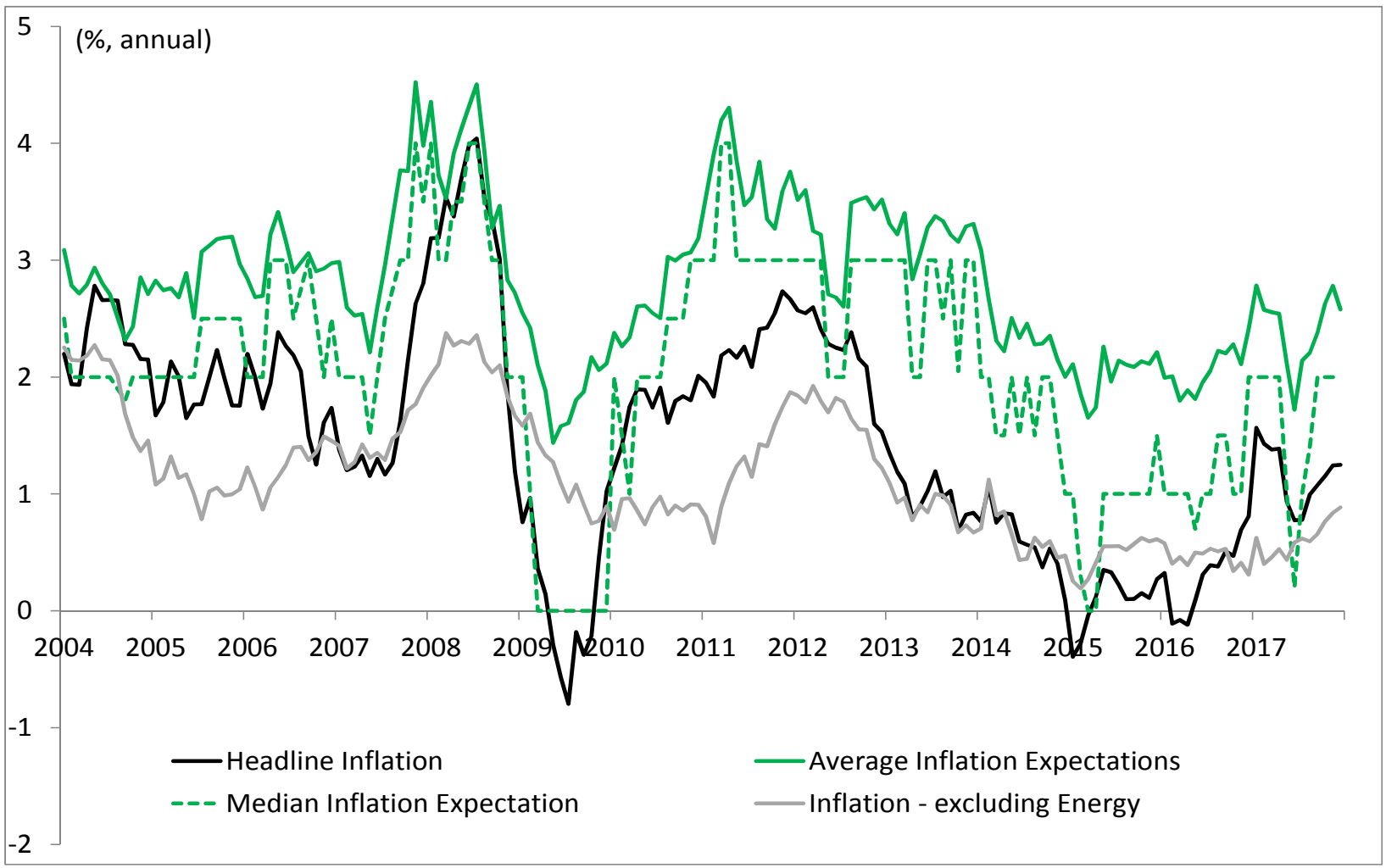
Yes / No

In view of the current general economic situation, do you think now is the right time for people to make major purchases?

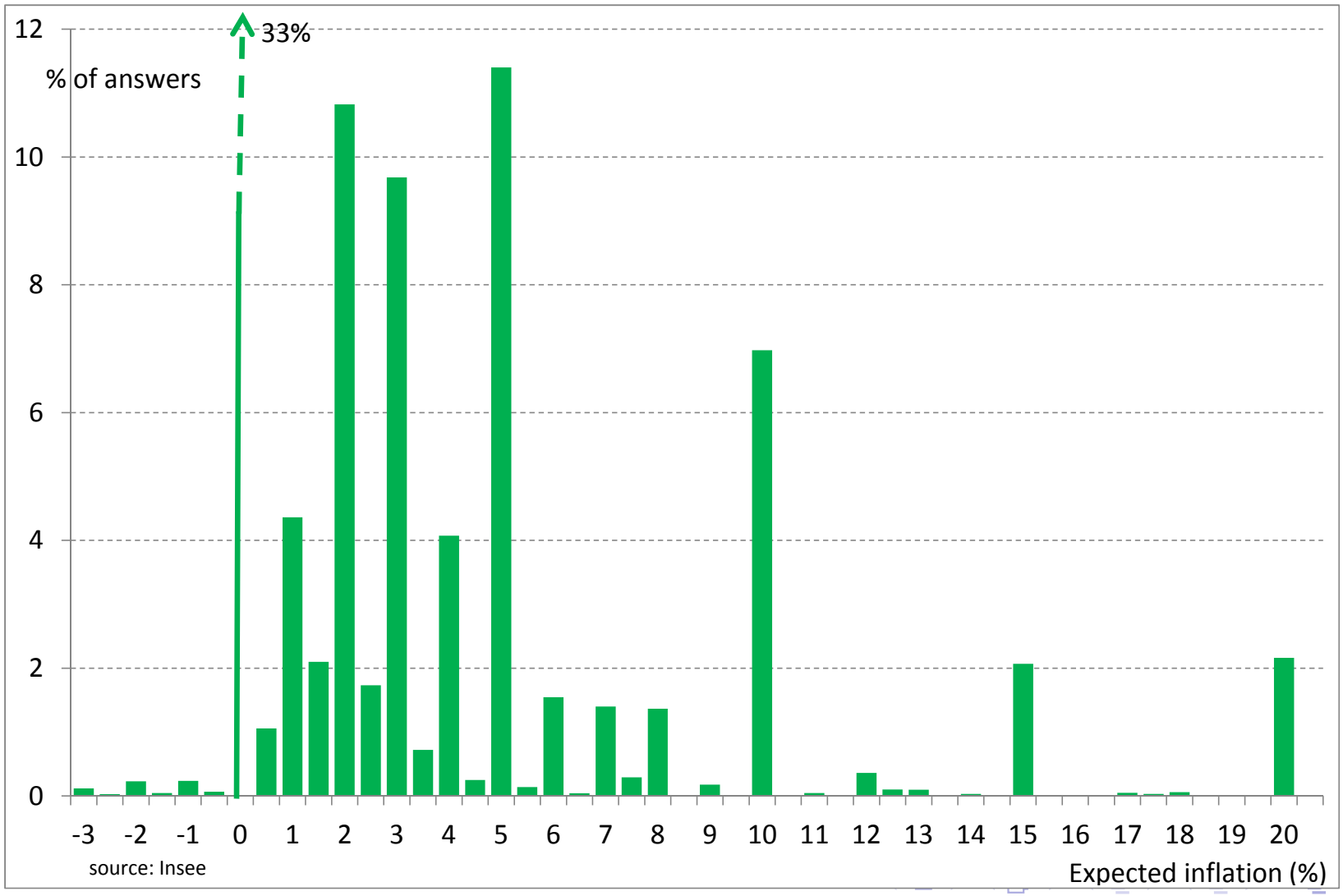
Yes, right time / Neither the right time nor the wrong time / No, wrong time

Inflation expectations overestimate actual inflation but are correlated with it

Outliers Perceptions Correlation

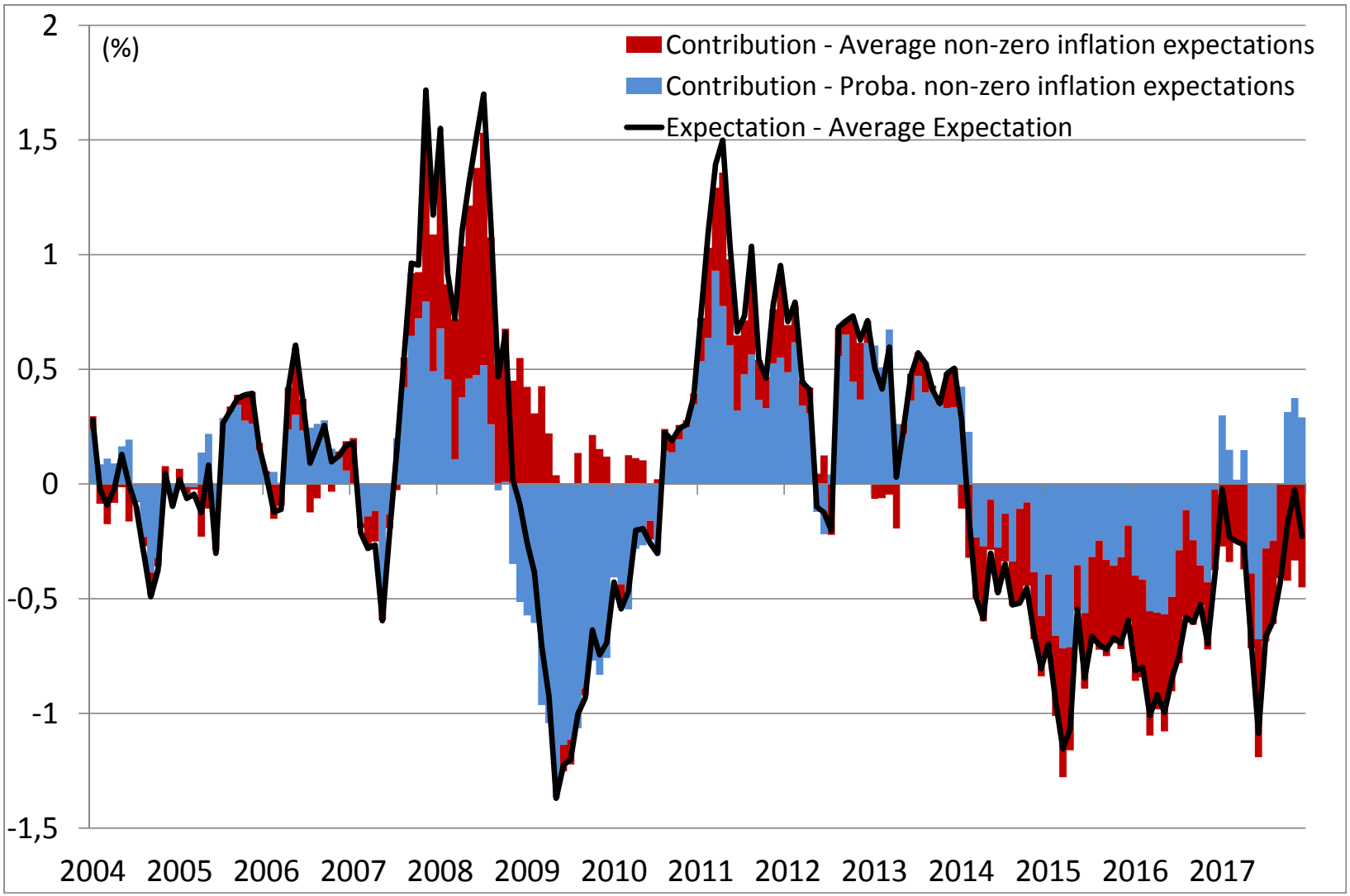


Cross-section distribution: large heterogeneity and strong asymmetry



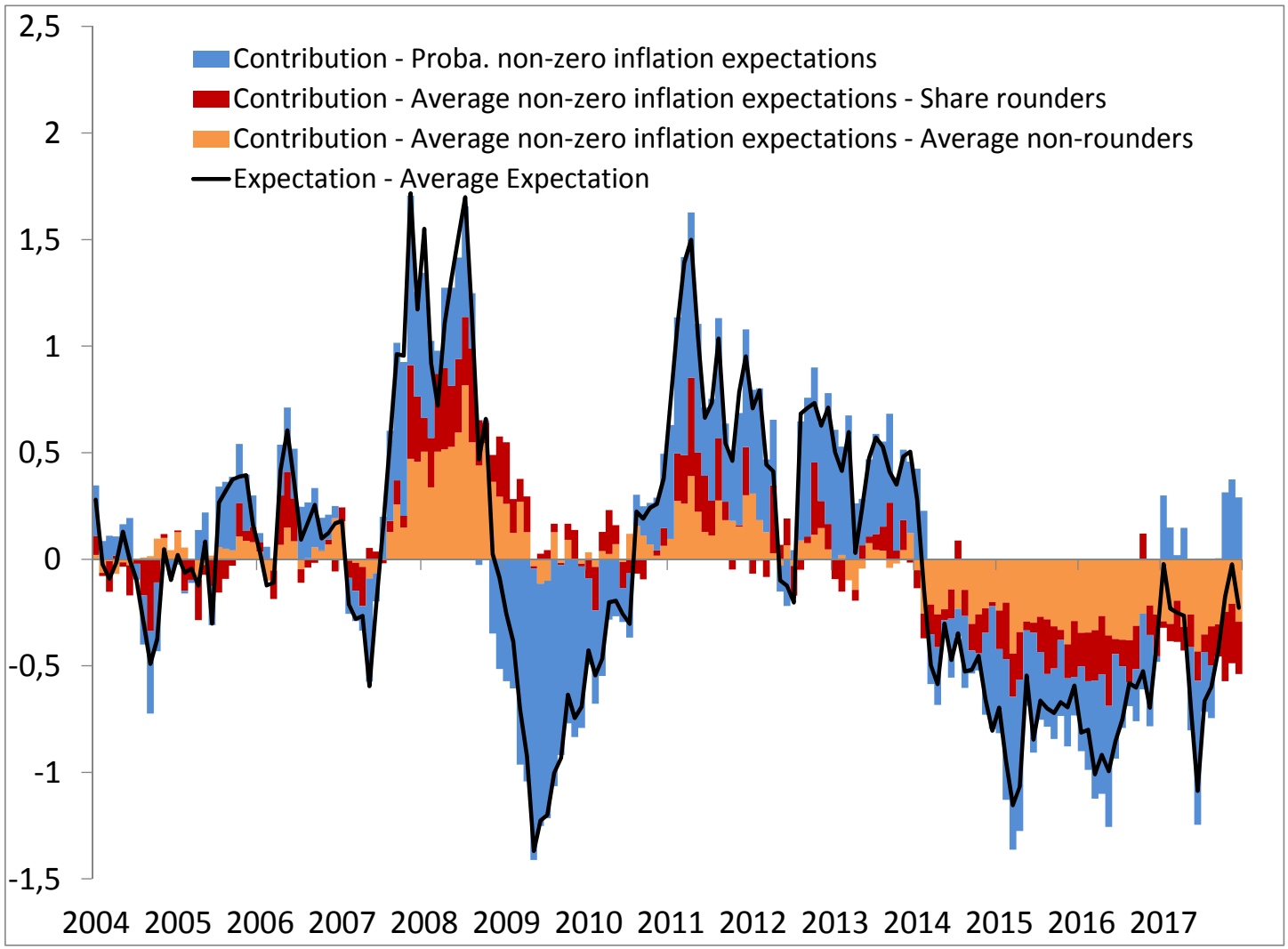
Large contribution of the share of HH expecting stable prices to changes in average expectations

Correlation



Moderate contribution of the share of HH expecting non-plausible values (i.e. multiple of 5)

Correlation



What role for inflation expectations on consumption?

- Durable goods: 25% of overall consumption but large contribution to aggregate consumption volatility Conso
- Infrequent decision: 31% of HH have made some major purchases over the last 12 months Stats.
- Non-linear model of consumption decision:

$$c_{it} = \begin{cases} 0 & \text{if } c_{it}^* \leq 0 \\ 1 & \text{if } c_{it}^* > 0 \end{cases} \tag{1}$$

where

$$c_{i,t}^* = \alpha E_{it}\left[\pi_{t+1}\right] + \beta E_{it}\left[c_{i,t+1}\right] + X_{it}\gamma + \lambda_t + \mu_i + \epsilon_{it} \tag{2}$$

$c_{it} = 1$ if HH has made some major purchases over the last 12 months (0 otherwise)
$E_{it}\left[\pi_{t+1}\right]$ inflation expectations over the next 12 months
$E_{it}\left[c_{i,t+1}\right]$ intention to make major purchases over the next 12 months
X_{it} control variables (inflation perception, unemployment, financial situation...)
λ_t date dummies and μ_i HH characteristics (age, education, job occupation...)

Marginal Effects of Expected Inflation on Consumption Decision

	c_{it}	$E_{it}[c_t]$
$E_{it}[\pi_{t+1}]$ **Quanti.**		
All	0.007	0.000
Less than 10%	0.191***	0.043
By intervals:		
$[10\%; +\infty[$	0.167	-0.164
$[5\%; 10\%[$	1.490***	0.700***
$[3\%; 5\%[$	1.240***	1.060***
$]0\%; 3\%[$	1.200***	0.799***
0%	Ref.	Ref.
$< 0\%$	-0.304	-0.024
$E_{it}[\pi_{t+1}]$ **Quali.**		
Stable	-0.781***	-0.254***
Stable ($E_{it}[\pi_{t+1}] \neq .$)	-1.020***	-0.547***
By intervals:		
Increase more rapidly	1.580***	0.041
– at the same rate	0.677***	0.313***
– at a slower rate	1.360***	0.815***
Stable	Ref.	Ref.
Fall	0.772	0.381

Column: endogenous variable; Row: exogenous variable; including controls
c_{it}: HH durable consumption $E_{it}[c_t]$ "Right Time" pvalues: *** 1%; ** 5% ; * 10%

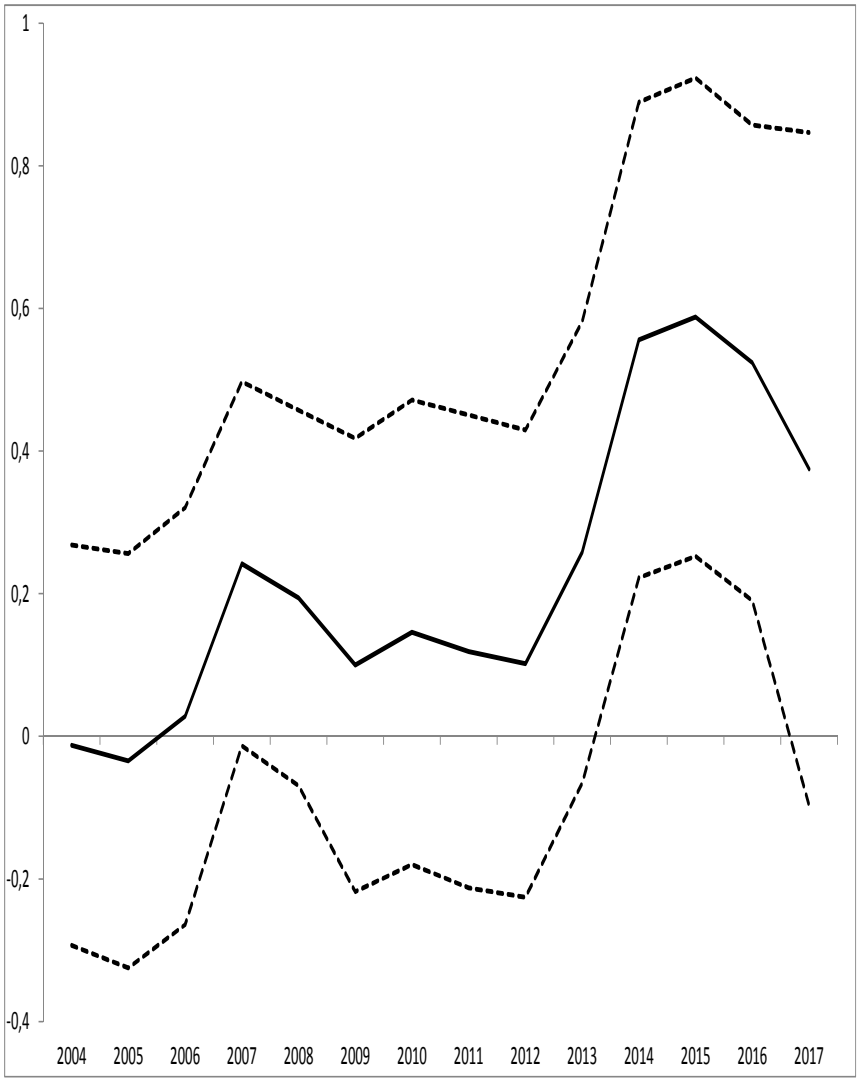
Marginal Effects - HH Heterogeneity Hetero2

		c_{it}		$E_{it}[c_t]$	
		$E_{it}[\pi_{t+1}]$ Quanti.	Stable Prices Quali.	$E_{it}[\pi_{t+1}]$ Quanti.	Stable Prices Quali.
Gender	Female	0.345***	-0.999***	0.090	-0.708***
	Male	0.101	-0.653***	0.011	0.017
Age	16-29	-0.194	-0.599	-0.142	0.602
	30-49	0.192**	-0.746**	0.039	-0.152
	50-64	0.257**	-1.440***	-0.010	-0.042
	65+	0.144	-0.197	0.197**	-0.610***
Education	Primary	0.052	0.244	0.063	-0.259
	Secondary	0.322***	-0.949***	0.106	-0.214
	Higher	0.162**	-1.103***	0.017	-0.285*
Income	$< Q1$	0.180	-0.460	0.022	-0.279
	$]Q1 - Q2]$	0.141	-0.456	0.070	-0.307
	$]Q2 - Q3]$	0.211*	-1.340***	0.059	-0.303
	$> Q3$	0.209*	-0.811*	0.027	-0.062

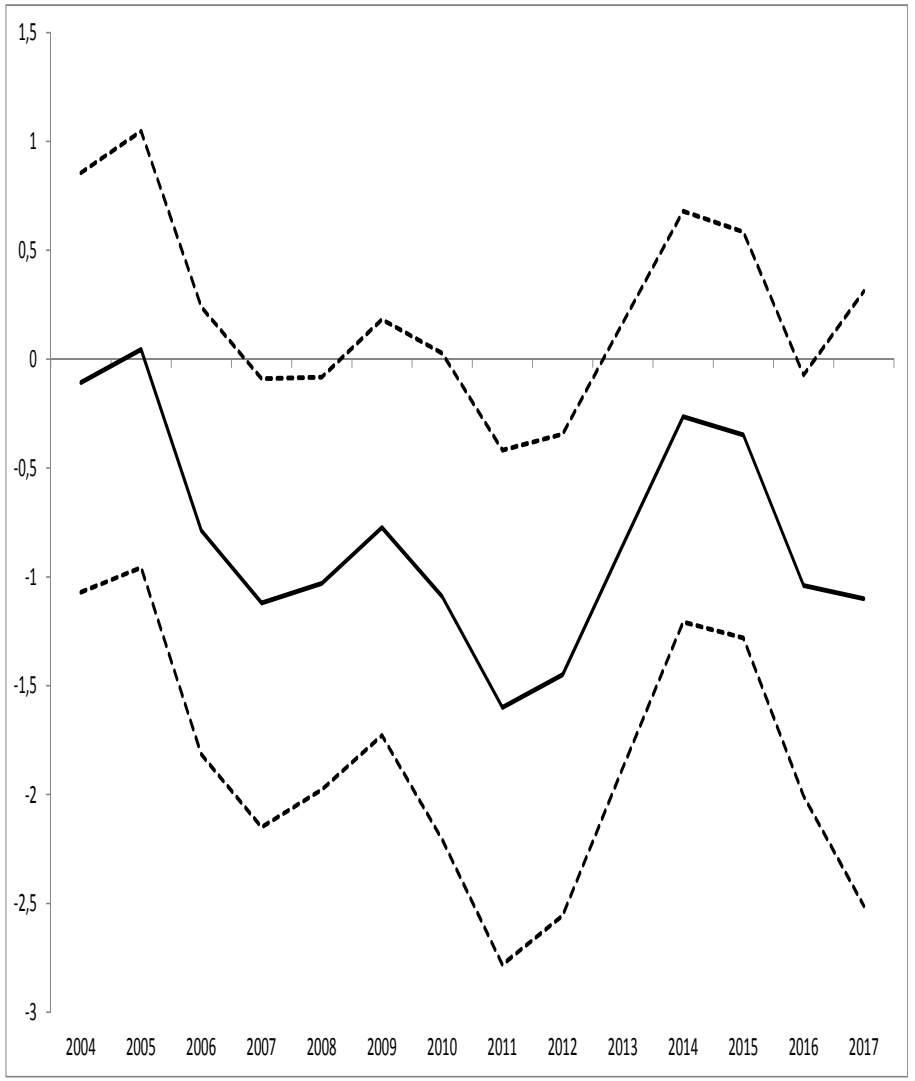
Column: endogenous variable; Row: exogenous dummy variable; including controls
c_{it}: HH durable consumption $E_{it}[c_t]$ "Right Time".
pvalues: *** 1%; ** 5% ; * 10%

Somewhat Larger Marginal Effects After 2013

Quanti. Expectation Correlation



Quali. Expectation (Stable Prices)



Conclusion

How do HH inflation expectations move over time?

- Overestimate but still correlate with actual inflation
- The share of HH expecting "stable prices" contributes a lot to changes in aggregate inflation expectations
- Smaller contribution of the share of HH expecting non-plausible values of inflation

Role of inflation expectations on durable consumption?

- Positive via the extensive margin (stables prices vs positive inflation); non-significant otherwise
- Stronger for high education, richer, older, female
- Mildly stronger at the ZLB

Appendix - Tables and Figures

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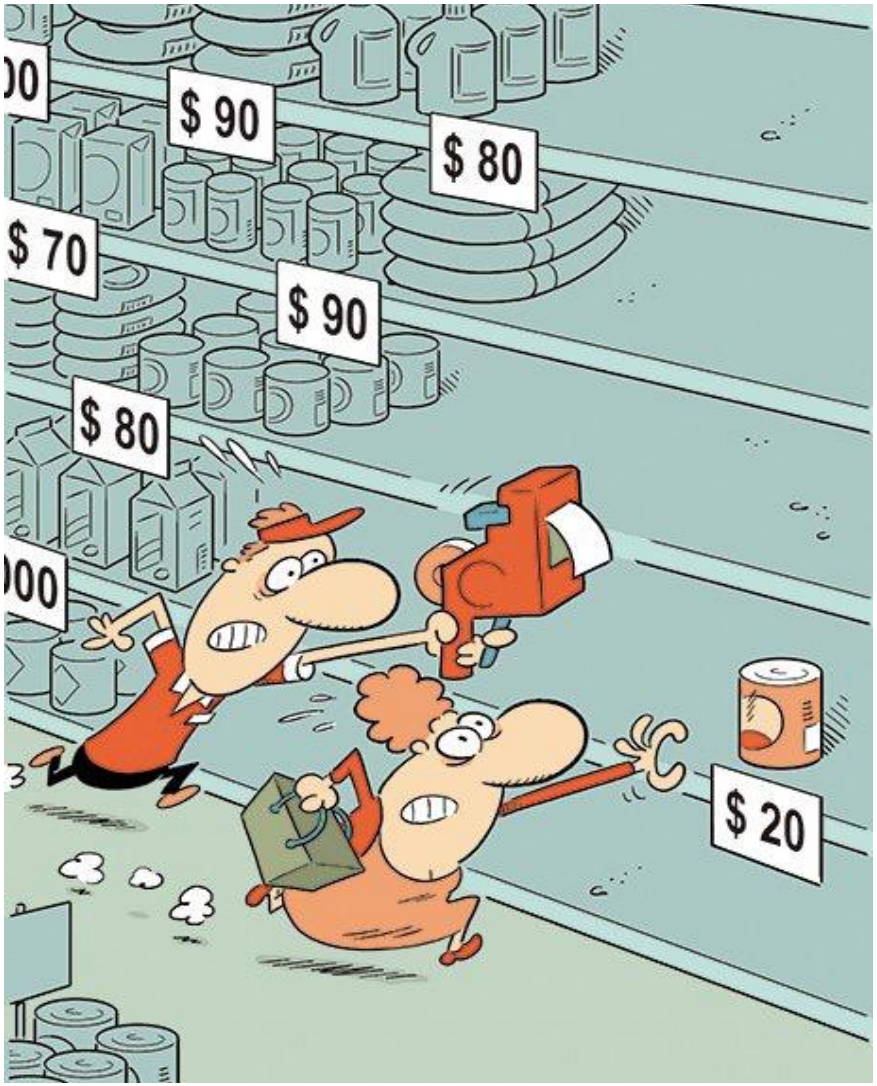

Questionnaire 1/4

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General Economic Situation

How do you think the general eco. situation in France has changed over the past 12 months? It has...
Got a lot better/– a little better/ Stayed the same/ Got a little worse/ – a lot worse
How do you expect the general economic situation in France to develop over the next 12 months? It will...
Get a lot better/ – a little better/ Stay the same/ Get a little worse/ – a lot worse

How do you think the quality of life in France has changed over the past 12 months? It has...
Got a lot better/ – a little better/ Stayed the same / Got a little worse/ – a lot worse
How do you expect the quality of life in France to develop over the next 12 months? It will...
Get a lot better/ – a little better/ Stay the same / Get a little worse/ – a lot worse

How do you expect the number of unemployed people will change over the next 12 months? The number will...
Increase sharply/ – slightly/ Remain the same/ Fall slightly/ – sharply

Questionnaire 2/4

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Prices

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
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

Consumption / Savings

In view of the current general economic situation, do you think now is the right time for people to make major purchases (such as furniture, washing machines, electronic or computer equipment ...)?
Yes, now is the right time / It is neither the right time nor the wrong time / No, it is the wrong time In view of the general economic situation, do you think that now is?
A very good time to save / A fairly good time to save / Not a good time to save / A very bad time to save

Questionnaire 3/4

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Own Personal Consumption

Have you made any major purchases over the last 12 months? (washing machine, refrigerator, furniture, dishwasher, ...)
Yes / No

How likely are you to make major purchases over the next 12 months?
Very likely / Fairly likely / Not likely / Not at all likely

How likely are you to buy a car over the next 12 months?
Very likely / Fairly likely / Not likely / Not at all likely

Are you planning to buy or build a home over the next 12 months?
Very likely / Fairly likely / Not likely

Questionnaire 4/4

◂ Back

Own Financial Situation

Over the next 12 months, how likely will you be to save any money?
Very likely/ Fairly likely/ Not likely/ Not at all likely
Which of these statements best describes the current financial situation of your household?
We are saving a lot/ – a little/ We are just managing to make ends meet on our income/ We are having to draw on our savings/ We are running into debt
How has the financial situation of your household changed over the last 12 months? It has...
Got a lot better/ – a little better/ Stayed the same/ Got a little worse/ – a lot worse
How do you expect the financial position of your household to change over the next 12 months? It will...
Get a lot better/ – a little better/ Stay the same/ Get a little worse/ – a lot worse

Sensitivity to implausible values

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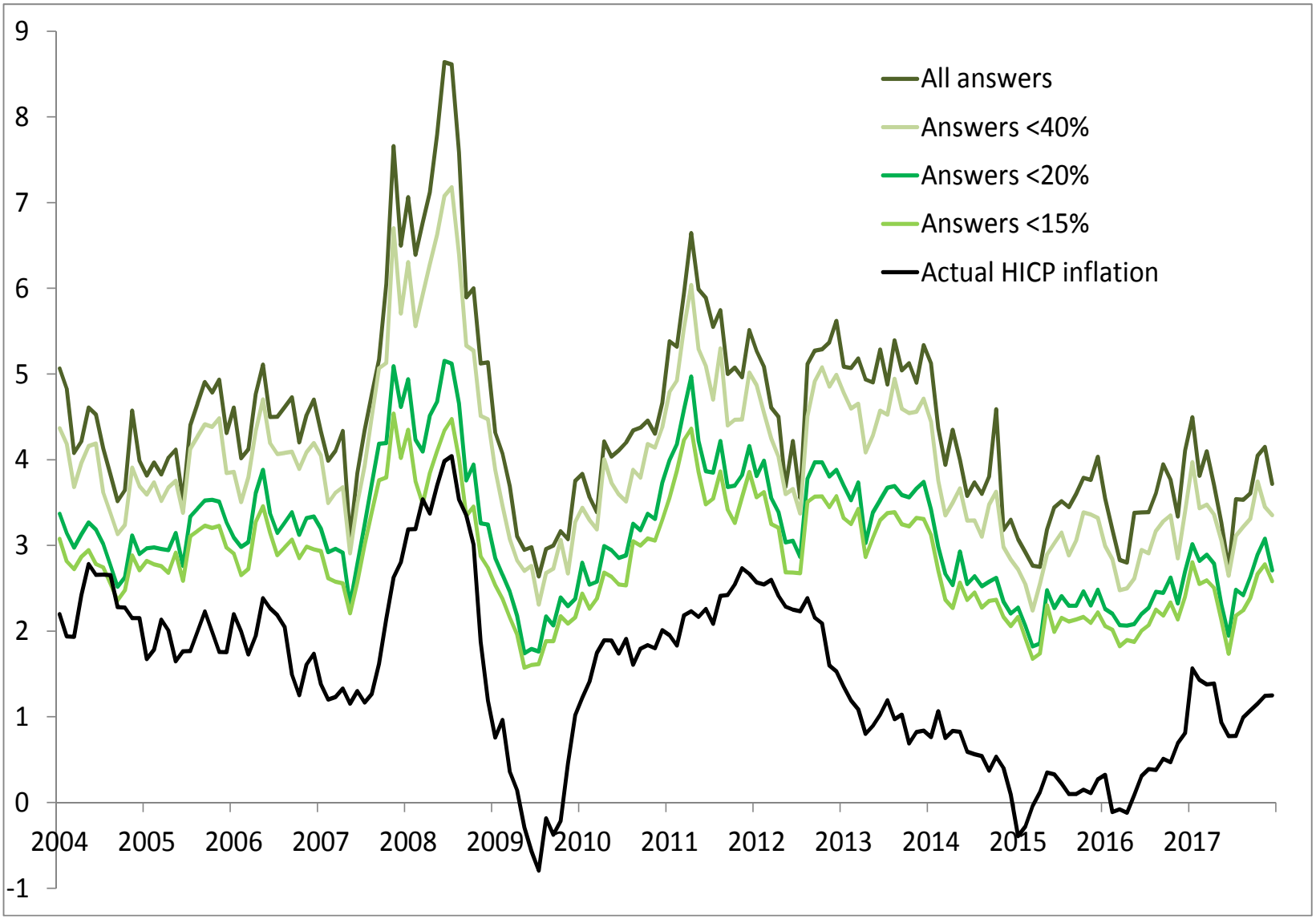

Dynamic Correlation with Actual Inflation

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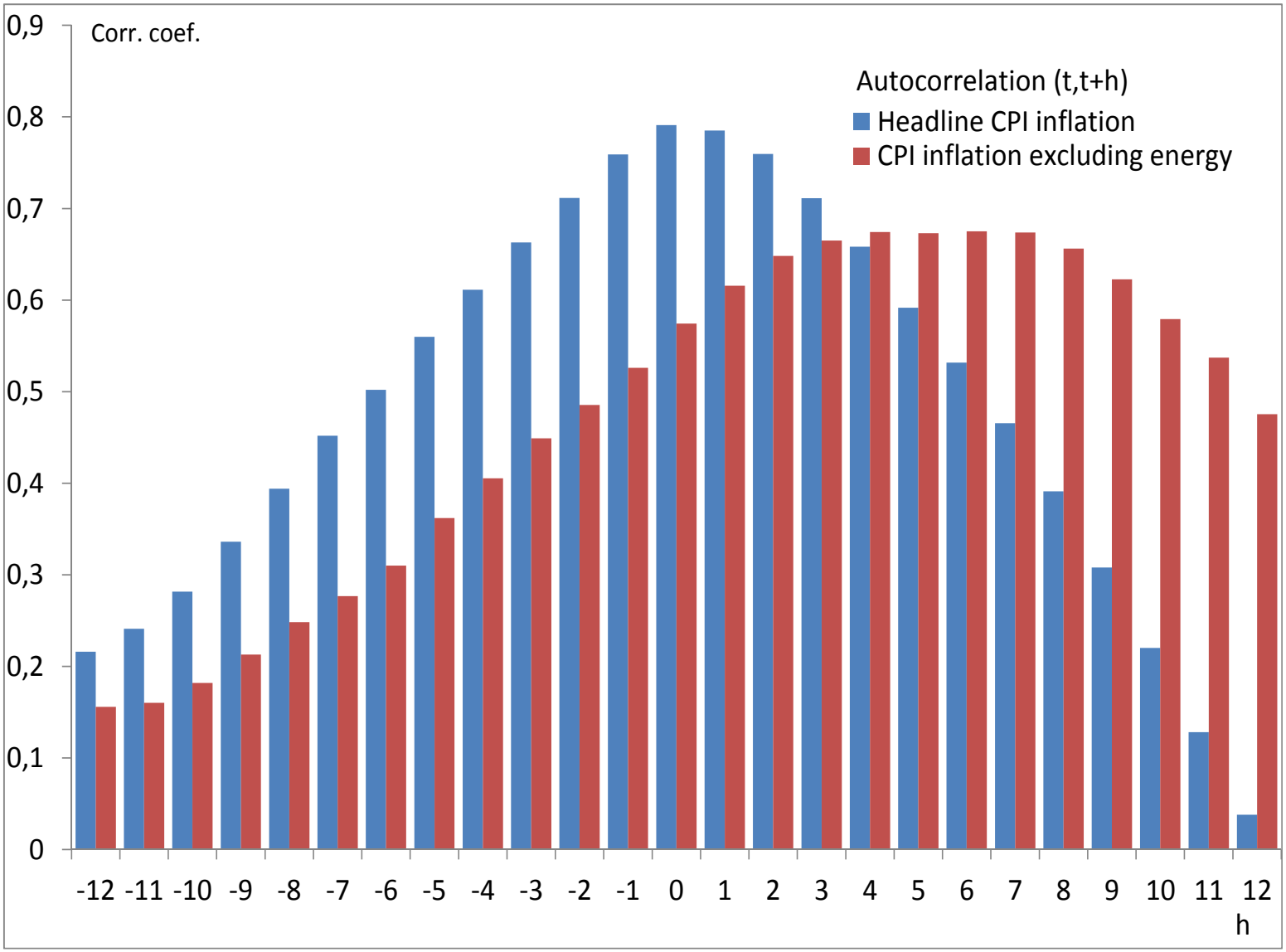

Perceived Inflation

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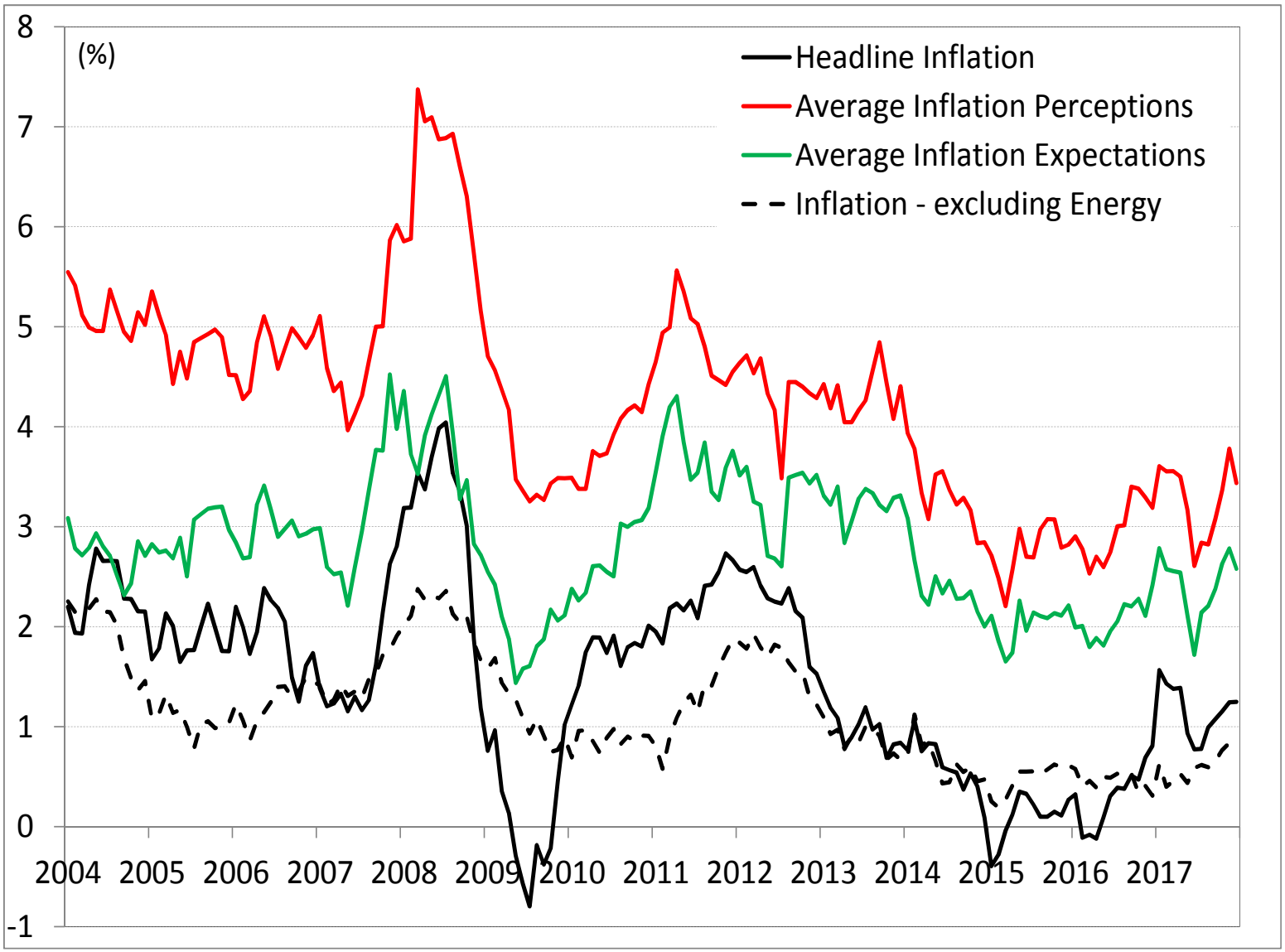
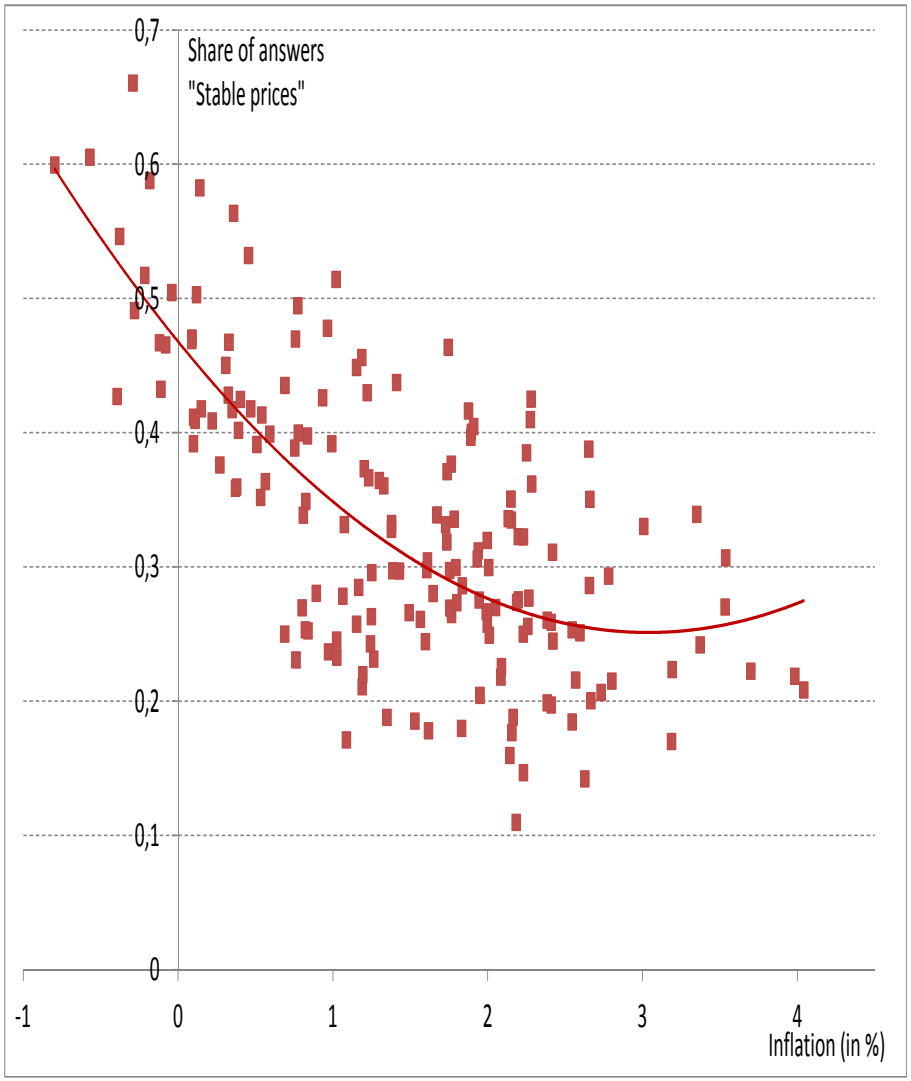


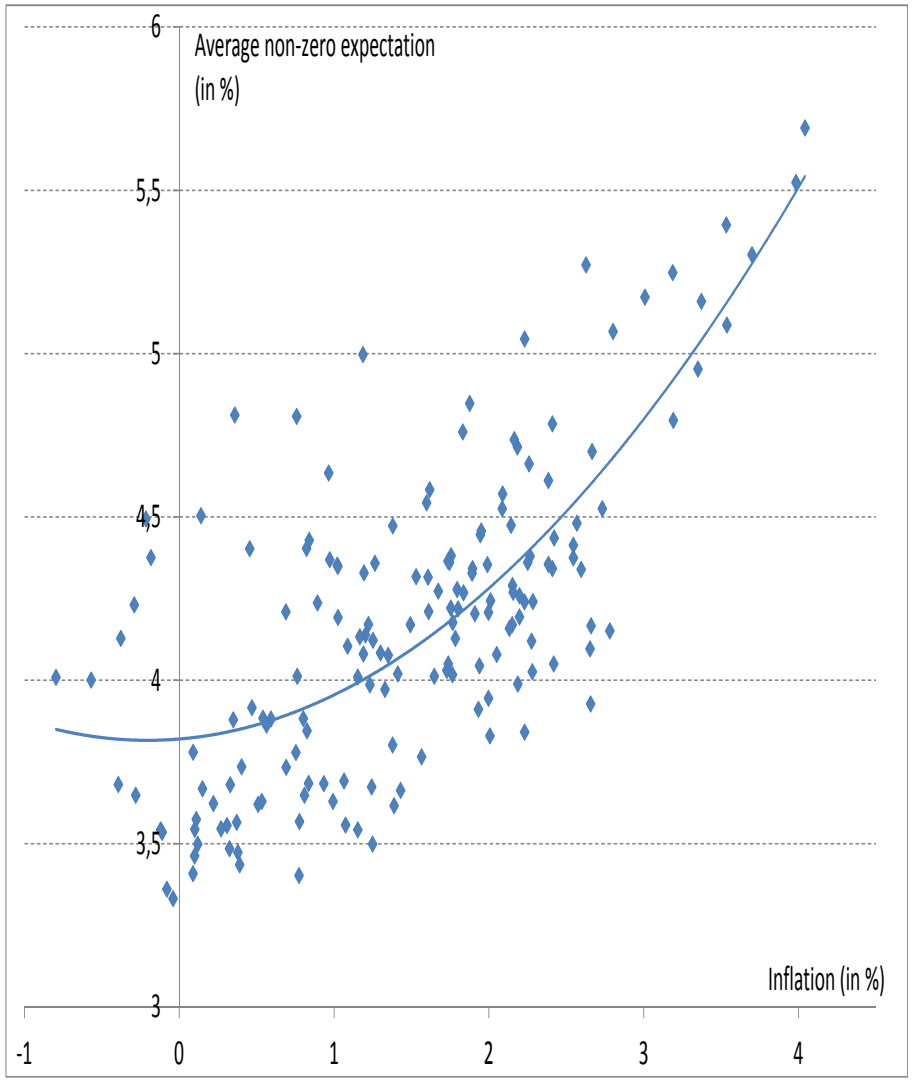
Inflation Expectations: stylised facts

	Aggregate Moments	Correlation with π	Correlation with π excl. Energy
Average	2.81	0.79	0.57
	(0.66)		
% "Stable Prices"	0.33	-0.66	-0.36
	(0.11)		
Average excl. 0	4.17	0.68	0.69
	(0.47)		

Correlation of Inflation Expectations and Inflation - A Decomposition

◂ Back1 ◂ Back2





Correlation of Implausible Values (ie multiple of 5) and Inflation

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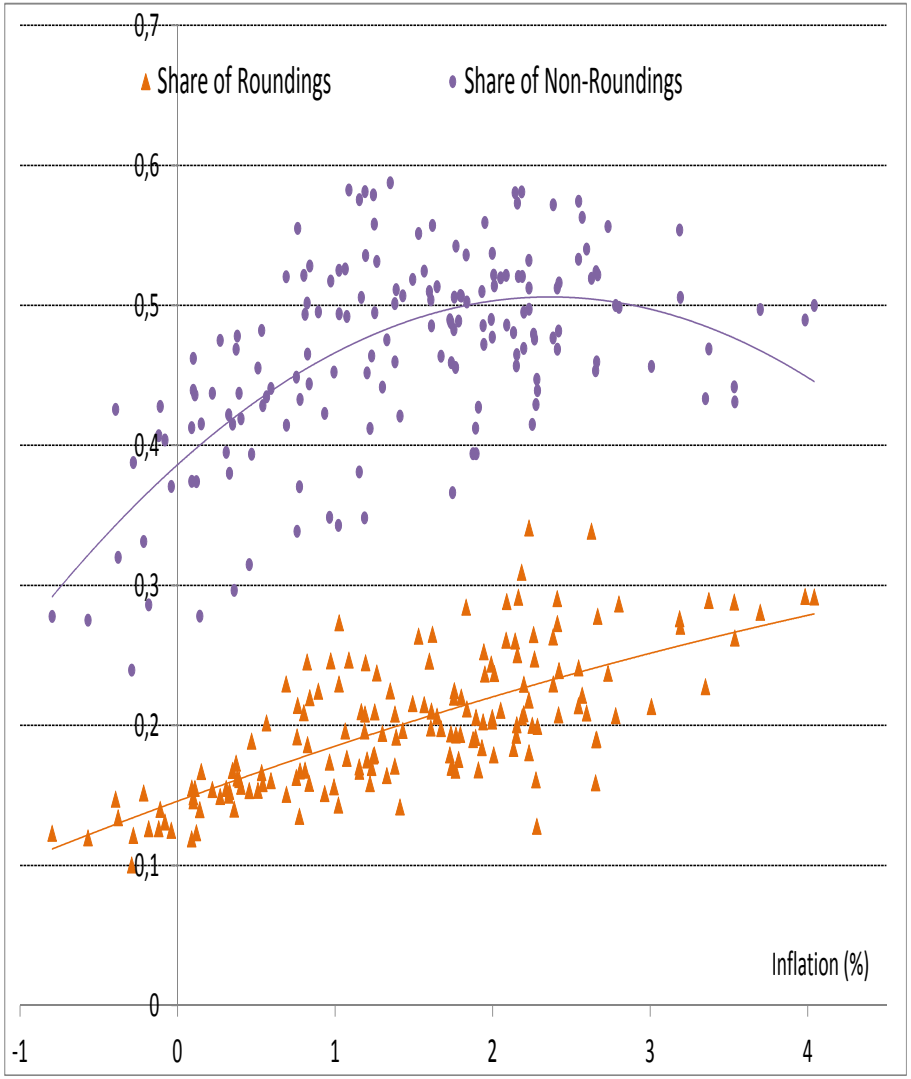

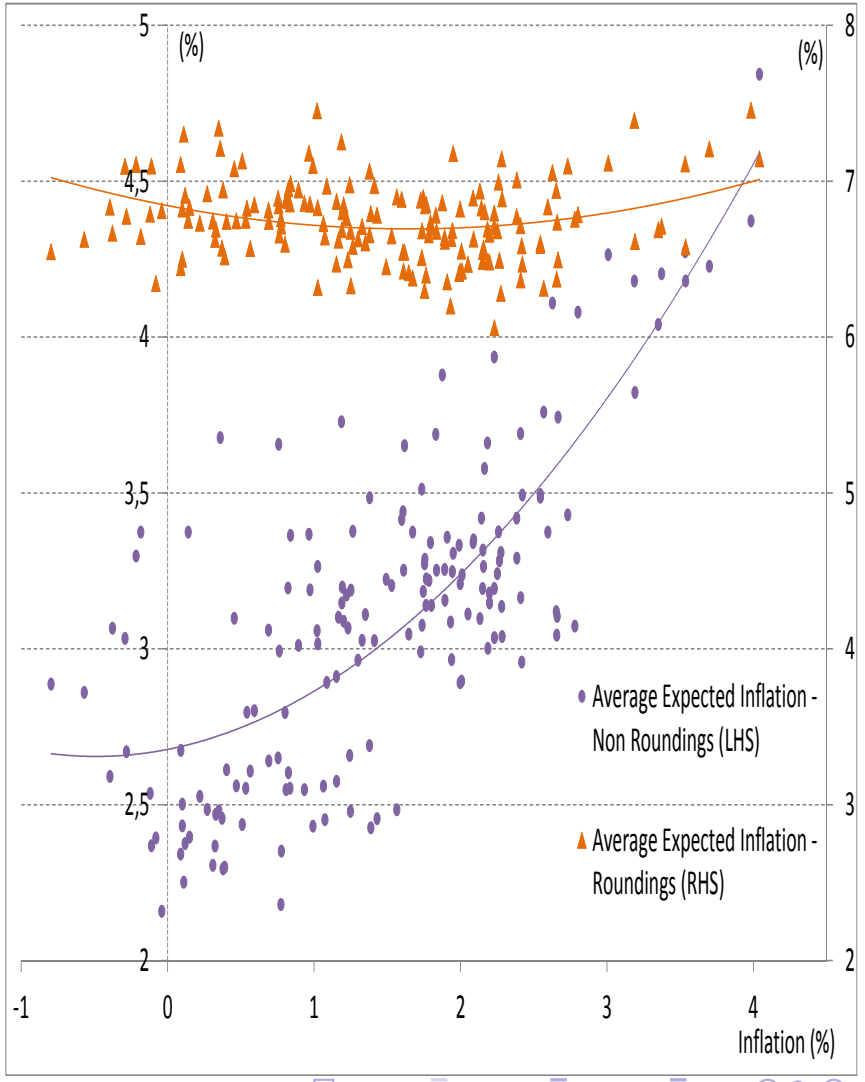

Consumption - Durable Goods

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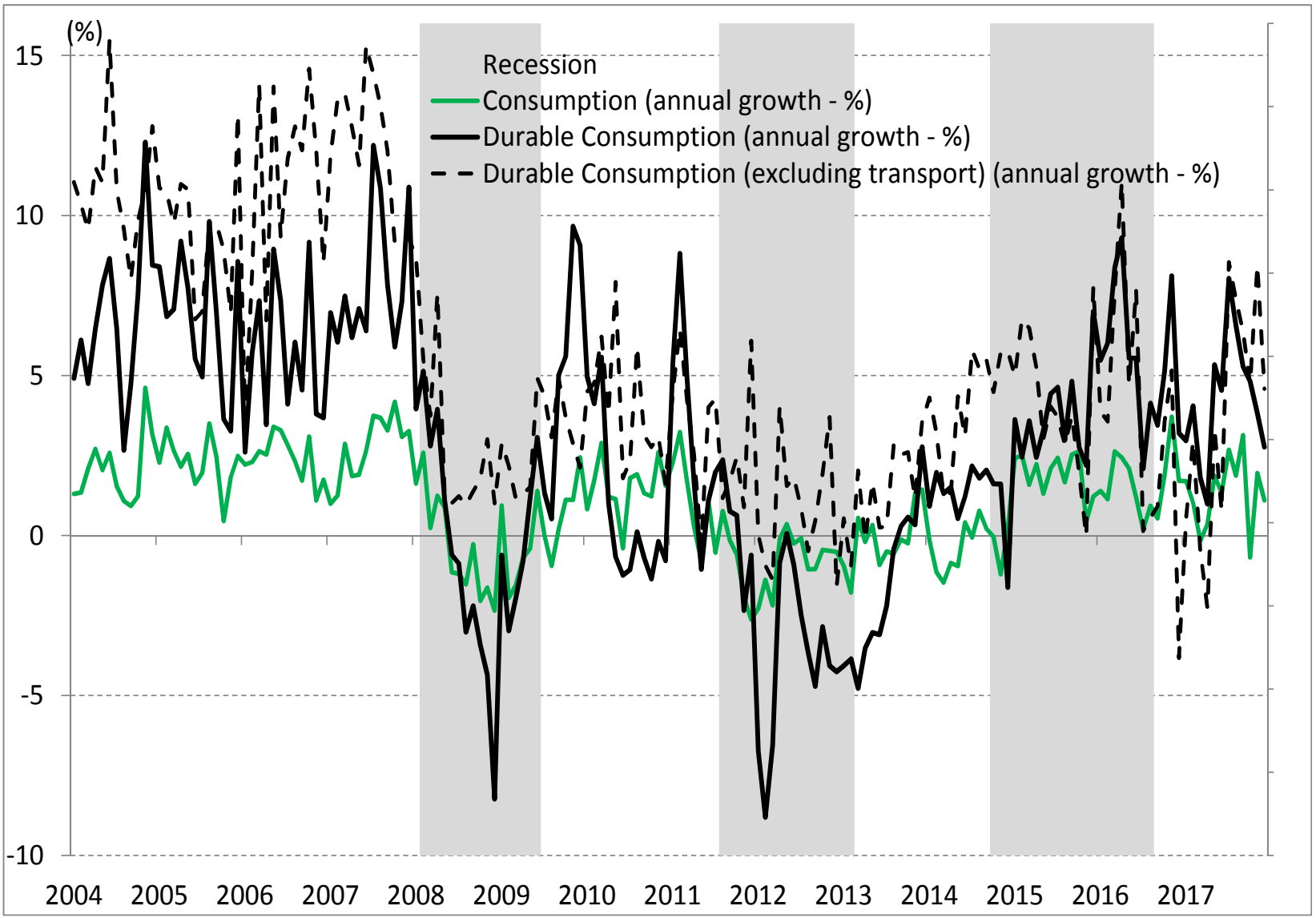

Durable Consumption - Survey

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	Freq. (in %)	Cons.	Correlation with Durable		
			All	Transp.	Excl. transp.
Own Consumption - last 12 months					
Yes	0.31	0.40	0.45	0.18	0.54
No	0.69	-0.40	-0.45	-0.18	-0.54
Right Time for People					
Yes	0.15	0.43	0.45	0.52	0.18
Neutral	0.50	0.64	0.65	0.42	0.68
No	0.35	-0.67	-0.70	-0.58	-0.56
Own Consumption - next 12 months					
Very likely	0.11	0.55	0.61	0.39	0.63
Likely	0.10	0.37	0.33	0.39	0.13
Unlikely	0.21	-0.19	-0.21	0.02	-0.41
Very unlikely	0.57	-0.14	-0.14	-0.27	0.08
Car - next 12 months					
Very likely	0.05	0.44	0.54	0.42	0.47
Likely	0.07	0.42	0.48	0.42	0.35
Unlikely	0.08	-0.05	-0.08	0.04	-0.19
Very unlikely	0.80	-0.21	-0.23	-0.28	-0.09

Marginal Effects - HH Heterogeneity

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Marginal effects of inflation expectations on consumption decisions

	Perceived Infl.		Perceived/actual inflations gap	
	Multiple of 5	Other	$\leq 3\%$	$\geq 3\%$
$E_{it}[\pi_{t+1}]$ **Quanti.**	0.151**	0.218*	0.254***	0.103
$E_{it}[\pi_{t+1}]$ **intervals:**				
$[10\%; +\infty[$	0.067	-0.001	0.618	0.023
$[5\%; 10\%[$	1.250**	1.610*	1.780***	1.260*
$[3\%; 5[$	0.896	1.490**	1.190**	1.580
$]0\%; 3\%[$	-0.229	1.770***	1.190**	1.830
0%	Ref.	Ref.	Ref.	Ref.
$< 0\%$	0.420	-0.776	-0.418	-0.121
$E_{it}[\pi_{t+1}]$ - **Stable**	-0.698*	-1.220***	-0.995***	-0.985**
$E_{it}[\pi_{t+1}]$ **Quali:**				
Increase more quickly	0.623	2.280***	2.240***	0.944
– at same rate	0.544	1.110***	0.947***	0.684
– at a slower rate	1.320***	1.320***	1.060**	1.860***
Stable	Ref.	Ref.	Ref.	Ref.
Fall	-0.790	1.410	0.837	0.123