

Fiscal Policy and Inflation Expectations

CEMLA

Joint Research 2020

Intermediate meeting, August 2020

Miguel Mello

Jorge Ponce

Motivation

- Inflation expectations play a crucial role in an inflation target monetary regime.
- There is a growing strand of literature about inflation expectations and their determinants:
 - Mainly concentrated on the expectations made by professional analysts.
 - Generally focused in monetary policy decisions, the policy stance, and communication issues.
- Does fiscal policy affect inflation expectations made by price setters (i.e. firms)?
- If it does, then fiscal policy can have an impact on monetary policy even in the absence of fiscal dominance (i.e. monetary financing of fiscal deficits).

Contribution

- We do an empirical study to assess the impact of fiscal policy outcomes on inflation expectations made by price setters in Uruguay.
- We focus on inflation expectations by price setters instead of professional analysts.
- We find robust empirical evidence of an interdependence between fiscal and monetary policies through inflation expectations by price setters in Uruguay.
 - Monetary policy faces more challenges to maintain inflation expectations anchored when the budget deficit worsen.
 - Nonetheless, monetary policy seems to be effective to compensate the distortions introduced by fiscal policy on inflation expectations.

Literature review

- Sargent and Wallace (1981) introduce the distinction between monetary and fiscal dominance.
 - Licandro and Vicente (2006) analyze the link between fiscal policy and inflation objectives in Uruguay.
 - Bucacos (2020) applies De Resende's (2007) methodology and finds no evidence of fiscal dominance in Uruguay.
- Sims (2003) shows that agents update their expectations based on noisy information.
- Coibion et al. (2018) shows that agents update their expectations after receiving new macroeconomic information.
- Gelos and Rossi (2008) state the influence of fiscal variables over inflation expectations in Uruguay.

The Data

- Inflation expectations survey (IES).
 - 591 firms throughout the entire period covered by the sample: October 2009 to March 2020, monthly frequency, average response ratio of 77% with a minimum of 54%.
 - Representative of private non-financial, non-agricultural firms with 50 employees or more.
 - 3 different horizons: the current year, the next 12 months and the monetary policy horizon (18 months up to June 2013 and 24 months since then).
- Fiscal and macroeconomic data
 - Budget deficit to GDP, FX depreciation and volatility, GDP growth, unemployment, etc.
- Monetary contractivity index
 - Assess the tone of monetary policy communications by analyzing strings of 13 words around *inflation* and *monetary policy*.
- Awareness about monetary policy
 - Assess the degree of attention of firms to *inflation rate* and *monetary policy objectives*. (Borraz et al., 2020)

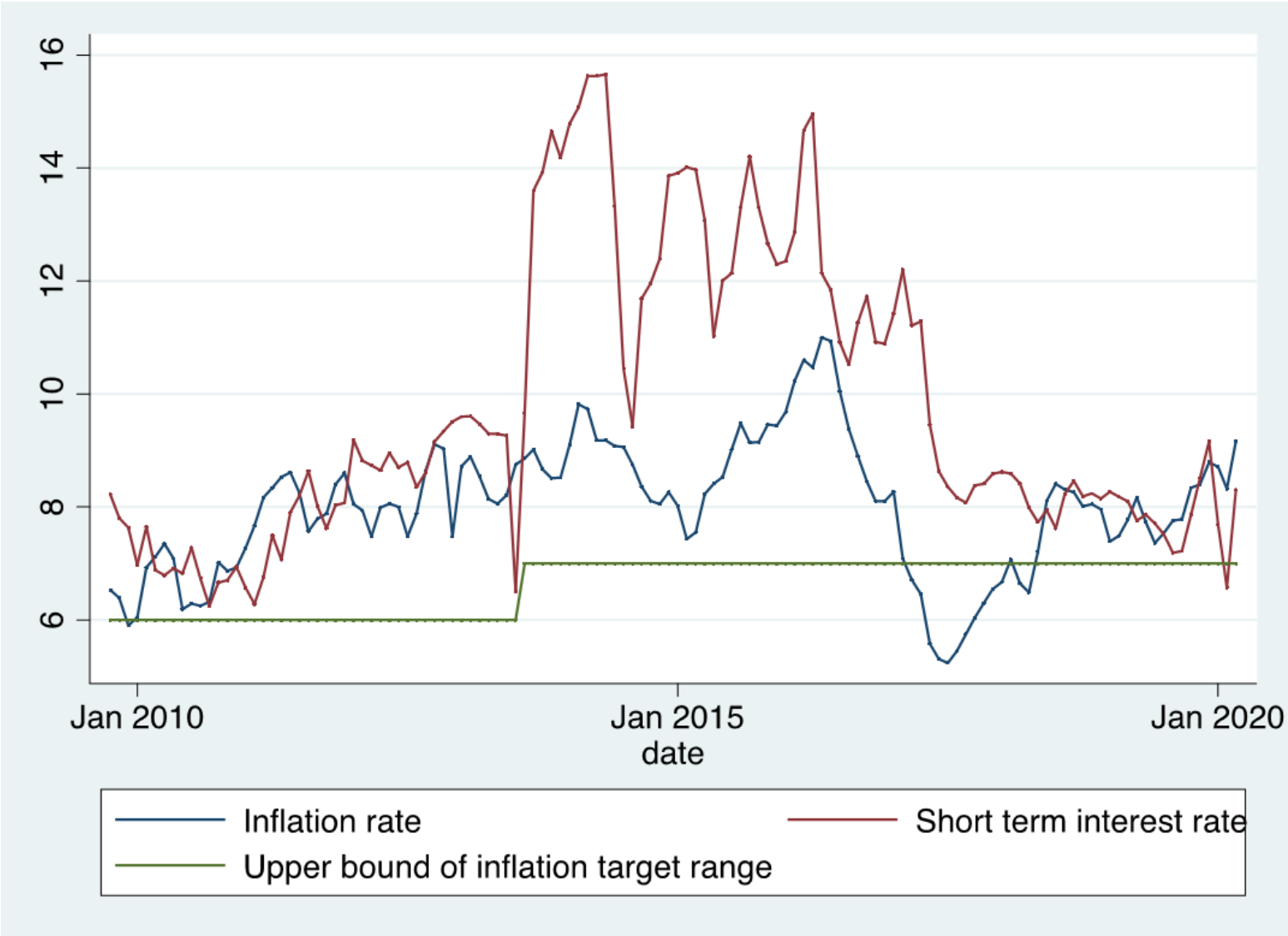
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Expected inflation rate in $t = H$	46,580	8.95	2.06	5.00	25.00
Inflation rate	46,580	8.00	1.16	5.24	11.00
Short term interest rate	46,580	9.76	2.60	6.25	15.66
Budget deficit to GDP	46,580	2.98	1.30	0.44	5.11
Monetary contractivity index	46,580	0.28	0.29	-0.33	1.00
Awareness about monetary policy	46,580	0.20	0.40	0.00	1.00
FX depreciation	46,580	0.48	2.43	-5.11	13.93
FX volatility	46,580	0.10	0.19	0.00	1.78
GDP growth	36,062	2.79	2.09	-1.49	7.96
Unemployment rate	46,580	7.25	1.00	5.60	10.80

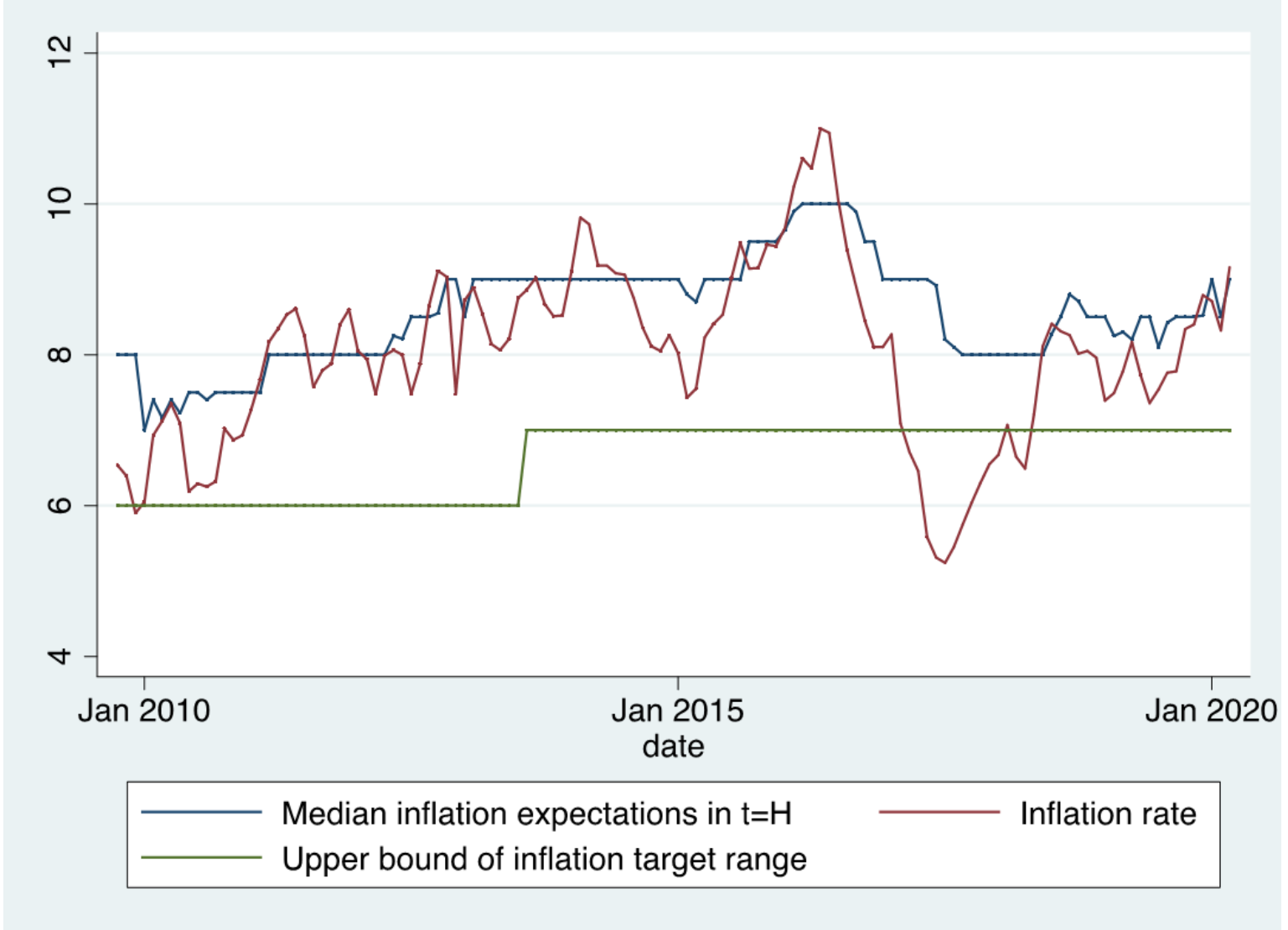
Monetary policy and fiscal deficit in Uruguay

- Uruguay has an inflation targeting regime since 2007.
- Two stages in terms of the monetary policy management instrument.
 - 2007 - June 2013: the interest rate was used as policy instrument.
 - July 2013 - nowadays:
 - The inflation target range was widened, from [4-6] to [3-7].
 - Growth of monetary aggregates became the policy instrument.
 - The monetary policy horizon was extended, from 18 months to 24 months.
- Inflation was rarely within the target range, however, there seems to be no substantive de-anchoring of expectations, as these are at high levels but relatively stable over time.
- Budget deficit to GDP increased from 2,5% to 5.1% during the period analyzed.

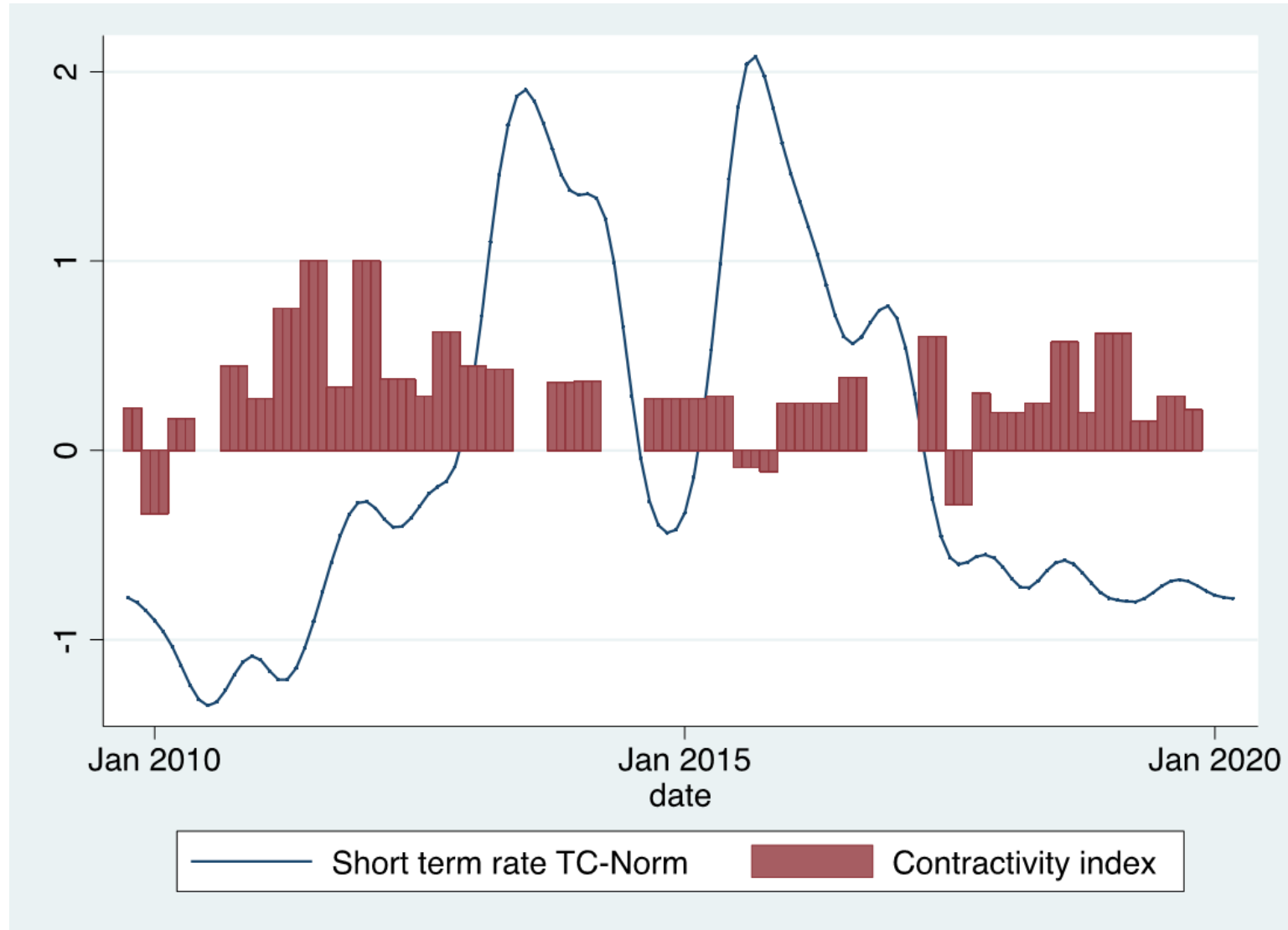
Inflation and monetary policy



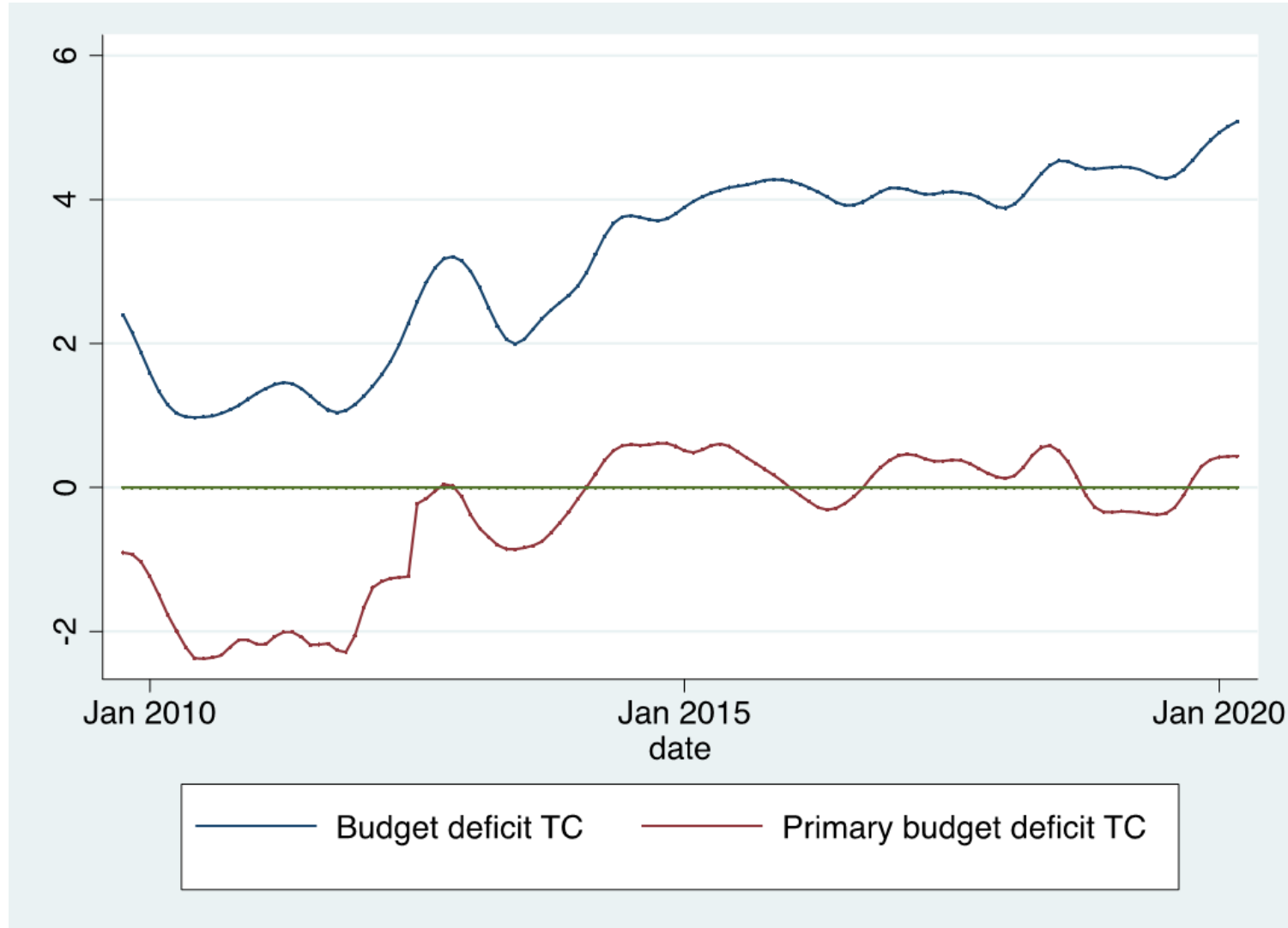
Inflation and inflation expectations



Monetary contractivity index



Budget deficit and primary deficit to GDP



Empirical approach

$$E_{it}(\pi_H) = \alpha_i + \beta_1 E_{it-1}(\pi_H) + \beta_2 \pi_{t-1} + \beta_3 i_t^{st} + \beta_4 E_{it}(F_t) + \varepsilon_{it}$$

- $E_{it}(\pi_H)$ is the inflation expectation for the monetary policy horizon ($t = H$) of agent i in period t .
- π_{t-1} is the observed annual inflation rate in $t - 1$.
- i_t^{st} is the short term interest rate, proxy of monetary policy.
- $E_{it}(F_t)$ is the expected budget deficit of agent i in period t , (unobserved, instrumented by F_{t-2}).

Estimation method

- Estimation method is two-step GMM with robust standard errors.
 - Inflation expectations in monthly frequency are highly persistent.
 - Endogenous variables (short term interest rate, budgeted deficit to GDP, monetary contractivity index) are instrumented by their lags, the 12 months average of firms' expected costs and inflation.
- Controls:
 - Annual and monthly fixed effects.
 - Monetary policy range and instrument changes.
 - Number of answers to the IES.

Main results

	M1	M2	M3	M4	M5	M6
(1) Expected inflation rate ($t - 1$)	0.118*** (0.031)	0.143*** (0.029)	0.143*** (0.029)	0.122*** (0.030)	0.122*** (0.030)	0.121*** (0.030)
(2) Inflation rate ($t - 1$)	0.314*** (0.012)	0.232*** (0.012)	0.225*** (0.013)	0.242*** (0.012)	0.244*** (0.012)	0.238*** (0.012)
(3) Short term interest rate (t)	-0.263*** (0.021)	-0.233*** (0.022)	-0.226*** (0.023)	-0.198*** (0.022)	-0.200*** (0.023)	-0.202*** (0.023)
(4) Budget deficit to GDP (TC) (t)		0.387*** (0.036)	0.390*** (0.036)	0.354*** (0.036)	0.350*** (0.036)	0.349*** (0.036)
(3)x(4)			0.053** (0.024)			
(5) Monetary contractivity index				-0.147*** (0.010)	-0.152*** (0.011)	-0.135*** (0.011)
(4)x(5)					0.013 (0.011)	
(3)x(4)x(5)						-0.027** (0.013)
Obs	41,078	37,930	37,930	37,930	37,930	37,930
N-Groups	570	560	560	560	560	560

Robustness check: primary deficit to GDP

	M1	M2	M3	M4	M5	M6
(1) Expected inflation rate ($t - 1$)	0.118*** (0.031)	0.160*** (0.029)	0.159*** (0.029)	0.136*** (0.030)	0.135*** (0.030)	0.135*** (0.030)
(2) Inflation rate ($t - 1$)	0.314*** (0.012)	0.284*** (0.012)	0.287*** (0.012)	0.291*** (0.012)	0.292*** (0.012)	0.290*** (0.012)
(3) Short term interest rate (t)	-0.263*** (0.021)	-0.245*** (0.022)	-0.227*** (0.023)	-0.209*** (0.022)	-0.212*** (0.023)	-0.215*** (0.023)
(4) Budget primary deficit to GDP (TC) (t)		0.070** (0.034)	0.083** (0.034)	0.071** (0.035)	0.062* (0.036)	0.070** (0.035)
(3)x(4)			0.001*** (0.000)			
(5) Monetary contractivity index				-0.158*** (0.010)	-0.173*** (0.011)	-0.137*** (0.012)
(4)x(5)					0.038*** (0.012)	
(3)x(4)x(5)						-0.000*** (0.000)
Obs	41,078	37,930	37,930	37,930	37,930	37,930
N-Groups	570	560	560	560	560	560

Robustness check: gross debt to GDP

	M1	M2	M3	M4	M5	M6
(1) Expected inflation rate ($t - 1$)	0.118*** (0.031)	0.048 (0.036)	0.049 (0.037)	0.048 (0.037)	0.047 (0.037)	0.045 (0.037)
(2) Inflation rate ($t - 1$)	0.314*** (0.012)	0.123*** (0.013)	0.124*** (0.013)	0.131*** (0.013)	0.132*** (0.013)	0.112*** (0.014)
(3) Short term interest rate (t)	-0.263*** (0.021)	-0.078*** (0.022)	-0.459 (0.513)	-0.078*** (0.022)	-0.080*** (0.022)	-0.086*** (0.022)
(4) Gross debt to GDP (TC) (t)		0.100*** (0.005)	0.100*** (0.005)	0.096*** (0.005)	0.095*** (0.005)	0.098*** (0.005)
(3)x(4)			0.006 (0.008)			
(5) Monetary contractivity index				-0.033*** (0.011)	-0.042*** (0.011)	-0.048*** (0.011)
(4)x(5)					0.022* (0.012)	
(3)x(4)x(5)						-0.001*** (0.000)
Obs	41,078	37,930	37,930	37,930	37,930	37,930
N-Groups	570	560	560	560	560	560

Robustness check: other macro variables

	R1	R2	R3	R4	R5	R6
(1) Expected inflation rate ($t - 1$)	0.146*** (0.029)	0.143*** (0.029)	0.141*** (0.030)	0.143*** (0.030)	0.143*** (0.030)	0.144*** (0.029)
(2) Inflation rate ($t - 1$)	0.227*** (0.012)	0.234*** (0.012)	0.241*** (0.012)	0.230*** (0.012)	0.235*** (0.012)	0.240*** (0.013)
(3) Short term interest rate (t)	-0.233*** (0.023)	-0.234*** (0.022)	-0.240*** (0.023)	-0.235*** (0.023)	-0.234*** (0.023)	-0.243*** (0.023)
(4) Budget deficit to GDP (TC) (t)	0.382*** (0.036)	0.395*** (0.035)	0.398*** (0.036)	0.389*** (0.036)	0.397*** (0.036)	0.401*** (0.036)
(5) Awareness about monetary policy (t)	0.624 (0.451)					0.573 (0.454)
(6) FX depreciation (t)		0.004 (0.003)				0.003 (0.004)
(7) FX volatility (t)			0.176*** (0.035)			0.155*** (0.041)
(8) GDP growth (t)				0.054* (0.031)		0.053 (0.033)
(9) Unemployment growth (t)					0.031 (0.027)	0.036 (0.028)
Obs	37,229	37,930	37,930	37,930	37,930	37,229
N-Groups	556	560	560	560	560	556

Final remarks

- Fiscal policy has a significant impact on inflation expectations in Uruguay, determining interdependence between monetary and fiscal policies.
 - Monetary policy faces more challenges to anchor expectations when the budget deficit worsens.
 - The interest rate channel of monetary policy working in isolation is not enough to compensate the negative impact of fiscal policy.
 - When the communication channel of monetary policy is added, then monetary policy has a significant impact over inflation expectations.
- Further work is needed in order to explain the determinants behind these results.

Fiscal Policy and Inflation Expectations

**Thank you very much for your attention,
comments and suggestions!**