

# What Matters in Households' Expectations?

**Philippe ANDRADE** (FRB Boston)

**Erwan GAUTIER** (Banque de France)

**Eric MENGUS** (HEC Paris, CEPR)

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# Inflation expectations in macro-models

Key determinant of

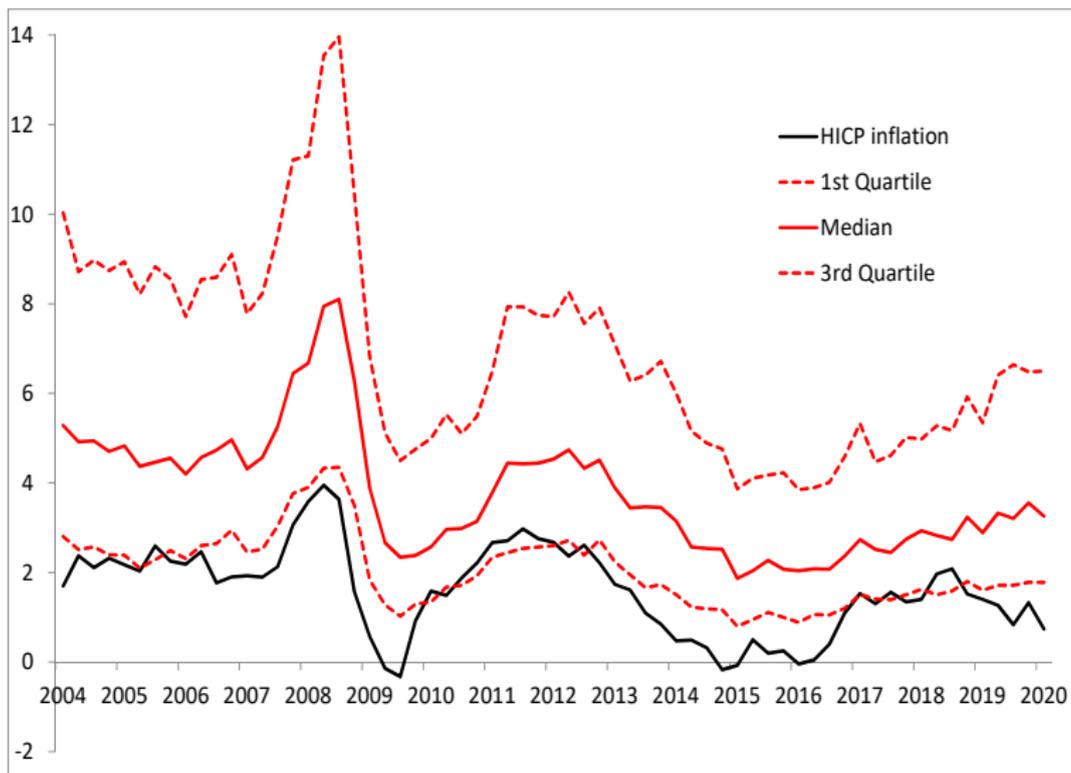
- ▶ Aggregate demand (Euler equation) + inflation (Phillips curve)
- ▶ Transmission of monetary policy

Central banks should thus manage them to

- ▶ Avoid de-anchoring (inflation / deflation spirals)
- ▶ Stabilize aggregate demand, in particular at the ZLB via FG

# Inflation expectations in the data

Euro-area households' one year ahead inflation expectations (European Commission)



# Do HHs' inflation expectations really matter?

- ▶ Are surveys of HHs' inflation expectations informative?
  - ▶ If yes, then they are not anchored at the inflation target and also exhibit sizeable dispersion around their central tendency
- ▶ Do they influence HHs decisions?
  - ▶ If yes, then these choices may be inefficient

# What matters is the broad inflation regime HHs expect

New facts using micro data from a survey of French HHs (2004-2018 sample)

Use both qualitative and quantitative answers

1. On average, 1/3 of resp. expect prices to 'stay about the same'
2. Fluctuations in the extensive margin (changes from prices 'stay about the same' to 'prices will increase') account for more than 1/2 of fluctuations in the average expected inflation
3. Fluctuations in the extensive margin are not purely random; in particular they correlate with realized inflation
4. HHs expecting 'prices to increase' have a higher probability to adjust their stock of durables than HHs expecting 'prices to stay about the same'
  - ▶ By contrast, variations in the intensive margin (i.e. among HHs expecting prices to increase) have no significant impact

# The French survey of households

Enquête mensuelle de conjoncture auprès des ménages (Insee)

- ▶  $\simeq$  2 000 households per month
- ▶ Sample period: Jan 2004 - Dec. 2018
- ▶ Very short panel dimension (max of 3 consecutive months for a fraction of the sample)
- ▶ About 20 questions (mostly qualitative) Questionnaire
  - ▶ European Commission harmonized questionnaire + country-specific questions
  - ▶ Observe HH level inflation expectations and reported decisions

# The French survey of households

## Questions on inflation expectations

### Question 1.

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*

### Question 1b.

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

XX.X%

### Remarks on data:

- ▶ Same questions on perceived inflation
- ▶ Impute 0 inflation to 'prices stay about the same'

# The French survey of households

## Questions on durable consumption

### Question 2.

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

*Yes / No*

### Question 3.

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*

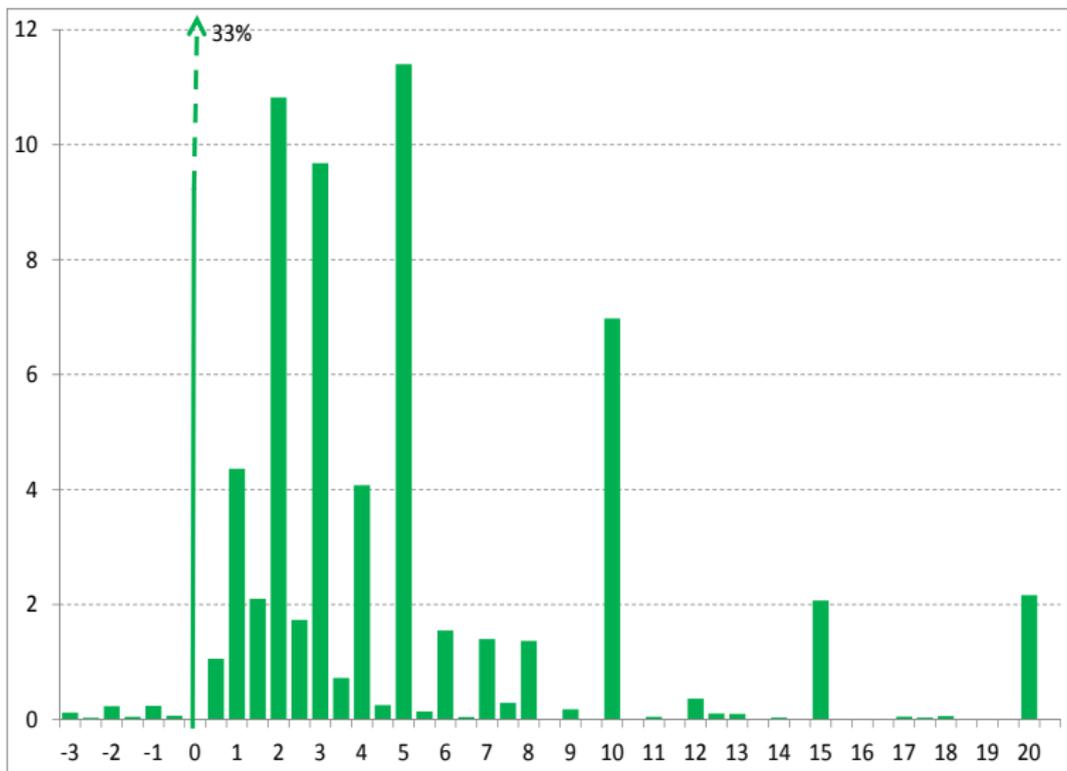
### **Other questions include:**

- ▶ Business cycle expectations
- ▶ Expected personal durable consumption
- ▶ Right time to save

# Fact 1

A large share of HHs expect prices to remain about the same

Germany



## Fact 2

### The extensive margin of inflation expectations

Average of individual inflation expectations:

$$\pi_{t|t+1}^e = \frac{1}{n_t} \sum_{i=1}^{n_t} \pi_{i,t|t+1}^e = fr_t \times dp_{t|t+1}^e$$

- ▶  $fr_t = \left( \frac{1}{n_t} \sum_{i=1}^{n_t} l_{it} \right)$ : share of HH with infl. expect.  $> 0$
- ▶  $dp_{t|t+1}^e = \left( \sum_{i=1}^{n_t} l_{it} \right)^{-1} \left( \sum_{i=1}^{n_t} \pi_{i,t|t+1}^e \right)$ : avg of  $> 0$  infl. expect

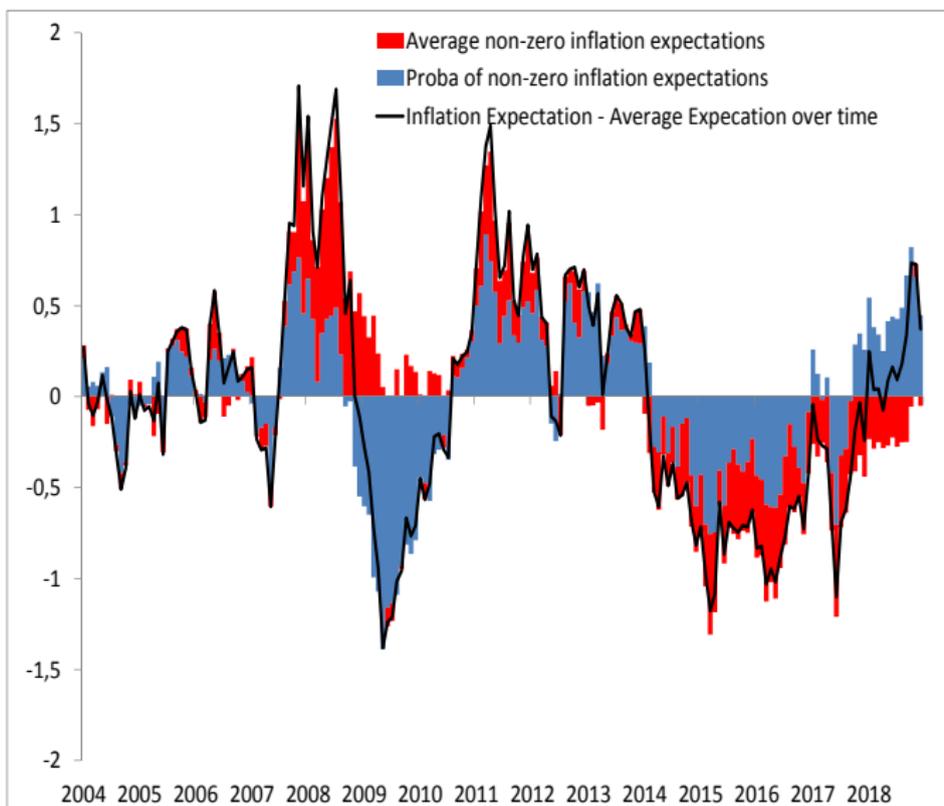
Contribution of extensive/ intensive margins to aggregate inflation:

$$\pi_{t|t+1}^e - \bar{\pi}^e = \underbrace{\left( fr_t - \bar{fr} \right) \bar{dp}^e}_{extensive} + \underbrace{\left( dp_{t|t+1}^e - \bar{dp}^e \right) \bar{fr}}_{intensive} + O(t).$$

## Fact 2

The extensive margin contributes a lot to variations in the average expectation

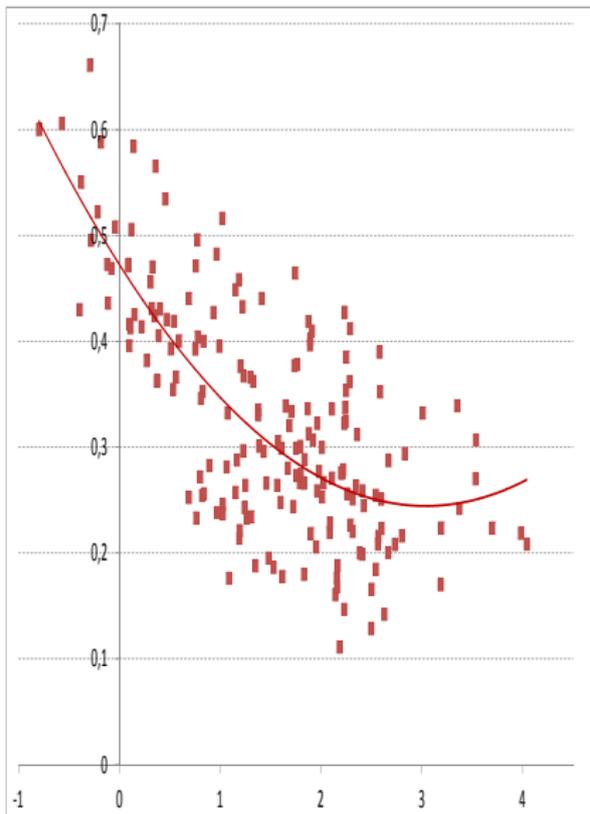
Germany



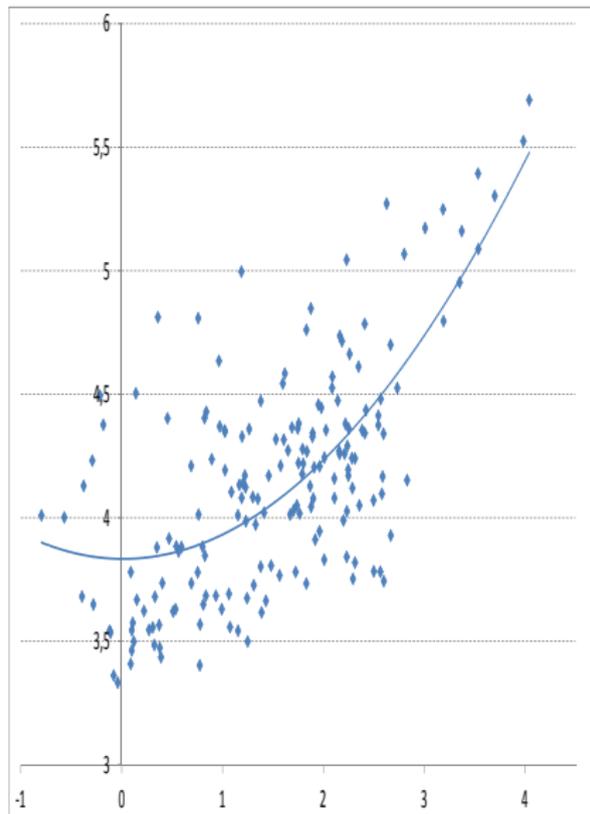
## Fact 3

Variations in the extensive margin are not just random

Share of Stable Prices



Average Non-Zero Expectations



## Fact 4

The extensive margin matters for consumption decisions

Estimation of a discrete choice model

$$b_{i,t} = \begin{cases} 1 & \text{if } z_{i,t}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

where  $b_{it} = 1$  if HH has made some major purchases over the last 12 months and latent variable

$$z_{i,t}^* = \alpha + \beta \pi_{i,t|t+1}^e + \gamma X_{i,t} + \lambda_t + \mu z_i + \epsilon_{i,t}$$

$\pi_{i,t|t+1}^e$  inflation expectations over next year

$X_{it}$  control variables (inflation perception, intention to make major purchases over next year, unemployment, financial situation...)

$\lambda_t$  date dummies (controlling for aggregate conditions)

$z_i$  individual characteristics (age, education, job occupation...)

# Fact 4

## Baseline results

	All	Intensive (Excl. 0)	Extensive	All Quali.	All Excl. outliers
$\pi^e$	0.005 (0.027)	-0.045 (0.037)			0.226*** (0.074)
$\pi^e \neq 0$			1.021*** (0.337)		
$\pi^e$ by intervals:					
[10%; + $\infty$ [				0.043 (0.574)	
[5%; 10%[				1.491*** (0.462)	
[3%; 5%[				1.257*** (0.492)	
]0%; 3%[				1.240*** (0.417)	
0%				Ref.	
< 0%				-0.258 (1.332)	
Controls	Yes	Yes	Yes	Yes	Yes
Obs.	136,574	92,002	136,574	136,574	114,786

# Fact 4

## Robustness and additional results

Robust to

- ▶ Using 'Right time to consume' instead of personal consumption
- ▶ Use qualitative question to split btw HHs with  $\pi_{i,t|t+1}^e > 0$
- ▶ Controlling for individual characteristics using panel dimension
- ▶ Using comparable survey of German HHs

Additional results: effect of extensive margin

- ▶ Stronger for women, older HHs, higher education, higher income, HHs less likely to be financially constrained
- ▶ Somewhat stronger at the ZLB

# Fact 4

## The role of controls

	All $\pi^e$ Excl. outliers	$\pi^e$ excl 0 Intensive	$\pi^e \neq 0$ Extensive
No Perceived / Expected Variables	-0.125** (0.052)	-0.543*** (0.072)	-0.000 (0.297)
+ Perceived Inflation	0.051 (0.057)	-0.400*** (0.084)	-0.057 (0.338)
+ Expected Own Durable Consumption	0.022 (0.057)	-0.284*** (0.084)	0.197 (0.335)
+ Expected Own Financial Situation	0.108* (0.058)	-0.197** (0.085)	0.636* (0.337)
+ Past and Current Own Financial Situation	0.147** (0.058)	-0.137 (0.085)	0.732** (0.332)
+ Expected Business Cycle & Unemployment	0.200*** (0.058)	-0.062 (0.085)	1.020*** (0.330)
+ Right Time to Save (Baseline)	0.206*** (0.060)	-0.043 (0.087)	1.021*** (0.337)

# What matters in HHs' inflation expectations?

The broad inflation regime HHs expect and more precisely the extensive margin

- ▶ Are surveys of HHs' inflation expectations informative?
  - ▶ Yes: provide information on who expect stable prices vs positive inflation
- ▶ Do they influence HHs decisions?
  - ▶ Yes: HH expecting stable prices consume relatively less than the ones expecting positive inflation

# Policy implications

AGMM (2019): 3-equation NK model with heterogeneous infl. expectations & ZLB

- ▶ Standard Euler equation:

$$c_t = E_t c_{t+1} - \sigma^{-1} r_t + \sigma^{-1} E_t(\pi_{t+1}) + \delta_t$$

- ▶ By contrast, assume sparse individual HH Euler equation:

$$c_{it} = E_t c_{it+1} - \sigma^{-1} r_t + dc_{it} + \delta_t$$

with  $dc_{it} = 0$  ( $dc^+$ ) if HH expect stable (increasing) prices

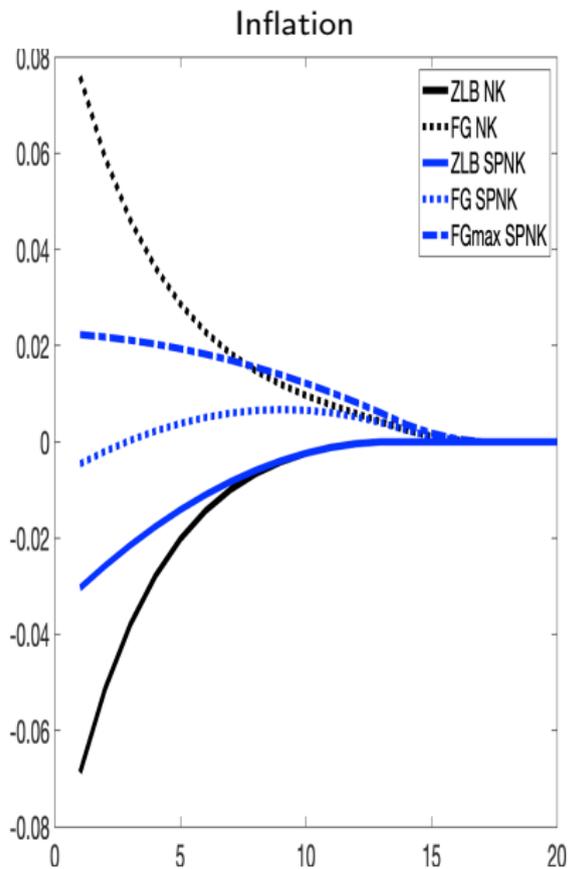
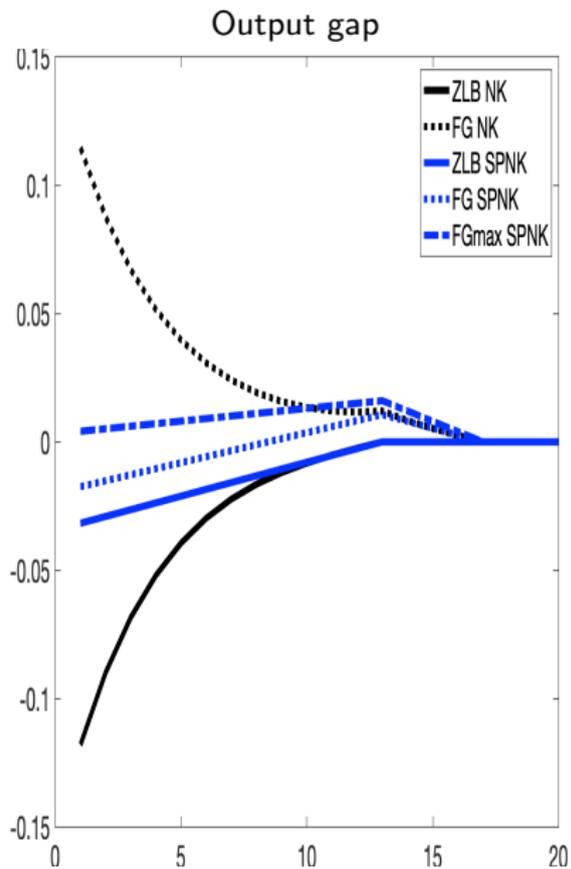
- ▶ At the aggregate level:

$$c_t = E_t c_{t+1} - \sigma^{-1} r_t + s_t dc^+ + \delta_t$$

with  $s_t$  share of HH expecting prices will increase

- ▶ Calibration using standard values + estimation results

# Policy implications: ZLB and FG with sparse households



# Appendix

## Inflation Expectations: stylised facts

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	Aggregate Moments	Correlation with	
		$\pi$	$\pi$ excl. Energy
Average	2.82 (0.64)	0.79	0.48
% "Stable Prices"	0.33 (0.11)	-0.68	-0.26
Average excl. 0	4.15 (0.46)	0.63	0.63

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# Inflation Expectations: Qualitative vs. Quantitative

Answers [◀ Back](#)

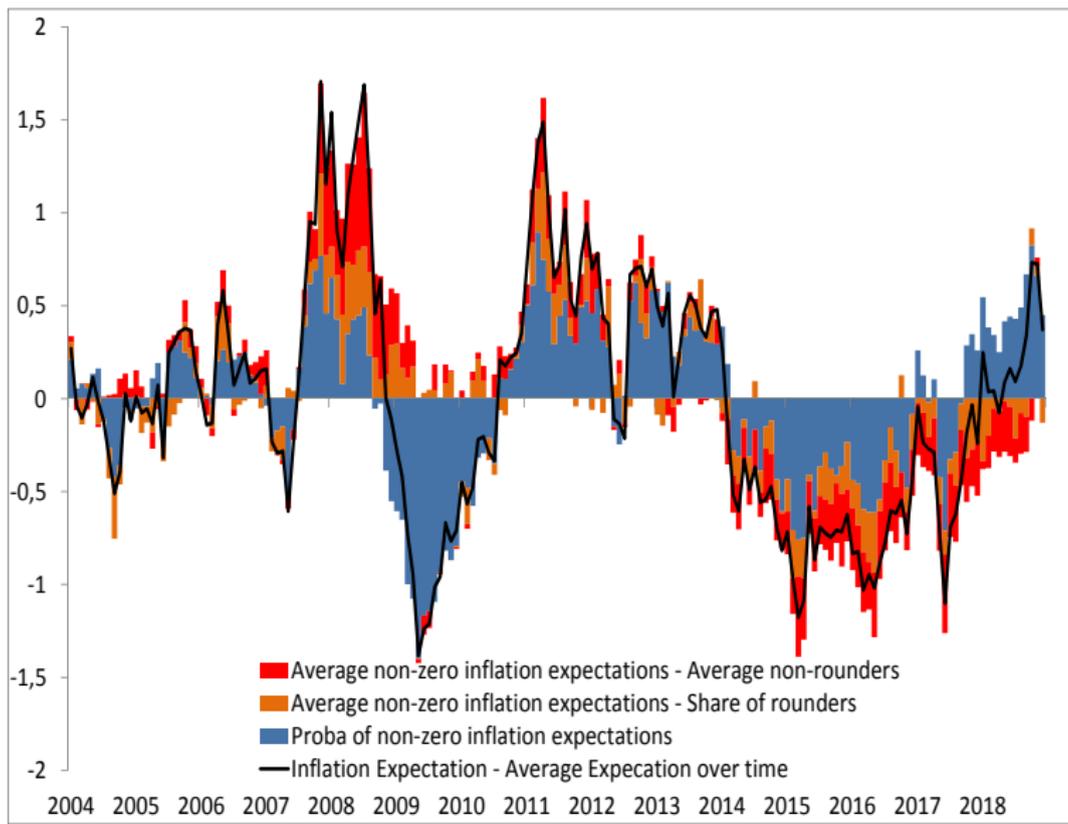
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		<b>Quantitative answers</b>			
	%	Mean	Q1	Q2	Q3
Increase more rapidly	9.1	4.93	3	4.5	7
Increase at the same rate	44.6	4.35	2	3.5	5
Increase at a slower rate	13.8	3.15	2	2.5	4.5
Stayed about the same	26.1	0	0	0	0
Fall	1.2	-3.59	-5	-2	-1
Don't know	5.2	-	-	-	-

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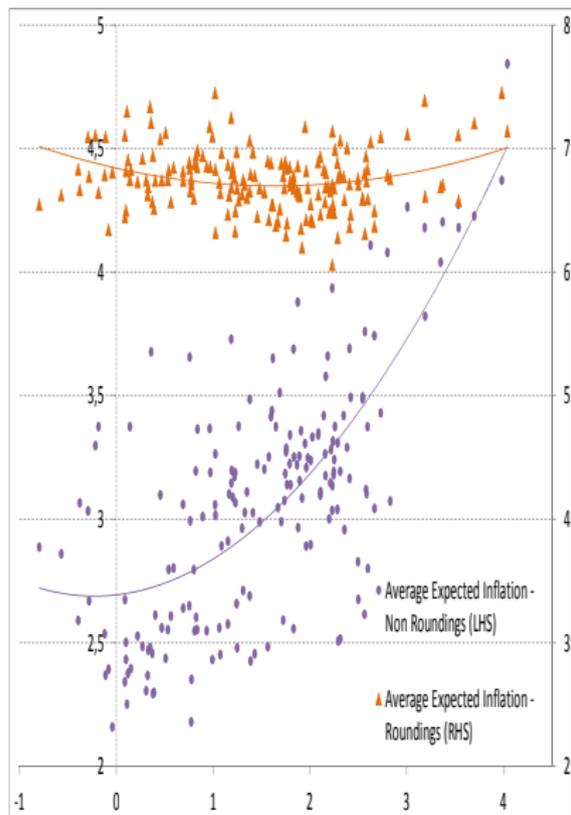
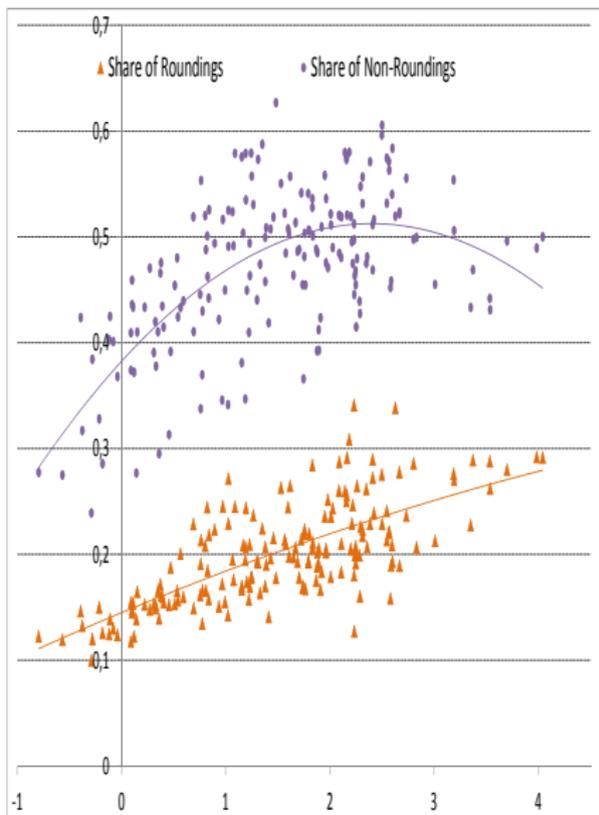
# Moderate contribution of the share of HH expecting non-plausible values (i.e. multiple of 5)

Correlation

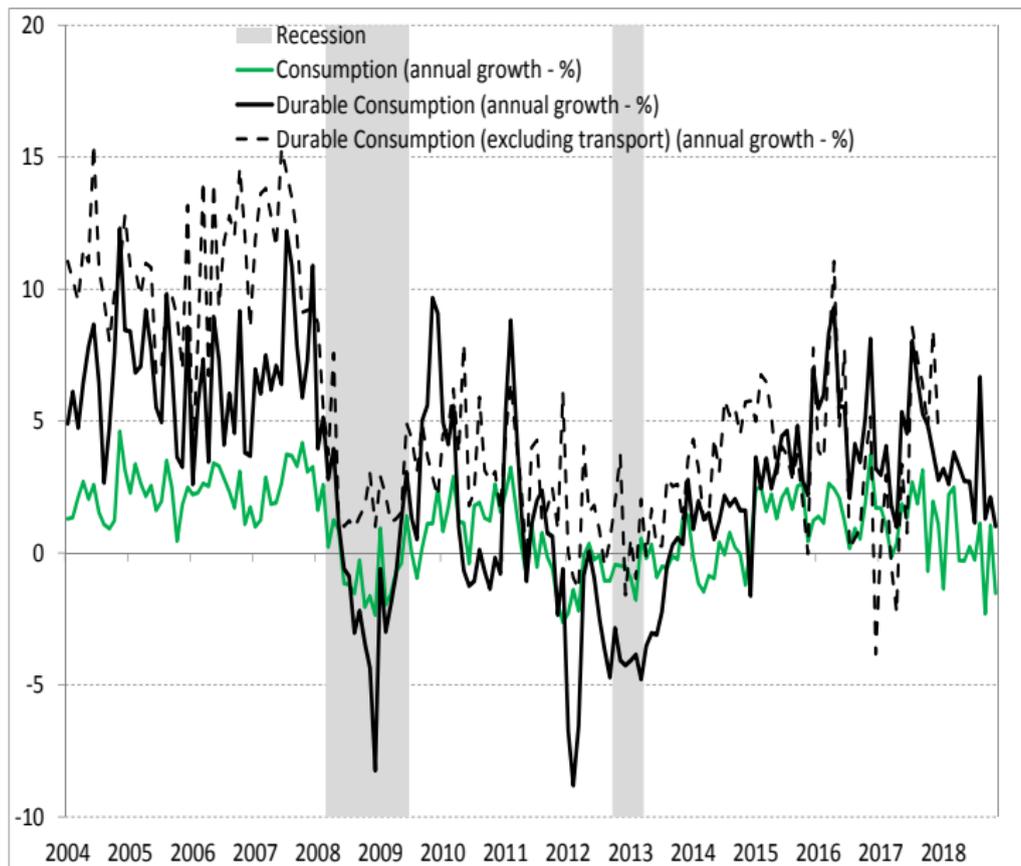


# Correlation of Implausible Values (ie multiple of 5) and Inflation

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# Consumption - Durable Goods [← Back](#)



# Durable Consumption - Actual Data [← Back](#)

	Year	Freq.	Moments - in euros			
			Q1	Q2	Q3	P90
Overall	2005	0.59	340	740	1559	2941
	2011	0.62	400	749	1450	2605
Home Appliances	2005	0.27	270	458	744	1213
	2011	0.30	280	422	700	1103
TV, computers, phones...	2005	0.35	200	416	990	1600
	2011	0.41	269	500	850	1370
Furniture	2005	0.30	240	531	1260	2846
	2011	0.28	270	549	1200	2570

Note: this table reports some moments of the distribution of durable spending over a year. Individual data comes from the survey "Enquete Budget des Familles", every 5 years Insee collects individual data on consumption for more than 10,000 households, HH report their durable spending over the last 12 months, product by product. We have dropped individual product spending less than 100 euros. We have calculated for every household in the survey the total durable spending. Freq. reports the share of households reporting durable spending over the last 12 months. The four last columns report moments of the distribution conditional of having reported a positive durable consumption.

# Marginal Effects of Expected Inflation on Consumption Decision - Right Time

	All	Excl. 0	Extensive	Quali.	All excl. outliers
$\pi^e$	0.006 (0.015)	-0.021 (0.019)			0.096** (0.045)
$\pi^e \neq 0$			0.632*** (0.185)		
$\pi^e$ by intervals:					
[10%; +∞[				-0.096 (0.296)	
[5%; 10%[				0.790*** (0.280)	
[3%; 5%[				1.176*** (0.300)	
]0%; 3%[				0.848*** (0.251)	
0%				Ref.	
< 0%				-0.070 (0.821)	
Controls	Yes	Yes	Yes	Yes	Yes
Obs.	134,117	90,566	134,117	134,117	112,676

# Marginal Effects of Expected Inflation on Consumption Decision - Quali.

$\pi^e$  quali.

	All Answers		Non-Missing Quantitative Answers	
	(1)	(2)	(3)	(4)
$\pi^e \neq 0$	0.835*** (0.213)	-	1.021*** (0.337)	
Increase more rapidly		1.721*** (0.333)		1.442*** (0.522)
Increase at the same rate		0.727*** (0.231)		0.924*** (0.361)
Increase at a slower rate		1.277*** (0.284)		1.339*** (0.464)
Stay about the same		Ref.		Ref.
Fall		0.821 (0.763)		-0.243 (1.333)
DK		-0.677 (0.447)		- -
Controls	Yes	Yes	Yes	Yes
Obs.	312,921	312,921	141,123	141,123

# Marginal Effects of Expected Inflation on Consumption Decision - Panel RE

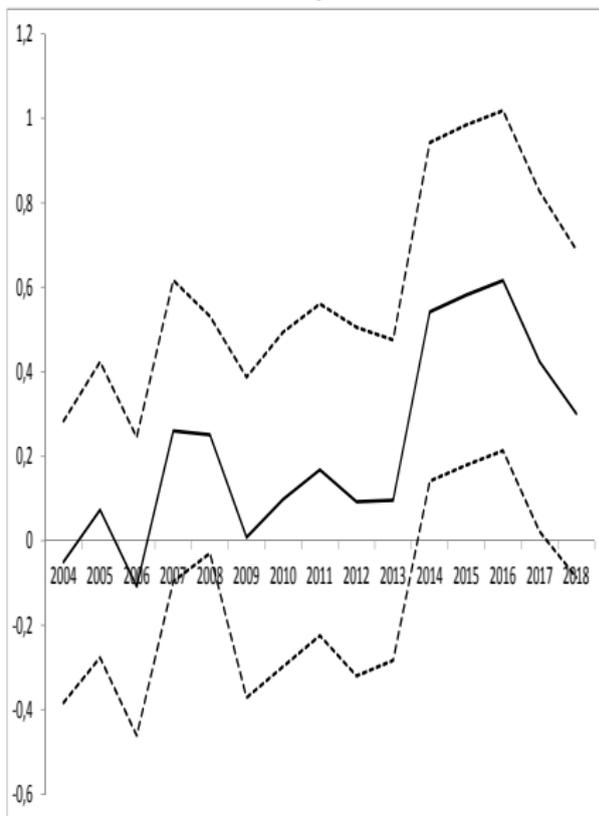
	All	Intensive (Excl. 0)	Extensive	All Quali.	All Excl. outliers
$\pi^e$	0.002 (0.023)	-0.027 (0.033)			0.143** (0.065)
$\pi^e \neq 0$			0.636** (0.285)		
$\pi^e$ by intervals:					
[10%; +∞[				0.186 (0.490)	
[5%; 10%[				0.685 (0.421)	
[3%; 5%[				0.953** (0.425)	
]0%; 3%[				0.674* (0.391)	
0%				Ref.	
< 0%				0.160 (1.210)	
Controls	Yes	Yes	Yes	Yes	Yes
Obs.	136,574	92,002	136,574	136,574	114,786

# Marginal Effects - HH Heterogeneity

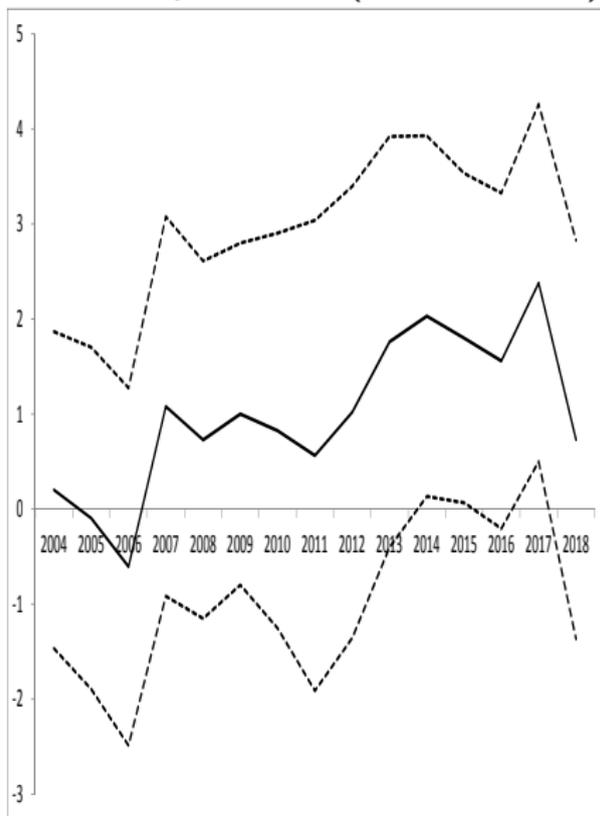
		All	Only $\pi^e \neq 0$	Extensive
Gender	Female	0.355***	0.137	1.317**
	Male	0.122*	-0.152	0.725**
Age	16-29	-0.187	-0.237	-0.719
	30-49	0.219**	0.140	0.512
	50-64	0.297***	-0.081	1.831***
	65+	0.113	-0.291	0.944*
Education	Primary	-0.008	-0.471**	0.200
	Secondary	0.334***	0.156	1.689***
	Further	0.192**	-0.052	0.832*
Income	< Q1	0.176*	-0.173	0.508
	]Q1 – Q2]	0.153	-0.255	1.039*
	]Q2 – Q3]	0.262**	0.188	0.973
	> Q3	0.200*	0.021	1.154**
HH Financial Situation	2	0.108	-0.225	-0.536
	1	0.367***	0.180	1.569***
	0	0.046	-0.169	0.615

# Somewhat Larger Marginal Effects After 2013

## Quanti. Expectation



## Quali. Expectation (Stable Prices)

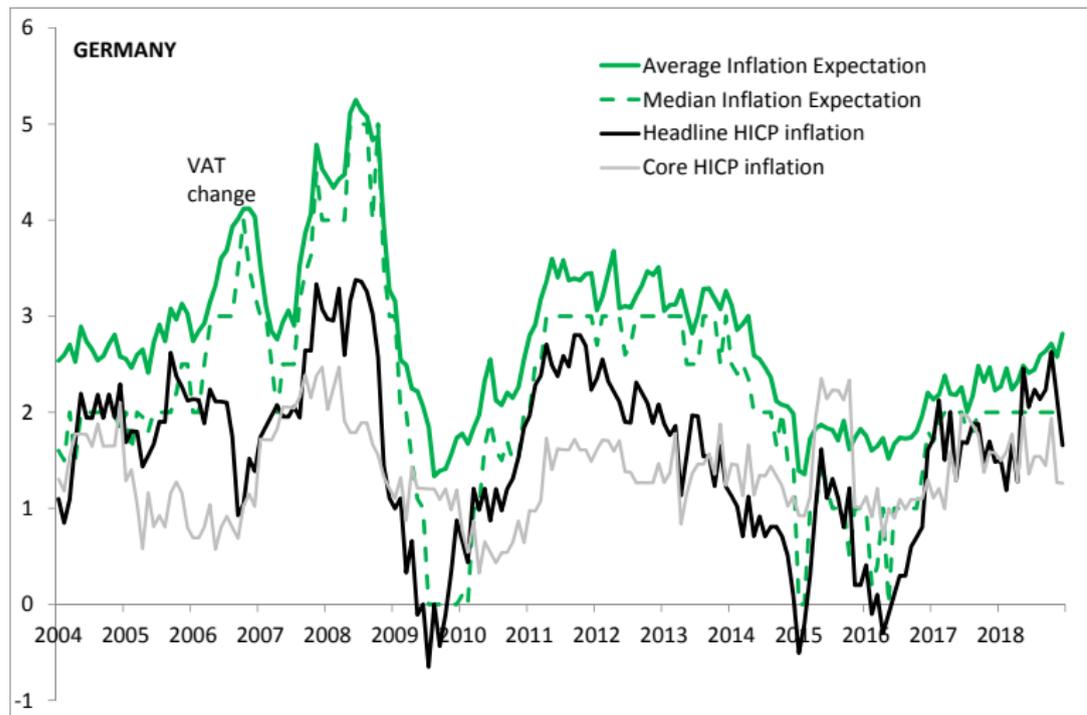


# Germany

	All	Excl. outliers	Excl. 0	Extensive	Quali.
$\pi^e$	-0.073*** (0.019)	-0.118*** (0.018)			0.144* (0.074)
$\pi^e \neq 0$			0.832*** (0.277)		
$\pi^e$ by intervals:					
[10%; + $\infty$ [				0.128 (0.474)	
[5%; 10%[				1.134*** (0.402)	
[3%; 5%[				1.710*** (0.251)	
]0%; 3%[				2.364*** (0.380)	
0%				Ref.	
< 0%				2.620** (1.144)	
Controls	Yes	Yes	Yes	Yes	Yes
Obs.	256,540	182,714	256,540	256,540	217,308

# Germany - Inflation expectations

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## Germany - stylised facts

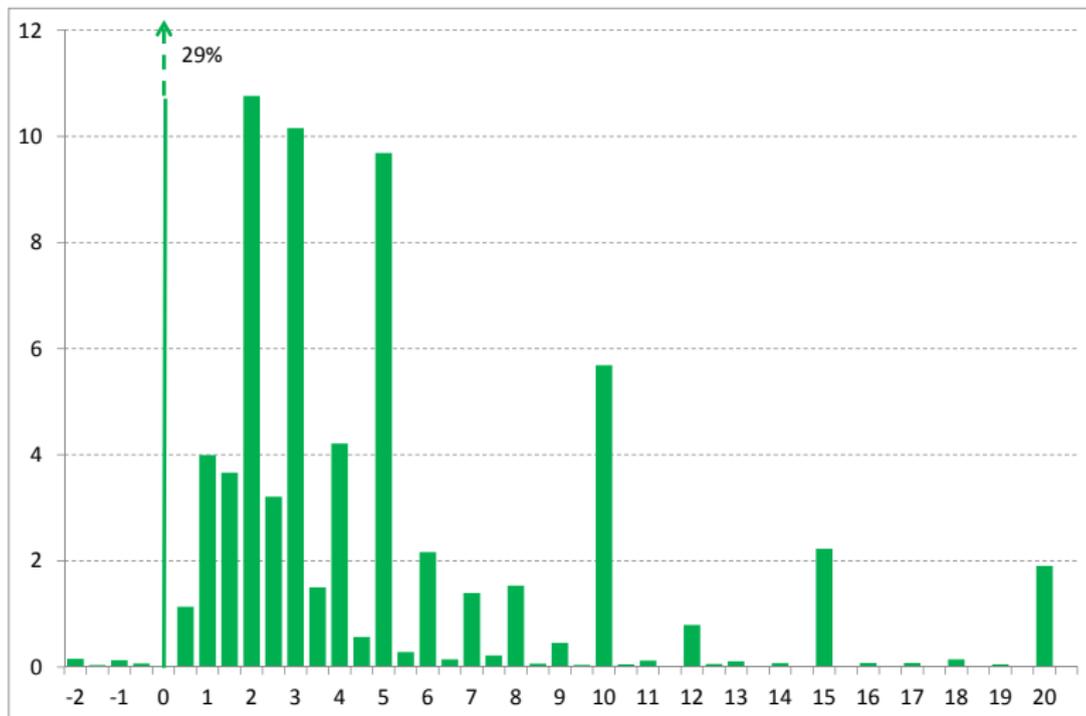
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	Aggregate Moments	Correlation with Headline $\pi$	$\pi$ excl. Energy
Average Expectation	2.76 (0.84)	0.75	0.30
% of Stable Prices	0.31 (0.10)	-0.76	-0.31
Average of non-zero inflation	3.91 (0.65)	0.72	0.25

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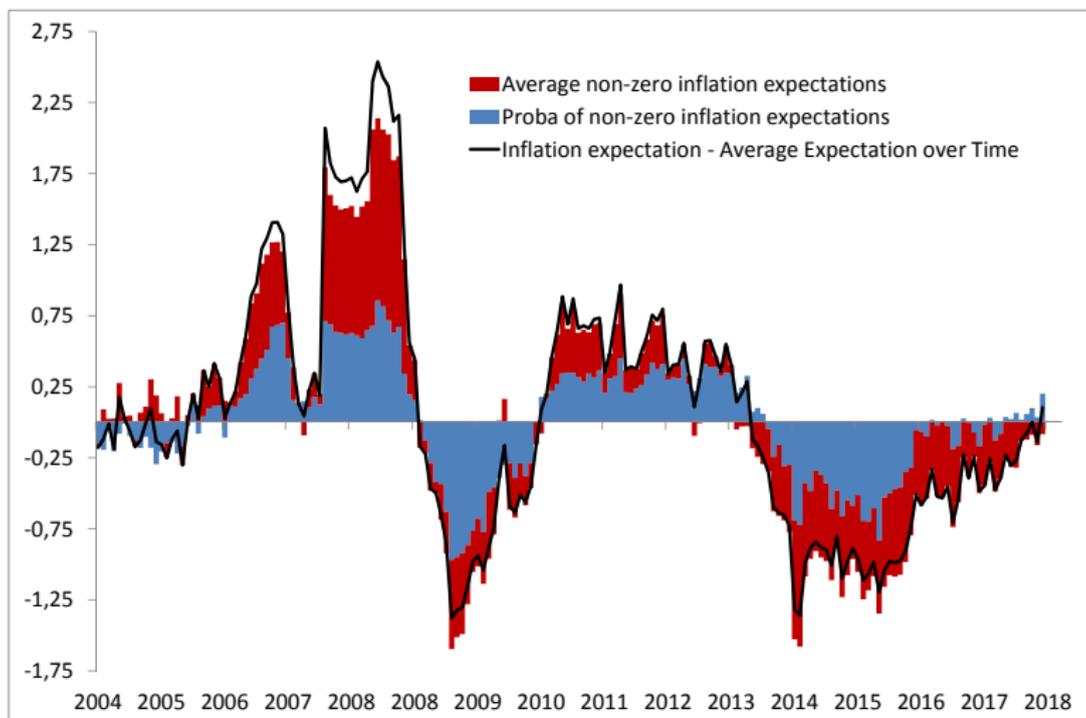
# Germany - Cross-section distribution

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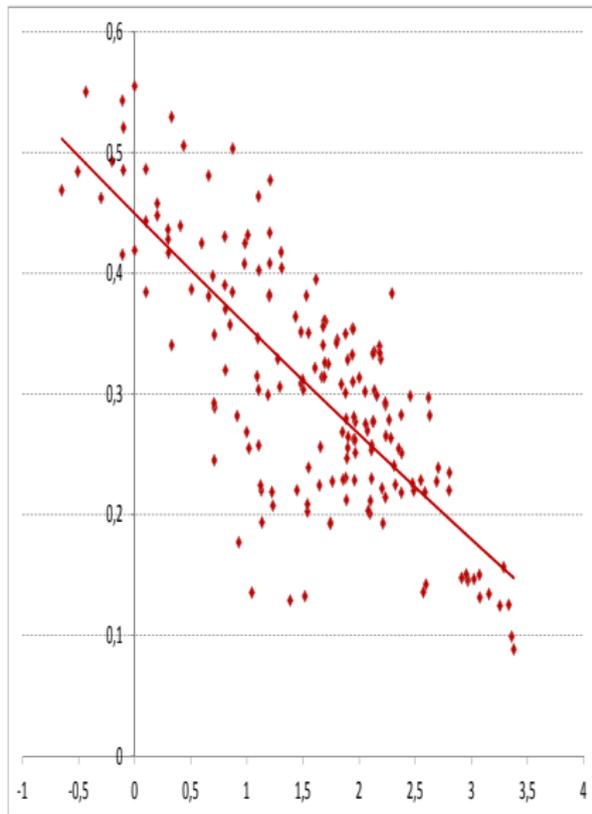


# Germany - Extensive/intensive margins

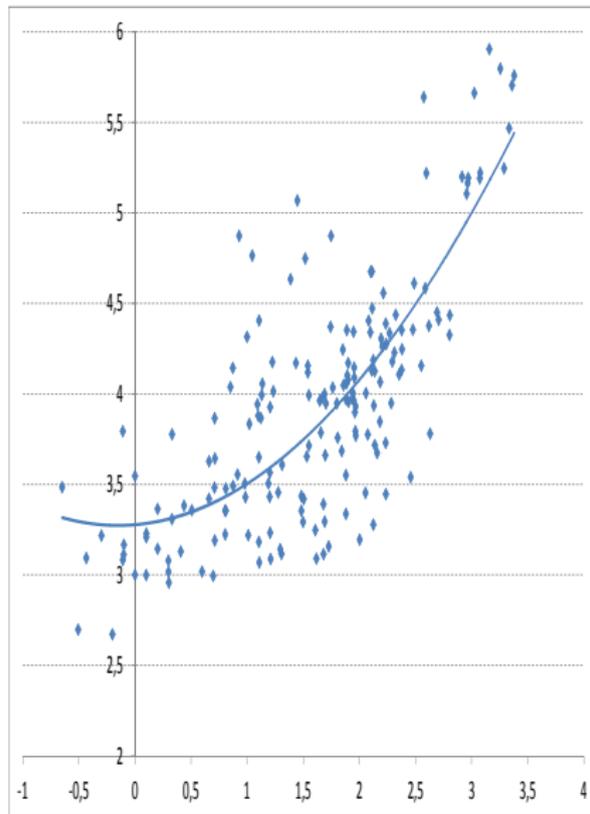
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Share of Stable Prices



Average Non-Zero Expectations



## 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

### 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

### 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

## 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