Communication, Information and Inflation Expectations[1]

Fernando Borraz[2] Miguel Mello[3]

Final Conference for the CCA Research Network - March 2021

[1]The views expressed herein are those of the authors and do not necessarily reflect the position of the Banco Central del Uruguay. All errors are ours.

[2]Banco Central del Uruguay, Facultad de Ciencias Sociales de la Universidad de la República and Universidad de Montevideo. E-mail: fborraz@bcu.gub.uy.

[3]Banco Central del Uruguay. E-mail: mmello@bcu.gub.uy.

Motivation

- A key aspect in the adoption and implementation of monetary policy decisions is communication. Blinder et al. (2008): "communication has become an increasingly important aspect of monetary policy."

- The success of monetary policy is not guaranteed just by controlling short-term interest rates, but also by influencing market expectations in the desired direction (Woodford (2011))

- Understanding inflation expectations is essential for monetary policy, particularly in an inflation target scheme

Contribution

- Our study aims to contribute to understand the effect of information disclosure and communication on the effectiveness' of monetary policy to affect inflation expectations

- We want to focus in a new and unexplored branch of the literature that refers to the effects of communication when expectations are not anchored in the inflation target

- We analyze the impact of the firm's knowledge about the inflation target, about the inflation rate and the Central Bank's communication over:

    - Inflation expectations

    - Firm's forecast errors

Stylized facts and findings - Uruguay

- Substantial disagreement about future inflation among firms
- Firms exhibit high degree of attention to inflation conditions but fail to incorporate all the available information to their forecasts (Borraz & Zacheo, 2018)
- Inflation expectations tend to converge as firms are more informed about past inflation (Frache & Lluberas, 2017)
- News do affect inflation expectations with the expected sign. Licandro & Mello (2015) construct a qualitative index of monetary policy (based on MP communications, news indices, Google trends)
- Negative relation between monetary policy stance and inflation expectations. (Licandro & Mello, 2014)

Research Strategy

- We exploit two main questions occasionally done in the Inflation Expectations Survey to Firms:

  - One referring to the knowledge of annual inflation rate

  - The other referering to the knowledge of the Central Bank's inflation target

- We categorize the firms into "informed about the inflation target (IAIT)" and "informed about inflation (IAIR)."

- We create a Monetary Contractivity Index using text analyzis over the Monetary Policy Committee (COPOM) releases

- Dynamic panel models for inflation expectations in t=H, and firms annual inflation rate forecast error

Data

- Inflation Expectations Firms Survey (IEFS)
- The IEFS is a sub-sample of the Annual Economic Activity Survey (AEAS)
- 591 companies throughout the entire period covered by the sample, between October 2009 and March 2020, monthly frequency
- Was sent monthly to 500 firms, with an average response ratio of 77% since October 2009, and a minimum response ratio of 54% (41,000 observations)
- It's representative of all the private non-financial nor agricultural firms with 50 employees or more
- 3 different horizons: the current year, the next 12 months and the next 24 months

Economic distribution and representativity

Table 1: Firms' distribution by sectors: sample and population (%)

Sector	Sample	Population
Manufacturing	41.48	46.60
Trade & commerce	29.99	23.06
Services	18.40	14.96
Health	4.47	11.61
Primary activities	2.36	1.06
Education	1.99	1.73
Utilities	0.58	0.74

Informational Variables

- 3 waves about inflation target's awareness and 5 waves for inflation rate's awareness
- Informed about IR: 09/2015, 03/2016, 03/2017, 06/2018, 09/2018
- Informed about IT: 09/2017, 06/2018, 09/2018

Informed about the inflation target

- "What rate of inflation (or range) do you think the Banco Central del Uruguay tries, on average, to achieve? "

- We assign a 1 if they know the target or if they say a rate that belongs to the target range

Table 2: Firms' distribution: Informed about the inflation target

	Observed *(IAIT)*		Imputed *(IAIT)*	
	Freq.	Percent	Freq.	Percent
No	587	66.03	30,297	65.26
Yes	302	33.97	16,127	34.74
Total	889	100	46,426	100

Informed about the inflation rate

- "Which is the last month's annual inflation rate?"
- We assign the value 1 if the answer to the previous question has an absolute error smaller than 0.25 percentage points

Table 3: Firms' distribution: Informed about the inflation rate

	Observed *(IAIR)*		Imputed *(IAIR)*	
	Freq.	Percent	Freq.	Percent
No	675	40.04	19,874	43.45
Yes	1,011	59.96	25,870	56.55
Total	1,686	100	45,744	100

Knowledge about monetary policy

- This variable combines all the information of firms about MP:

  - 0 firm knowns nothing about monetary policy
  - 1 firm knows the inflation rate
  - 2 firm knows the inflation target
  - 3 firm knows inflation rate and target

Table 5: Firms' distribution: Knowledge about monetary policy

Value	Freq.	Percent	Cum.
0	13,765	29.55	29.55
1	16,688	35.83	65.38
2	6,945	14.91	80.29
3	9,182	19.71	100.00
Total	59.96	49.01	

Communicational Variable Monetary Contractivity Index

- Monetary policy statements-COPOM
- Using web scraping and text analysis techniques we identify two target words inside each statement: inflation and monetary policy
- We selected and analyze strings of 13 words that contain one of our target words
- To characterize the tone of each string we assign a value between -2 and 2 to each one:
- - 2 means very expansive, -1 is expansive, 0 is neutral, 1 is contractive, and 2 is very contractive
- The contractivity index of each monetary policy statement is computed as the simple average of the values assigned to the corresponding strings

Score assignment in Monetary Contractivity Index I

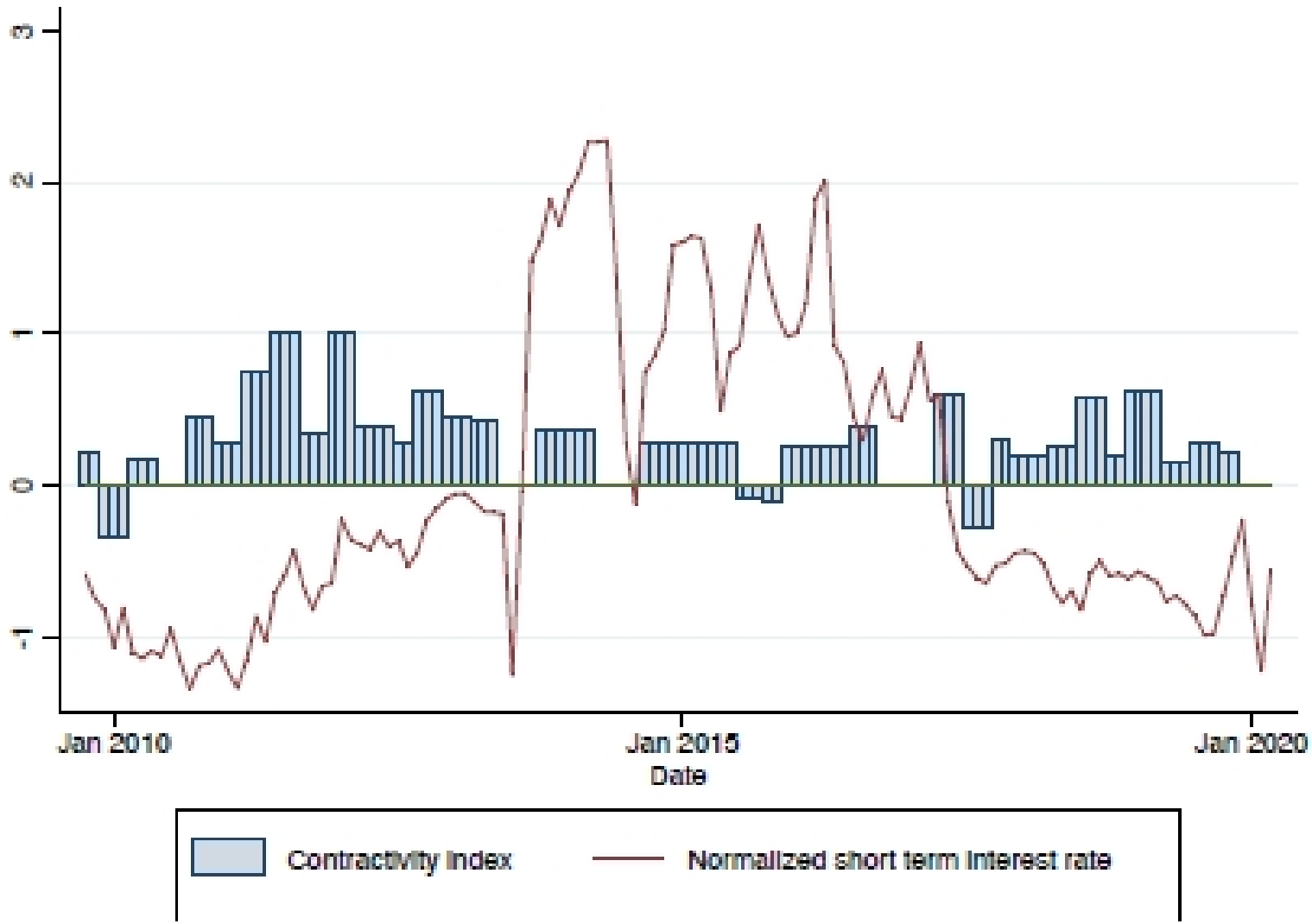
- Controlling inflation as its priority: very contractive score (+2)
- Worry about inflation: contractive score (+1)
- Inflation is not a main priority: expansive score (-1)
- Worry about economic activity: very expansive score (-2)
- Inflation or inflation expectations are low or had gone down: expansive score (-1)

Score assignment in Monetary Contractivity Index II

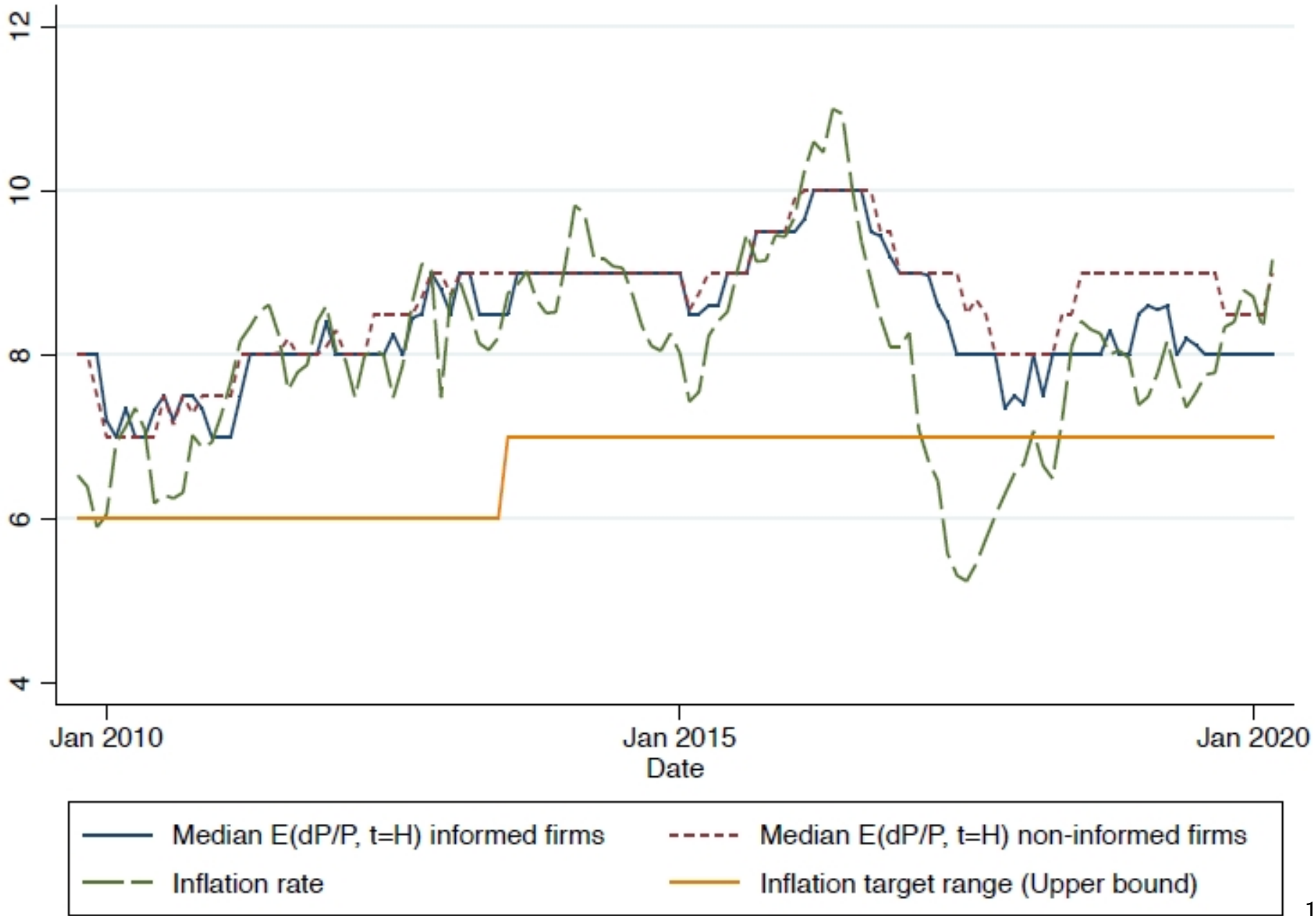
- Change in the monetary policy rate: very contractive or a very expansive score (-2 or 2)
- Monetary authority explicits the contractionary character of the monetary policy stance: contractive score (+1)
- When the monetary authority claims that monetary policy is or has been slightly contractive but the real monetary stance is expansive: expansive (-1)
- If there is not a clear bias in the monetary policy stance: a neutral score (0)

Short term interest rate and contractivity index

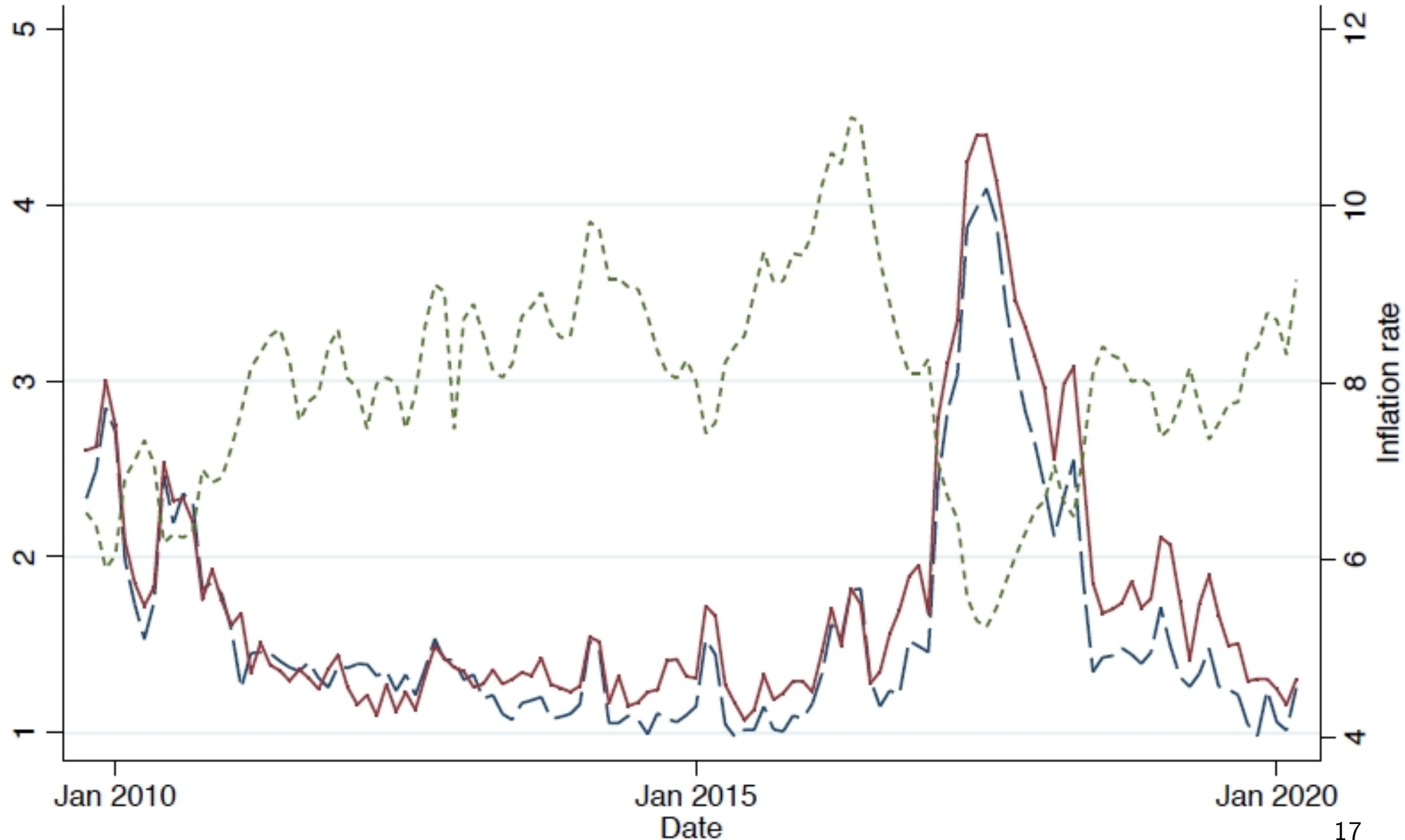
Figure 2: Short term interest rate and contractivity index



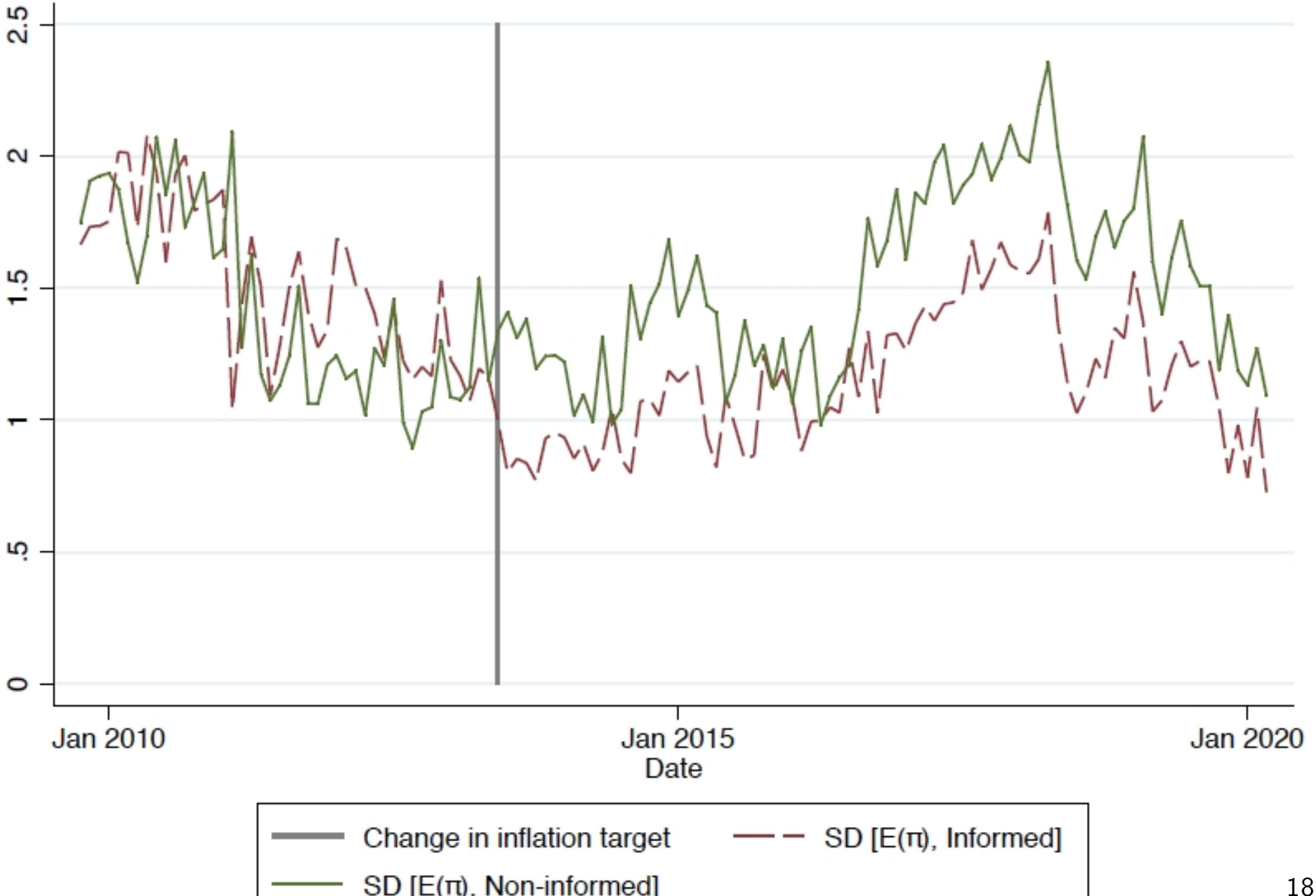
Inflation expectations



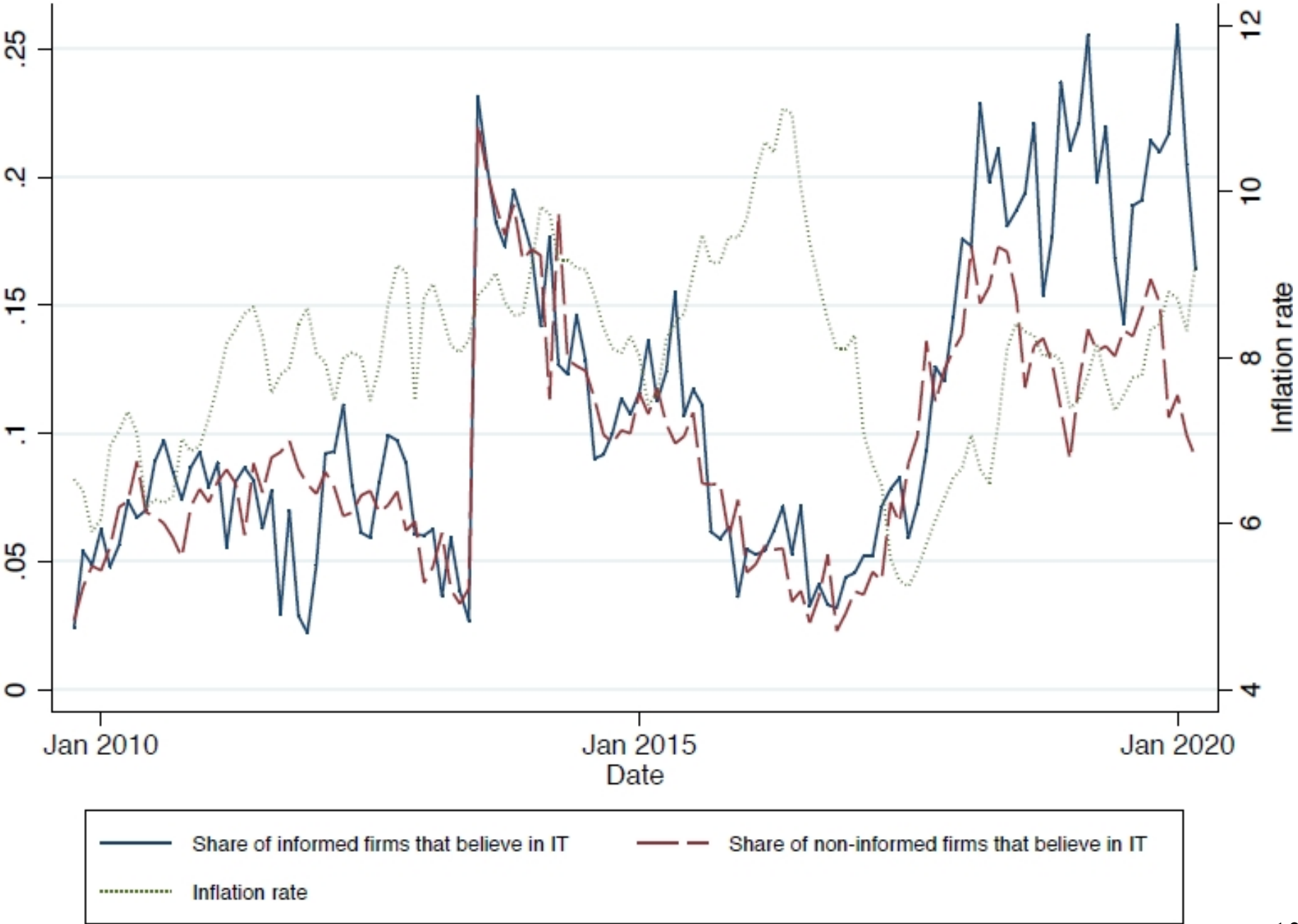
Annual inflation rate forecast error



Forecast of volatility



Firms' credibility in the inflation target



Inflation expectations

- $E_{it}(\pi_H) =$
  $\alpha_i + \beta_1 E_{it-1}(\pi_H) + \beta_2 \pi_{t-1} + \beta_3 i_s^{st} + \beta_4 CI_t + \beta_k INF_{it} + \varepsilon_{it}$
- $E_{it}(\pi_H)$ is the inflation expectation for the monetary policy horizon $(T = H)$
- $\pi_{t-1}$is the observed annual inflationrate in $t-1$
- i_s^{st} is the short term interest rate in t
- CI_t is the contractivity index in t
- INF_{it}theis a vector of informational variables

Information, communication, and inflation expectations

	M1	M2	M3	M4	M5	M6
Expected inflation rate $(t-1)$	0.118***	0.095***	0.088***	0.072**	0.065***	0.074*
	(0.031)	(0.030)	(0.034)	(0.035)	(0.024)	(0.042)
Inflation rate $(t-1)$	0.314***	0.323***	0.306***	0.283***	0.274***	0.287***
	(0.012)	(0.012)	(0.013)	(0.016)	(0.020)	(0.050)
Short term interest rate (t)	-0.263***	-0.229***	-0.222***	-0.203***	-0.192***	-0.202***
	(0.021)	(0.021)	(0.021)	(0.029)	(0.027)	(0.035)
Contractivity Index		-0.156***	-0.150***	-0.142***	-0.136***	-0.143***
		(0.010)	(0.010)	(0.013)	(0.013)	(0.020)
Informed inflation rate			1.019***	0.961***	1.608***	
			(0.324)	(0.288)	(0.340)	
Informed inflation target				2.084***	3.243***	
				(0.775)	(0.624)	
Informed monetary policy					-2.128**	
					(0.836)	
Knowledge monetary policy						0.912***
						(0.333)
Obs	41,078	41,078	40,377	40,290	40,.290	41,078
N-Groups	570	570	570	566	566	570
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

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

Inflation prediction and information

- To evaluate the relationship between the precision of the inflation forecasts and information we estimate an equation for the absolute value fo the forecast error

- $\rho_{it} = c_i + \alpha_i \rho_{it-1} + \delta_k INF_{it-12} + v_{it}$

- $\rho_{it} = \mid \pi_t - E_{it-12}(\pi_t) \mid$

Absolute forecast error models

	FE1	FE2	FE3	FE4	FE5
Absolute forecast error $(t-1)$	0.132***	0.131***	0.107***	0.108***	0.106***
	(0.018)	(0.017)	(0.033)	(0.039)	(0.019)
Informed inflation rate $(t-12)$		-0.807***	-0.506**	-0.682	
		(0.231)	(0.209)	(0.432)	
Informed inflation target $(t-12)$			-2.429***	-2.843**	
			(0.722)	(1.339)	
Informed monetary policy $(t-12)$				0.622	
				(0.852)	
Knowledge monetary policy $(t-12)$					-1.015***
					(0.199)
Obs	32,761	32,224	32,188	32,188	32,761

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

Results I

- We find differences in how informed and non-informed firms form their inflation expectations and in the precision of their predictions
- Informed firms predict better than non-informed firms and have lower volatility than non-informed firms
- Partially informed firms have higher inflation expectations, consistent with the fact that the inflation rate is mostly above the inflation target range
- Full informed firms predict an inflation rate nearer to the inflation target, even when they have higher expectations than the target
- Knowledge about monetary policy is positively correlated with inflation expectations and with the precision of the forecasts

Results II

- The share of informed firms that predict the inflation rate inside the inflation target is much higher when the inflation rate goes into the inflation target
- Asimetric reaction to changes in the inflation rate according to the level of information that firms have
- Is the monetary policy regime is related to the volatility of inflation expectations according to the degree of information that the agents have?
- Central bank's communication reinforces the monetary conditions determined by the policy instrument, both elements contribute to the formation of the expectations of the firms

Thank you!

- Comments: fborraz@bcu.gub.uy mmello@bcu.gub.uy