

# Fiscal Autonomy and Fiscal Sustainability

Subnational taxation and public indebtedness in contemporary Spain

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## Strands of related literature I

General approach compares polar systems: e.g. Goodspeed (2002)

Approaches without a specific role for taxation

- Enhanced preference matching: Oates (1999)
- Local needs responsiveness: Faguet (2004)
- Indirect channels of decentralization
  - ⇒ Enhanced productivity: Blanchard/Weil (2002), Weingast (2009)
  - ⇒ Reduced informality: e.g. Seabright (1996)

Focus here on different degrees of autonomy

## Strands of related literature II

More specific approaches are contradictory

Unclear

$$\text{Corr}(\text{autonomy, deficits}) < 0$$

- (a) Historical legitimacy: Rodriguez-P./Gill (2003), Baskaran (2012)
- (b) Tax competition: Tiebout (1956), Brennan/Buchanan (1981)
- (b') Intertemporal signaling: Martinez-Vazquez/McNab (2003)

$$\text{Corr}(\text{autonomy, deficits}) > 0$$

- (a) Softening of budgets: Wildasin (1997), De Mello (2000)
- (b) Burden of coordination: Tsebelis (1995), Wibbels (2000)

## Spain's regional fiscal structure

Since late 1970s, contemporary Spain consists of

- 17 autonomous communities:  
*Comunidades Autónomas*
- 7 (v. 10) communities with more legislatively recognized autonomy due to distinct historical and cultural identity:  
*Nacionalidades*
- 3 (v. 14) communities with zero fiscal power over ceded taxes:  
*Especiales*
- 2 fiscal regimes differing in taxing autonomy:  
*Régimen Foral* (2) and *Régimen Común* (15)

## Contribution of paper

- Use Spanish fiscal-institutional variation across communities by sub-sampling panels in order to identify the “nature” of fiscal autonomy that implies fiscal sustainability
- Methodologically (Trehan/Walsh, 1988; Bohn, 2005), we do
  - ⇒ Budget constraints based sustainability concept
  - ⇒ Unit Root (UR) and panel stationarity tests
- Conservative test choice (Hlouskova/Wagner, 2006)
  - ⇒ Hadri-test tending to over-reject stationarity

# Fiscal Sustainability Concept

## Sustainable budget constraints

Consider a one-period budget constraint of regional government  $i$

$$G_{i,t} + (1 + i_{i,t})D_{i,t-1} = T_{i,t} + D_{i,t},$$

where  $D_{i,t}$  – stock of debt,  $G_{i,t}$  – public expenditure w/o interest,  $T_{i,t}$  – public revenue,  $i_{i,t}$  – interest rate of region  $i$  in period  $t$ .

$$\text{Hence, } DEF_{i,t} \equiv \Delta D_{i,t} = D_{i,t} - D_{i,t-1} = G_{i,t} - T_{i,t} + i_{i,t}D_{i,t-1}$$

$$\xRightarrow{\text{real}} \Delta \left( \frac{D}{P} \right)_{i,t} = \frac{D_{i,t}}{P_{i,t}} - \frac{D_{i,t-1}}{P_{i,t-1}} = \frac{DEF_{i,t}}{P_{i,t}} - \frac{D_{i,t-1}}{P_{i,t-1}} \frac{\pi_{i,t}}{\pi_{i,t} + 1}$$

## Sustainable budget constraints

$$\Delta \left( \frac{D}{P} \right)_{i,t} = \frac{D_{i,t}}{P_{i,t}} - \frac{D_{i,t-1}}{P_{i,t-1}} = \frac{D_{i,t-1}}{P_{i,t}} + \frac{D_{i,t-1}}{P_{i,t}} \Leftrightarrow$$

$$\Delta \left( \frac{D}{P} \right)_{i,t} = \frac{DEF_{i,t}}{P_{i,t}} - \frac{D_{i,t-1}}{P_{i,t-1}} \frac{(P_{i,t} - P_{i,t-1})}{P_{i,t}}$$

At the heart of sustainability is debt rather than deficit:

$$\frac{D_{i,t}}{P_{i,t}} = \frac{DEF_{i,t}^0}{P_{i,t}} + (1 + i_{i,t}) \frac{D_{i,t-1}}{P_{i,t-1}} \frac{P_{i,t-1}}{P_{i,t}} = \frac{DEF_{i,t}^0}{P_{i,t}} + \frac{1 + i_{i,t}}{1 + \pi_{i,t}} \frac{D_{i,t-1}}{P_{i,t-1}}$$

## Sustainable budget constraints

$$\text{Let } d_{i,t} \equiv \frac{D_{i,t}}{P_{i,t}}; \quad s_{i,t} \equiv -\frac{DEF_{i,t}^0}{P_{i,t}}; \quad r_{i,t} \equiv \frac{1 + i_{i,t}}{1 + \pi_{i,t}} - 1$$

$$\Rightarrow d_{i,t}^* = \sum_{j=0}^n \frac{1}{(1 + r_i)^j} E_t[s_{i,t+j}] + \frac{1}{(1 + r_i)^n} E_t[d_{i,t+n}].$$

And in the limit, the following conditions apply

$$d_{i,t}^* = \sum_{j=0}^{\infty} \frac{1}{(1 + r_i)^j} E_t[s_{i,t+j}] \quad (\text{IBC})$$

$$+ \lim_{n \rightarrow \infty} \frac{1}{(1 + r_i)^n} E_t[d_{i,t+n}]. \quad (\text{TC})$$



# TSA Sustainability Condition

Definition (Fiscal Sustainability Condition: Trehan/Walsh, 1988)

For  $d_{i,t} \sim I(\delta)$  with  $\delta \in \{0, 1\}$ , 2 implications for  $s_{i,t}$  result

- (i) T/W-sustainability for  $\delta = 0$  if  $\Delta d_{i,t} \sim I(0)$  and  $s_{i,t} \sim I(0)$
- (ii) T/W-sustainability for  $\delta = 1$  if  $\Delta d_{i,t} \sim I(0)$  and  $s_{i,t} \sim I(1)$ .

$\Rightarrow$  (TC)  $\rightarrow$  0: sustainability.

- Test: real revenues, real spending, real debt  $\sim I(1)$  and (with-interest) real deficit  $\sim I(0)$
- Equivalent to real primary surplus and real debt  $\sim CI(1, -r)$
- Equivalent to real revenues, real non-interest spending, and real debt  $\sim CI(1, -1, -r)$

# Data

## Construction of time series

- (a) Quarterly debt series range from Q4:1994 to Q2:2013  
( $T = 75$ )  $\rightarrow N \times T = 1,275$
- (b) Annual deficit, revenue and expenditure series range from 1984 to 2011 ( $T = 28$ )  $\rightarrow N \times T = 476$
- (c) We deflate series by respective regional CPI series

### Sources:

- (a) Quarterly series – Bank of Spain
- (b) Annual series – Ministry of Finance (MINHAP)
- (c) CPI series – Spanish Federal Statistical Office

## Cross sections (I)

### Régimen Foral vs. Régimen Común



## Cross sections (II)

Historic Nationalities



## Cross sections (III)

- *Comunidades Especiales*: 3 South-Central/South-Western autonomies: **Andalusia, Castile-La Mancha, Extremadura**
  - In general, communities know three central revenue sources
    - (1) Proceeds from fees for services and proceeds from loans
    - (2) Revenues from ceded “WIGTG” taxes including the right to set rates
    - (3) 15% block grant of PIT collected in territory plus option of 15% additional share with configurational rights through tax credits (“autonomous” within-PIT rate)
- ⇒ The exceptional cases have **no** decision power over ceded taxes and can **not** grant tax credits, that is, they can **not** configure an autonomous within-PIT rate (OECD, 1999)

# Testing Strategy

## Considered tests

- Univariate time series tests
  - ADF-test,  $H_0$ : time series contains a unit root (UR)
  - KPSS-test,  $H_0$ : time series is stationary
    - both relatively weak in power
    - ADF biased towards UR
- Panel UR and stationarity tests
  - IPS-test,  $H_0$ : all time series in panel contain a UR ( $H_A$ : some...)
  - Hadri-test,  $H_0$ : all time series are stationary ( $H_A$ : some...)
    - larger sample sizes, more power
    - Hadri over-rejects stationarity (Hlouskova/Wagner, 2006)

# Findings and Interpretation

## Standard ADF, KPSS: real debt (quarterly levels)

	ADF (AIC)	ADF (BIC)	KPSS	Implication
Andalusia	-0.655	4.238	0.624**	non-stationary
Aragon	4.589	4.589	0.766***	non-stationary
Principality of Asturias	-1.996	2.846	0.724**	non-stationary
Balearic Islands	3.404	2.756	1.017***	non-stationary
Basque Country	-1.903	1.185	0.262	inconclusive
Canary Islands	1.563	1.819	0.792***	non-stationary
Cantabria	1.138	4.384	0.789***	non-stationary
Castile-La Mancha	2.987	2.987	0.874***	non-stationary
Castile and Leon	0.548	5.782	0.795***	non-stationary
Catalonia	3.741	3.741	0.885***	non-stationary
Extremadura	0.750	0.699	0.738**	non-stationary
Galicia	2.412	2.152	0.753***	non-stationary
La Rioja	-0.310	0.601	0.892***	non-stationary
Community of Madrid	2.630	2.630	1.104***	non-stationary
Murcia	-4.552***	3.758	0.635**	inconclusive
Navarre	-2.399	3.131	0.444*	non-stationary
Valencian Community	1.700	4.322	1.091***	non-stationary

## Standard ADF, KPSS: real debt (quarterly 1st diff)

	ADF (AIC)	ADF (BIC)	KPSS	Implication
Andalusia	-1.887	-3.187**	0.470**	inconclusive
Aragon	-1.226	-1.226	0.679**	non-stationary
Principality of Asturias	-2.816*	-1.736	0.420*	inconclusive
Balearic Islands	-8.987***	-8.987***	0.365**	inconclusive
Basque Country	-0.942	-5.285***	0.502**	inconclusive
Canary Islands	-3.283**	-10.666***	0.665**	inconclusive
Cantabria	0.129	0.139	0.652**	non-stationary
Castile-La Mancha	0.211	-9.411***	0.374*	inconclusive
Castile and Leon	0.087	-1.566	0.514**	non-stationary
Catalonia	-1.923	-6.457***	0.684**	inconclusive
Extremadura	-2.423	-3.117**	0.446*	inconclusive
Galicia	-1.181	-1.181	0.482**	non-stationary
La Rioja	-1.766	-2.319	0.647**	non-stationary
Community of Madrid	-1.038	-7.153***	0.364*	inconclusive
Murcia	-2.998**	-6.772***	0.656**	inconclusive
Navarre	0.337	-6.856***	0.770***	inconclusive
Valencian Community	2.186	-4.563***	0.521**	inconclusive



## Standard ADF, KPSS: real deficit (annual levels)

	ADF (AIC)	ADF (BIC)	KPSS	Implication
Andalusia	-2.178	-1.869	0.221	inconclusive
Aragon	-0.033	-0.033	0.461*	non-stationary
Principality of Asturias	-1.780	-1.780	0.231	inconclusive
Balearic Islands	0.130	0.130	0.384*	non-stationary
Basque Country	-2.343	-1.986	0.202	inconclusive
Canary Islands	-0.323	-2.228	0.474**	non-stationary
Cantabria	-1.995	-2.173	0.208	inconclusive
Castile-La Mancha	1.969	3.743	0.467**	non-stationary
Castile and Leon	-1.492	-1.492	0.390*	non-stationary
Catalonia	0.865	0.865	0.380*	non-stationary
Extremadura	-0.209	-0.209	0.313	inconclusive
Galicia	-1.976	-1.976	0.321	inconclusive
La Rioja	-0.528	-0.528	0.505**	non-stationary
Community of Madrid	-1.232	-1.224	0.340	inconclusive
Murcia	-2.784*	0.447	0.250	inconclusive
Navarre	-2.589*	-2.589*	0.140	stationary
Valencian Community	-1.711	-1.711	0.314	inconclusive

## Panel UR and stationarity tests

### (i) Real debt levels

	IPS	Hadri	Implication	First differences		
				IPS	Hadri	Implication
Total	19.532	35.149***	non-stationary	-20.955***	13.876***	inconclusive
Exceptional	7.151	12.350***	non-stationary	-6.889***	6.765***	inconclusive
Non-exceptional	17.483	32.748***	non-stationary	-18.052***	13.301***	inconclusive
Historical	11.360	25.074***	non-stationary	-13.261***	10.185***	inconclusive
Non-Historical	11.525	31.305***	non-stationary	-16.554***	6.530***	inconclusive
Foral	2.347	2.903***	non-stationary	-3.345***	5.781***	inconclusive
Non-Foral	18.540	33.002***	non-stationary	-19.500***	13.493***	inconclusive

### (ii) Real deficits

	IPS	Hadri	Implication	First differences		
				IPS	Hadri	Implication
Total	1.735	5.111***	non-stationary	-15.863***	3.587***	inconclusive
Exceptional	-0.100	1.570*	non-stationary	-3.419***	0.756	stationary
Non-exceptional	0.046	5.690***	non-stationary	-15.979***	3.825***	inconclusive
Historical	0.995	4.394***	non-stationary	-10.330***	3.129***	inconclusive
Non-Historical	-1.043	5.602***	non-stationary	-15.200***	3.161***	inconclusive
Foral	-1.827**	1.203	stationary	-5.909***	-0.258	stationary
Non-Foral	3.498	5.403***	non-stationary	-15.020***	3.666***	inconclusive

## Panel UR test results for real deficits

P-values (%), IPS tests: real deficits



## Panel stationarity test results for real deficits

P-values (%), Hadri tests: real deficits



# Conclusion

- Study makes use of asymmetries in fiscal characteristics of Spanish autonomous communities to assess fiscal sustainability at regional level for different shades of fiscal autonomy
- Only for the widely taxing-autonomous regions, Navarro and Basque Country, time series properties accord with IBC sustainability
- Negative link via taxation, not via historical legitimacy, is confirmed
- “Laboratory federalism” (Feld/Kirchgässner, 2008): *Régimen Foral* might be seen as role model and gradually extended to more Spanish communities besides Navarro and Basque Country

