The Performance of Discretionary Fiscal Policies and Fiscal Rules at the Argentine Subnational Level

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Outline

Motivations

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- The question of whether discretionary fiscal policy is **pro or counter cyclical** is still a permanent motive of analysis and research for economists and experts all over the world,
- The matter not only concerns to the highest government level of countries but also to subnational and local ones due to evidences that **provincial and state policymakers very often pursue pro-cyclical discretionary fiscal policies**,
- Reasons for that suggest:
  - Difficulties acceding to credit markets during contractionary phases
  - Political considerations whereby policymakers tend to run deficits whichever the phase of the cycle
  - Subnational governments´ strategies running pro-cyclical tax reductions during boom times instead of generating surpluses for economic downturns.

The Papers' Objectives

Based on the growing subnational public finances´ role and importance all over the world, and in particular in Argentina,

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- It is first purported **to assess provinces´ fiscal behaviour in relation to economic cycles**; that is, their pro or counter cyclical patterns as determined by the conventional fiscal reaction function (using in this case a variant of the **'CAPB model' fiscal rule**) in which the cycle explanatory variables are the output gap or the unemployment rate. Control and dummy variables are also considered.

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- Secondly, and seeking for also ascertaining the role of what Larch et al (2020) called the drivers of pro or countercyclical policie, **the classical linear reaction function is extended by including ´interaction terms´** that might enrich the analysis of stabilization properties of subnational discretionary fiscal policies.

The Standing Literature

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- He concluded that the **government historically responded to increases in the debt-GDP ratio by raising the primary surplus, or by reducing the primary deficit**. Bohn´s empirical work also pointed out that the positive response of the primary surplus to changes in debt reasserted that U.S. fiscal policy was satisfying an intertemporal budget constraint.

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1. The **´CAPB Model´ fiscal rule** in which the discretionary fiscal action (Δ CAPB) was explained by this variable lagged and debt (also lagged) and the level of the output gap as a measure of cycle conditions;
2. The **Primary Balance Model** in which the primary balance was now the dependent variable and its lagged value enters the equation as an explanatory variable.

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2. The **Primary Balance Model** in which the primary balance was now the dependent variable and its lagged value enters the equation as an explanatory variable.

A key difference between both models is that in the second one the dependent variable also included the effects of automatic stabilizers.

The Standing Literature

Larch et al (2020) analyzed discretionary fiscal policy in the **EU and in non EU countries**. They resorted to the classical **linear fiscal reaction function**. The dependent variable was ΔCAPB. The lagged ΔCAPB, as well as cycle and control variables and a number of dummies accounted for the explanatory variables.

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- Regressed panel data models showed **pro-cyclicity of discretionary fiscal policy when the output gap or the unemployment rate were the cycle variables**.
- **They could not confirm priors related to other cycle variables**, as for instance the Industrial Production and Δ OECD Composite Leading Indicator.
- The counter cyclical behaviour exhibited by **debt to GDP ratio**, apart from a **sign of sustainability**, might also be understood as **debt ratios not reaching yet dangerous thresholds**.

The Standing Literature

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For that, they investigated the ´drivers´ of pro or counter cyclicality by introducing **non linearities in the classical approach**. This procedure allowed **dummies to interact with cycle variables of interest**.

The Conventional Linear Fiscal Reaction Function

$$\Delta CAPB_{i,t} = \alpha_1 + \alpha_2 \, \Delta CAPB_{i,t-1} + \alpha_3 \, \Delta OG_{i,t-1} + \alpha_4 \, DR_{i,t-1} + \alpha_5 \, EY_t + \alpha_6 \, CR_{t-1} + \alpha_7 \, HI_{t-1} + \alpha_8 \, FRL_t + \mu_{i,t}$$

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Where:

$CAPB =$ Cyclically Adjusted Primary Balance

$$CAPB = R\left(\frac{GGP^p}{GGP^a}\right)^{\epsilon_R} - S\left(\frac{GGP^p}{GGP^a}\right)^{\epsilon_S}$$

$OG =$ Output Gap (Cycle variable, alternative: Unemployment Rate, UR)
$DR =$ Debt to GGP ratio (Control variable)

The Conventional Linear Fiscal Reaction Function

Dummies used:

- $EY =$ Election Year
- $CR =$ Systemic Crises Dummy
- $HI =$ High Inflation Years
- $FRL =$ Fiscal Responsability Laws, standing for the performance of Laws 25917/04 and 27428/01

The Conventional Linear Fiscal Reaction Function

- Regressions for the period (2005-2019), including data for 23 Argentine provinces were in turn run by using the **two stage system GMM** estimator which, as known, successfully deals with the so called **Nickel bias** and also with important econometric problems found when using dynamic panel data models such as **endogeneity**, **heteroskedasticity** and **autocorrelation**.

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- The **Hodrick-Prescott** filter is resorted to in order to separate trend from cyclical components in time series used, which allows in turn a better analysis of economic fluctuations.

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- The dependent variable ΔCAPB measures the discretionary fiscal impulse following different phases of the economic cycle (the pattern of discretionary fiscal policies). In this connection, the ensuing comments highlight regression results related to cyclicality at the Argentine subnational level.

Results

OUTPUT GAP IN LEVELS AND NOT LAGGED			
Number of instruments = 20		Number of obs = 299	
Wald chi2(7) = 113.00		Number of groups = 23	
Prob > chi2 = 0.000			
CAPB	Coef.	z	P > |z|
CAPB (t-1)	-.2350***	-2.66	0.008
GGP Gap (t)	-.0250***	-4.06	0.000
Debt to GGP ratio (t-1)	.3340***	2.95	0.003
Crisis Dummy (t-1)	.0014	0.26	0.798
High Inflation Dummy (t-1)	-.0020	-0.41	0.679
Election Year Dummy (t)	-.0067**	-1.99	0.046
Fiscal Respons. Laws (t)	-.0028	-0.49	0.624
Cons	.0034	1.40	0.162
Arellano-Bond test for AR(1) in first differences: Pr > z = 0.003			
Arellano-Bond test for AR(2) in first differences: Pr > z = 0.131			
Hansen test of overid. restrictions: Prob > chi2 = 0.103			

$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$

Results

UNEMPLOYMENT RATE IN LEVELS AND LAGGED ONE PERIOD

Number of instruments = 20 | Number of obs = 299

Wald chi2(7) = 86.70 | Number of groups = 23

Prob > chi2 = 0.000

CAPB	Coef.	z	P > |z|
CAPB (t-1)	-.197*	-1.68	0.093
Unemp. Rate (t-1)	.680**	2.12	0.034
Debt to GGP ratio (t-1)	.161*	1.79	0.073
Crisis Dummy (t-1)	.001	0.16	0.873
High Inflation Dummy (t-1)	-.004	-1.00	0.319
Election Year Dummy (t)	-.008**	-2.35	0.019
Fiscal Respons. Laws (t)	-.004	-0.58	0.559
cons	.006	1.34	0.182

Arellano-Bond test for AR(1) in first differences: Pr > z = 0.007

Arellano-Bond test for AR(2) in first differences: Pr > z = 0.166

Hansen test of overid. restrictions: Prob > chi2 = 0.081

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

Results from the Conventional Linear Fiscal Reaction Function Approach

- No matter the variant and lags used, and in line with what is upheld by the literature, **the Output Gap´s negative and statistically significant coefficients show a marked procyclical impact upon subnational discretionary fiscal policy**.

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- Contrary to expectations, **positive and significant coefficients of the unemployment rate also depict a procyclical impact** of this alternative cycle variable. Suffice it to say that if employment falls were viewed as a signal of a recessive economic phase, counter cyclical fiscal policy should be expected to go in the opposite direction, causing CAPB to shrink.

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- The **counter cyclical performance of the Debt/GGP ratio means here an indicator of sustainability**, particularly in this case in which statistically significant coefficients hold positive signs implying a reinforcement of provincial budget constraints. The increase of debt is thus regarded as a necessary shock absorber expected to perform a stabilizing role during downturns, provided that the ratio does not reach very high thresholds.

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- Surprisingly, the performance of CR, mainly aimed at capturing the negative fiscal impact of developed countries´ crises of years 2009-2011 **seemed not to have had an important impact on provincial public finances** as the dummy held not statistically significant coefficients.

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- Similar to the preceding one, High Inflation (HI) dummy´s **not statistically significant** coefficient does not permit to ascertain its pro or counter cyclical impact upon subnational discretionary fiscal policy.

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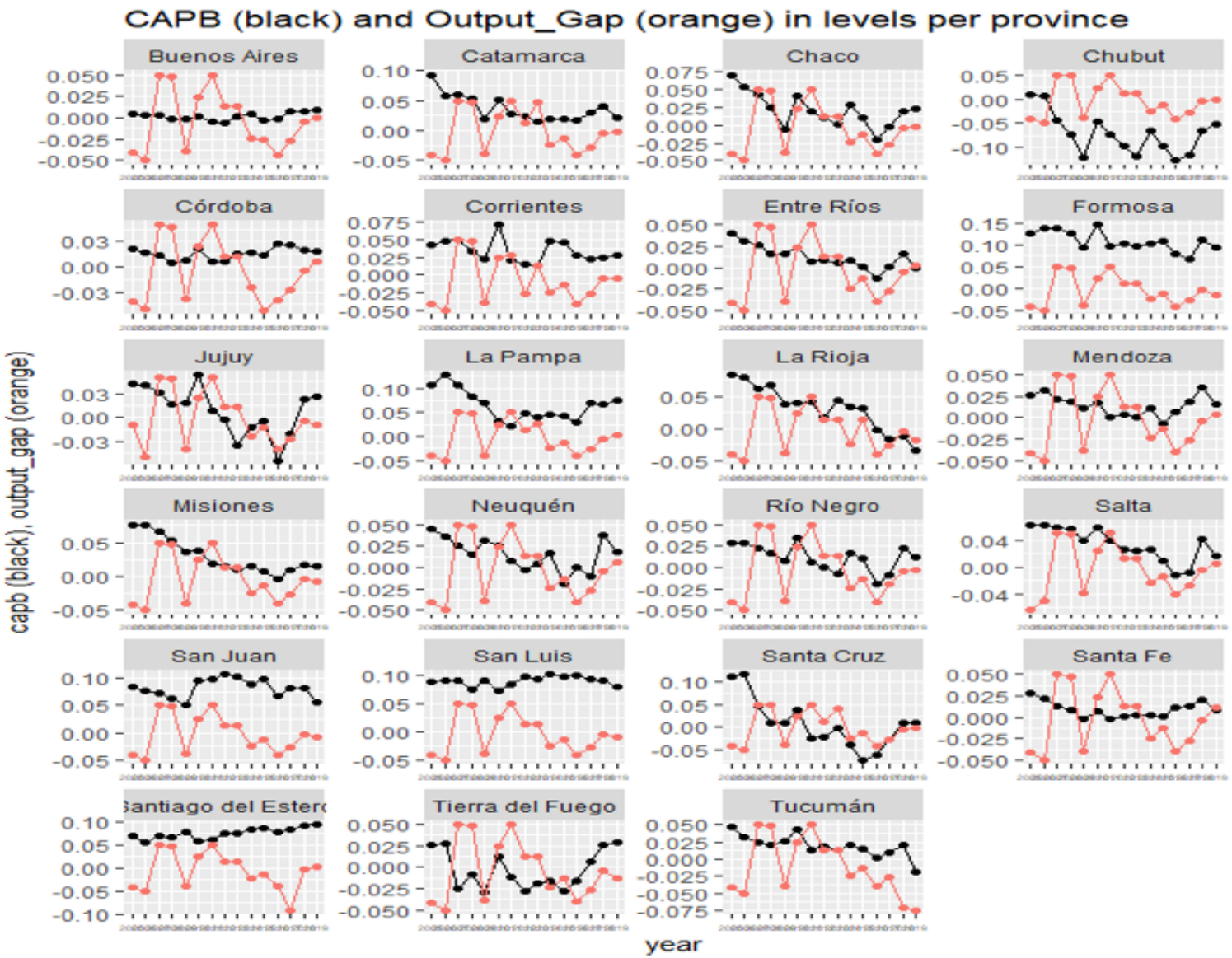
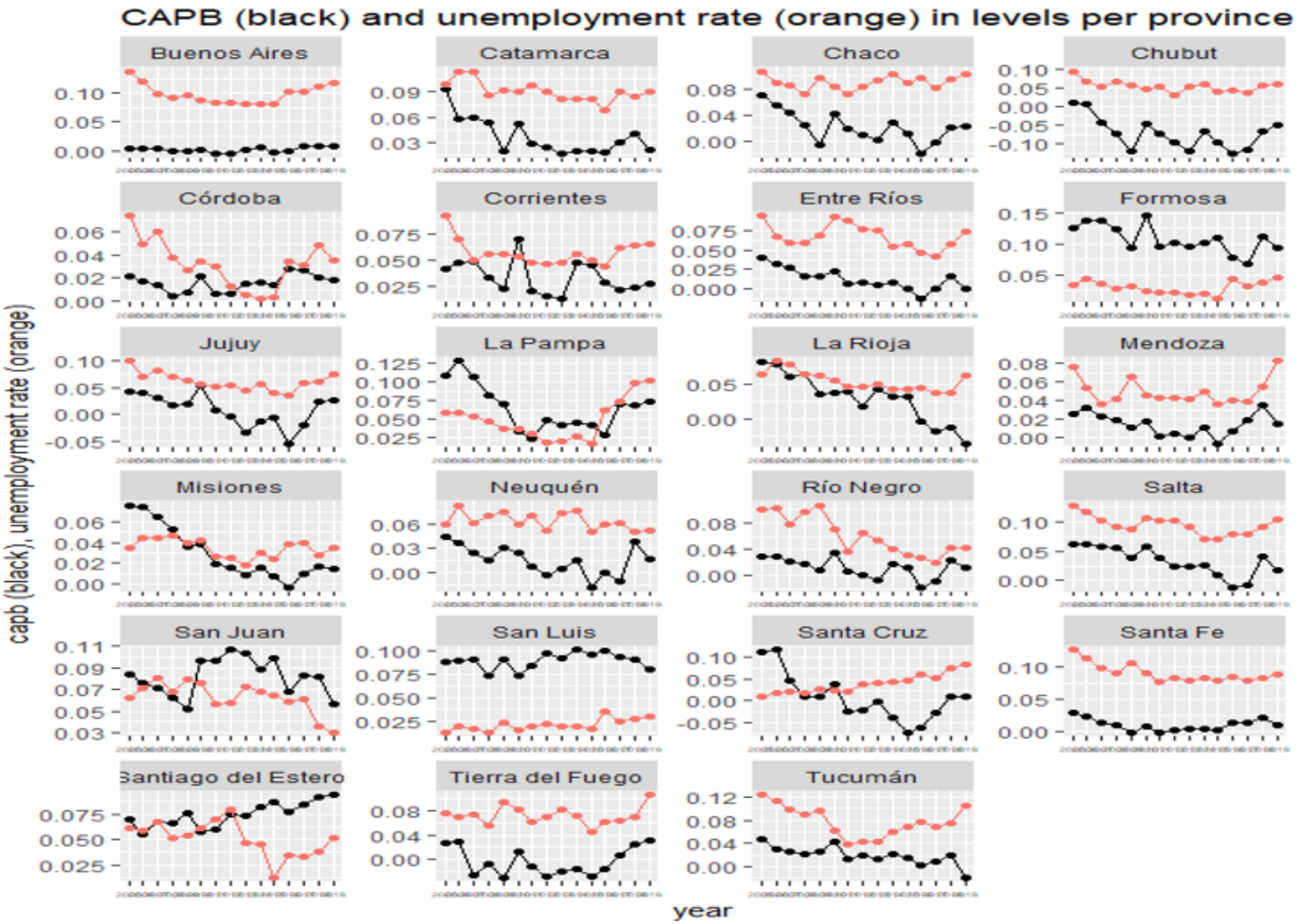
- In turn, Argentine Fiscal Responsibility Laws (FRL) **did not help** to enhance countercyclical features of subnational discretionary fiscal policy, as is shown by coefficients´ positive signs but no statistical significance. That is, **as laws rather promoted financial balances and imposed mandatory limits to spending**, the chances of theirs favouring stabilization were thwarted in practice.

Charts


CAPB (black) and Output_Gap (orange) in levels per province
Buenos Aires
Catamarca
Chaco
Chubut
Córdoba
Corrientes
Entre Ríos
Formosa
Jujuy
La Pampa
La Rioja
Mendoza
Misiones
Neuquén
Río Negro
Salta
San Juan
San Luis
Santa Cruz
Santa Fe
Santiago del Estero
Tierra del Fuego
Tucumán
capb (black), output_gap (orange)
year

Charts


CAPB (black) and unemployment rate (orange) in levels per province
Buenos Aires
Catamarca
Chaco
Chubut
Córdoba
Corrientes
Entre Ríos
Formosa
Jujuy
La Pampa
La Rioja
Mendoza
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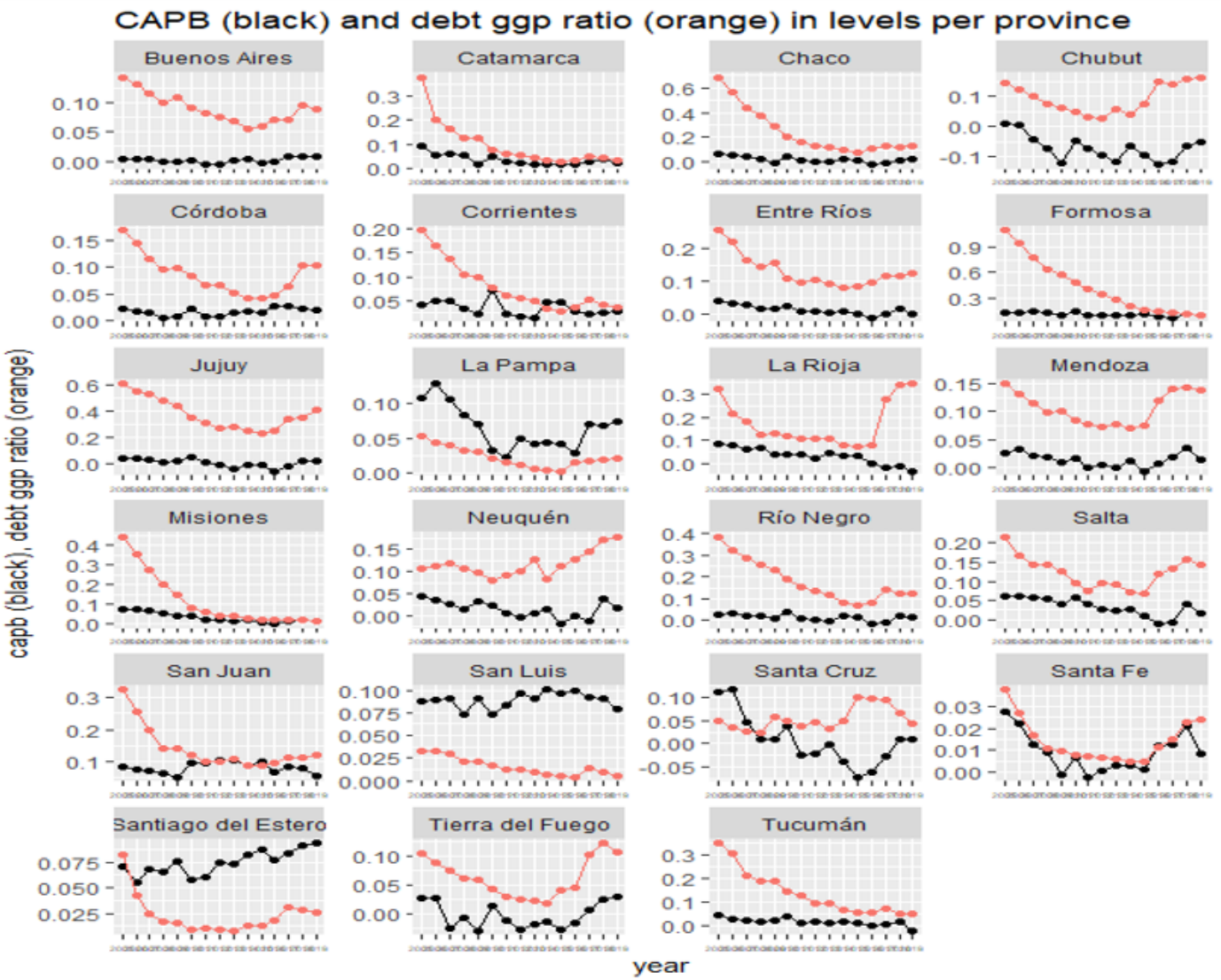
Charts


CAPB (black) and debt ggp ratio (orange) in levels per province
Buenos Aires
Catamarca
Chaco
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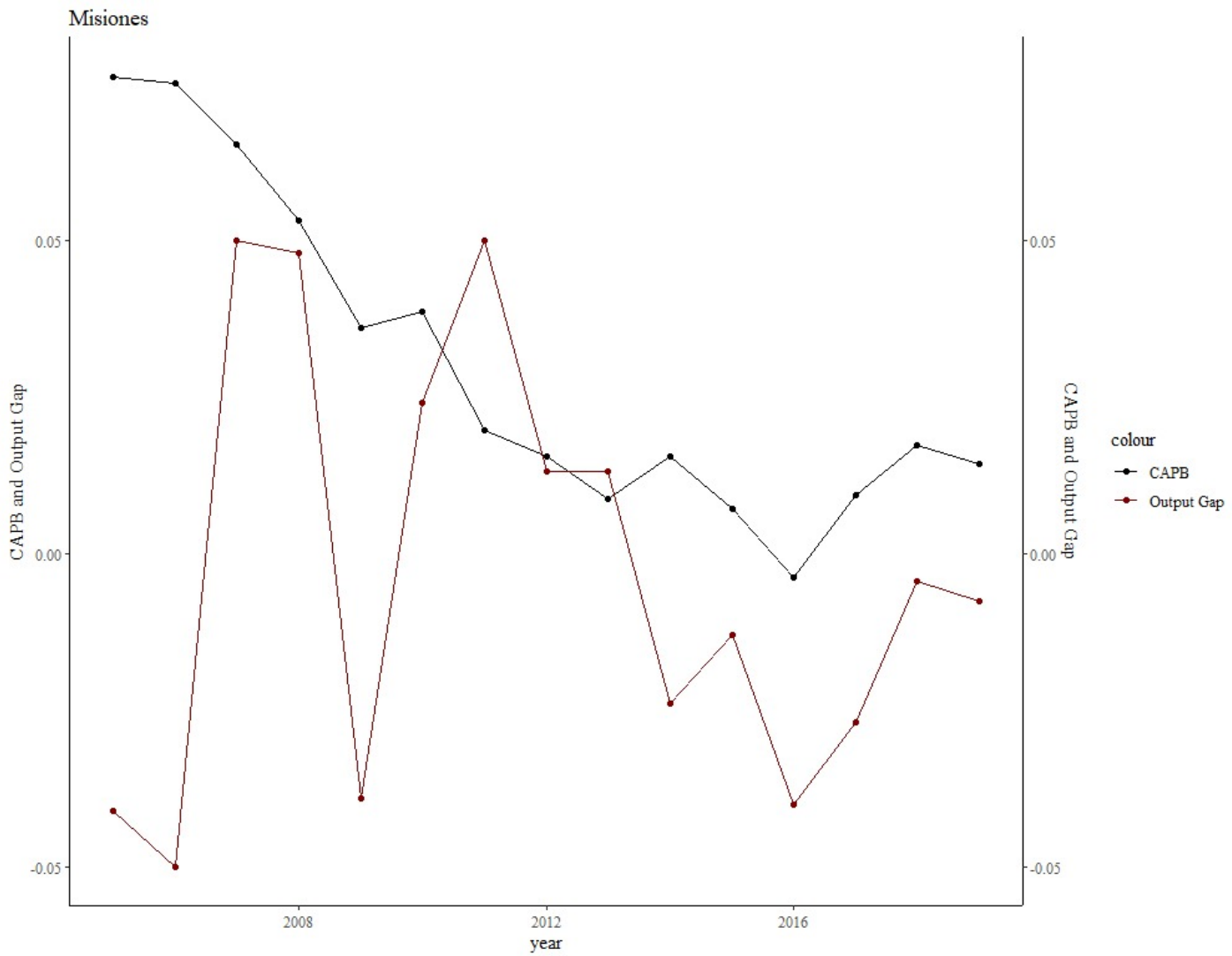
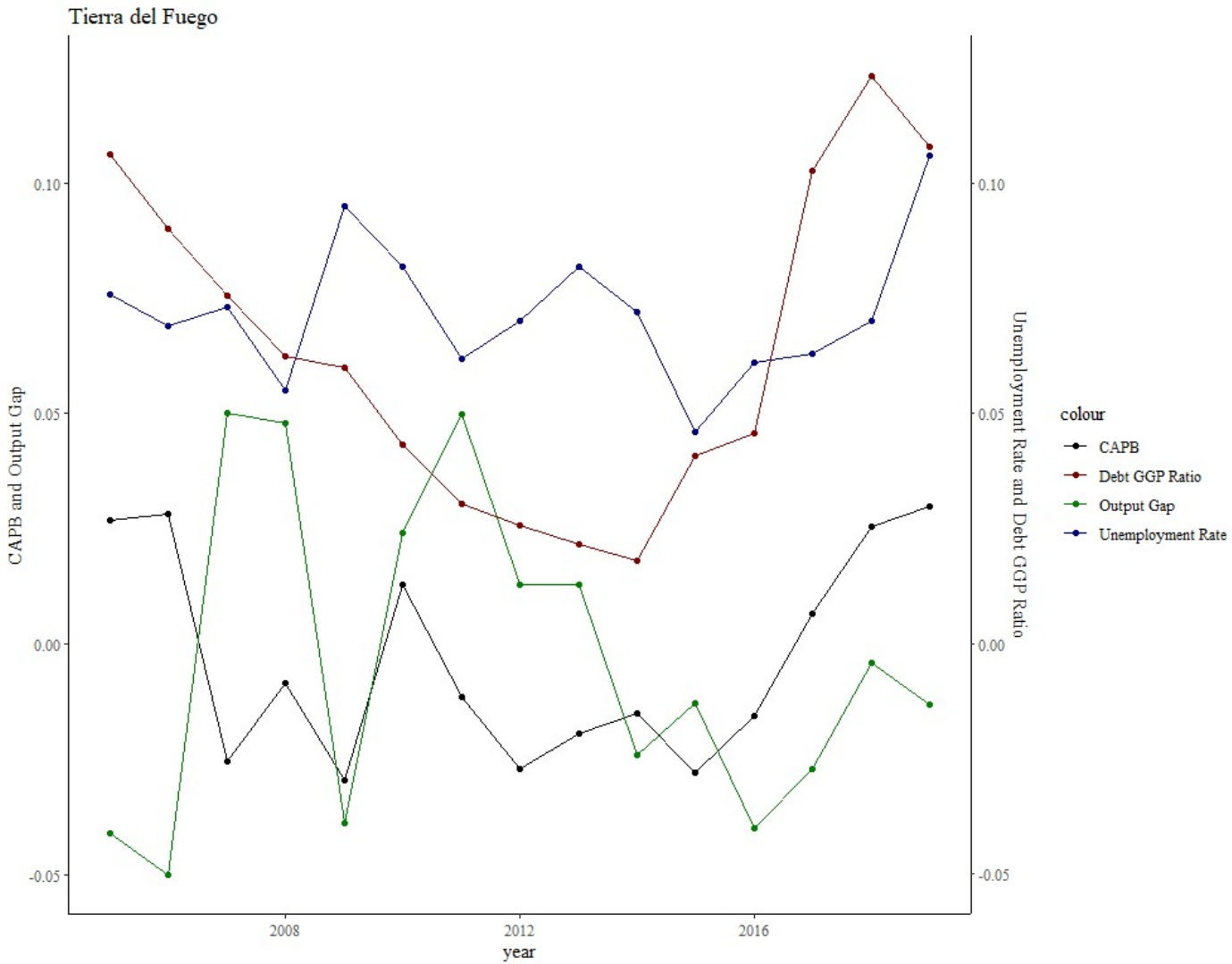
Tierra del Fuego
Tucumán
capb (black), debt ggp ratio (orange)
year

Charts (Misiones)



Charts (Tierra del Fuego)



The Extended Non-Linear Equation

$$\begin{aligned}\Delta CAPB_{i,t} = \alpha_1 + \alpha_2\, \Delta CAPB_{i,t-1} + \alpha_3\, \Delta OG_{i,t-1} \\ + \alpha_4\, F_{i,t-1} + \alpha_5\, (\Delta OG_{i,t-1}\, F_{i,t-1}) \\ + \alpha_5\, (\text{Vector of control and other dummy variables}) + \mu_{i,t}\end{aligned}$$

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Where:

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- Factor $F_{i,t-1}$ interacts with the cycle variable when dummy $F = 1$
- $(\Delta OG_{i,t-1}\, F_{i,t-1})$ stands for the Interaction Term (when $F = 0 \rightarrow IT = 0$)
- If α_5 positive, $F_{i,t-1}$ increases the effect of the cycle upon discretionary fiscal policy
- If α_5 negative, $F_{i,t-1}$ diminishes the effect of the cycle upon discretionary fiscal policy

Results

OUTPUT GAP IN DIFFERENCES AND LAGGED ONE PERIOD			
Number of instruments = 20		Number of obs = 299	
Wald chi2(8) = 126.51		Number of groups = 23	
Prob > chi2 = 0.000			
CAPB	Coef.	z	P > |z|
CAPB (t-1)	-.287**	-2.36	0.018
GGP Gap (t-1)	-.024*	-1.75	0.080
Debt to GGP ratio (t-1)	.879**	2.31	0.021
Crisis Dummy (t-1)	.005	0.58	0.559
Election Year Dummy (t)	-.009***	-2.98	0.003
Fiscal Respons. Laws (t)	-.020*	-1.67	0.095
GGP Gap Sign	-.014**	-2.23	0.026
GGP Gap Sign Interaction	-.066***	-3.24	0.001
Cons	.014**	2.42	0.015
Arellano-Bond test for AR(1) in first differences: Pr > z = 0.176			
Arellano-Bond test for AR(2) in first differences: Pr > z = 0.706			
Hansen test of overid. restrictions: Prob > chi2 = 0.237			

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

Results

UNEMPLOYMENT RATE IN DIFFERENCES AND LAGGED ONE PERIOD

Number of instruments = 20 | Number of obs = 299

Wald chi2(8) = 113.00 | Number of groups = 23

Prob > chi2 = 0.000

CAPB	Coef.	z	P > |z|
CAPB (t-1)	-.289***	-3.63	0.000
Unemp. Rate (t-1)	.965***	2.78	0.005
Debt to GGP ratio (t-1)	.038	0.48	0.630
Crisis Dummy (t-1)	-.004	-0.64	0.521
Election Year Dummy (t)	-.008***	-4.18	0.000
Fiscal Respons. Laws (t)	.007	0.99	0.323
GGP Gap Sign	-.0016	-0.48	0.630
GGP Gap Sign Interaction	-.4860	-1.51	0.132
Cons	.0031	0.84	0.402

Arellano-Bond test for AR(1) in first differences: Pr > z = 0.002

Arellano-Bond test for AR(2) in first differences: Pr > z = 0.145

Hansen test of overid. restrictions: Prob > chi2 = 0.322

$^{*}p< 0.10$, $^{**}p< 0.05$, $^{***}p< 0.01$

Conclusions from the Extended Non-Linear Fiscal Equation

- When interaction terms include output gap as the cycle variable, coefficients are negative and statistically significant, thus providing marginal support to **more pro-cyclical subnational fiscal policies**.

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- When interaction terms include output gap as the cycle variable, coefficients are negative and statistically significant, thus providing marginal support to **more pro-cyclical subnational fiscal policies**.
- The additional fall in CAPB induced by interaction terms clearly counteracts the effects of better cyclical conditions since, instead of benefitting from improvements in the fiscal balance by drawing public resources, **subnational policymakers react by not buiding up fiscal stabilization funds.**

Conclusions from the Extended Non-Linear Fiscal Equation

- The previous pro cyclical pattern of the linear model, when the unemployment rate was the cycle variable, **has not been reverted but somehow impaired**, following the marginal effects of both the interaction terms. However, the cyclical bias was mainly backed by the negative sign and relatively statistical significance of the compound interaction term´s coefficient..

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- The previous pro cyclical pattern of the linear model, when the unemployment rate was the cycle variable, **has not been reverted but somehow impaired**, following the marginal effects of both the interaction terms. However, the cyclical bias was mainly backed by the negative sign and relatively statistical significance of the compound interaction term´s coefficient..
- It is finally worth pointing out that, in terms of **stabilization properties** of subnational fiscal policy, the pro cyclical bias seems in this case to go along side with the bad performance of the debt to GGP ratio.

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