

# The politics of health funding in Italy

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*Health needs and Resources: allocation and measurement issues*

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Palazzo Battiferri (Aula Rossa), Via Saffi 42

09-10 Novembre 2023

## #1 Topic

The **strategic use of resources by central governments** as a source of welfare losses, excessive government spending, and inequities.

## #2 Setting

- the **Italian multi-tier government**
- quasy-formula-based health intergovernmental grants** in the financing of subnational governments

Resource allocation are driven by:

- ▶ electoral concerns
- ▶ political influence

## # ASSUMPTIONS

- 1 Politicians are mainly self-interested office seekers that care about (re-)election instrumentally using redistributive policies to maximize their electoral results
- 2 Voters are primarily interested in their private consumption derived from public policy investments

Empirical analyses at one level of government with symmetrically and spatially organized parties:

- 1 Nordhaus (1975) and Lindbeck (1976) - Opportunistic political business cycles: incumbents manipulate the economy before elections to maximize their probability of re-election, taking advantage of the asymmetry of information, to appear as competent as possible.
- 2 Dixit & Londregan (1996, 1998) and Porto & Sanguinetti (2001): political support for the central government can be rewarded by higher transfers.

## Model

how outcome-contingent **transfers are targeted?**

- ▶ Tactical redistribution under budget constraint:
  - ▶ Cox & McCubbins (1986) **core voter model** i.e. supporters with strong party attachment
  - ▶ Lindbeck & Weibull (1987) **swing voter model**, voters likely to switch their votes on the basis of benefits received (incumbents will invest resources in districts until reaching the specific point where swing voters decide to vote for them. Empirical studies have concerned an array of countries)
- ▶ Many studies on distributive politics, with mixed empirical evidence
- ▶ Arulampalam et al. (2009): political agency model where the **opportunistic support hypothesis** interacts with the **swing voter's mechanism**: A state that is both swing and aligned with the center is more likely to get higher transfers.

we integrate two strands of the literature on **transfers to sub-national government**:

- ▶ **partisan alignment**: the incumbent parties at the central gov. target the aligned sub-national gov.
- ▶ **swing subnational jurisdiction**: central Government targets swing subnational jurisdictions

we account a 3th strands of the literature

- ▶ **Fragmentation approach**: we hypothesize that fragmentation interacts with the effect of alignment.

The novelty of the approach is the **Alignment Fragmented Premium**

- ▶ a multi-tier government
- ▶ alignment
- ▶ fragmentation of the aligned regions
  - ▶ effective number of parties
  - ▶ effective number of opposition parties
- ▶ quasi- formula based resources allocation

We create an Index of fragmentation based on (Golosov, 2010):

Effective Number of Parties according to ?

$$ENP_{Gol} = \sum_1^x \frac{s_i}{s_i + (s_1^2) - s_i^2} \quad (1)$$

- ▶ better “accounts the relative sizes of parties”
- ▶ better discriminate between concentrated and fragmented coalitions,
- ▶ (partly) overcome the inherent problems of the low variability of other fragmentation indices with fixed effects estimators



## Relevant Variables

### POLITICAL TIMING

- ▶ Worthington & Dollery, (1998). Baleiras & da Silva Costa (2004), Drazen & Eslava (2005) and Mouriuén (1989):
  - ▶ Before elections, incumbents exploit information asymmetry by manipulating economic policy instruments to appear as competent as possible.
  - ▶ Resources diverted to **state politicians** in a **local** election year are more productive due to increased political awareness, but,
  - ▶ when **central** elections approach, there are direct political benefits from centralized spending, so grants should decrease

## Relevant Variables

### political strength and bargaining power of the agents

- ▶ Roubini & Sachs (1989), Roubini et al.(1989), Grilli et al.(1991), Edin & Ohlsson (1991)
  - ▶ durability (stability as measured by the length of tenure),
  - ▶ minority status
  - ▶ multiplicity of governing parties
  - ▶ coalitions (Perotti & Kontopoulos (2002).The multitude of parties and candidates running in the elections determines a high level of **political fragmentation** which ends up into coalitions formation affected by the common pool problem. ). A central weakness is that it disregards:
    - ▶ the other side of the bargaining game, i.e., the opposition
    - ▶ the subnational-jurisdiction

## Literature: shortcoming..

A central weakness of the previous literature is that it ignores:

- ▶ the other side of the bargaining game, i.e., the opposition
- ▶ the subnational-jurisdiction
- ▶ government tenure
- ▶ misinterpretation of ex-post and ex-ante indicators of government life i.e., executive cabinets may use the vote of confidence as a signal of an incoming election, expanding the budget to increase the stability (Padovano & Venturi (2001))

## Literature: shortcoming..

A central weakness of the previous literature:

- ▶ the dependent variable concerns discretionary expenditures. Besley & Coate (2003) **even when spending is allocated formulaically**, it is possible for legislators to manipulate such formulas to favor their own districts.
  - ▶ Sorribas-Navarro (2011) in Spain
  - ▶ Litschig (2012) in Brazil
  - ▶ Banful (2011) in Ghana

## ITALY Health care system

### The funding of the Italian National Health Service:

- ▶ regions are involved in the provision of health services
- ▶ the central government retains a financing and regulatory role:
  - ▶ defines the total amount of public resources assigned to the NHS,
  - ▶ determines the size of the National Health Fund financed with various taxes applied at both regional and national level, pooled at the national level and redistributed to regions.
  - ▶ additional resources are allocated to the regions, assessed *ex ante* on the basis of a formula that basically equalizes per capita health financing across regions, with some adjustments being made (..for the interregional mobility of patients, the age structure of the population and the age-specific utilization rates for hospital care, drugs and residential care for the aged, plus the standardized mortality rate (SMR) as a proxy for need).

## ITALY Health care system

The INHS: the allocation of the national funds:

- ▶ are given by formula
- ▶ the total funding from central government is predetermined,
- ▶ ... but the allocation of the national funds to each region DOES NOT follow automatically and a good deal of political negotiation is involved:
  - ▶ partly because the weighted capitation formula changes from year to year after negotiations among the regions and the center
  - ▶ partly because the formula itself allows some room in interpreting

## ITALY Govn. & electoral rules

- ▶ Italy is a unitary parliamentary republic with a regional electoral system
- ▶ Italian Regional Govnt :
  - ▶ a council, with legislative powers,
  - ▶ an executive committee and its President
  - ▶ a mixed electoral- system (proportional with a majority bonus at central level) :
    - ▶ 4/5 of regional council members are elected by a proportional system,
    - ▶ 1/5 are elected by a majoritarian system from a regional list (called the *listino*).

## ITALY Govn. & electoral rules

### The regional electoral system

- ▶ Each regional list is headed by a leading member who is the coalition's candidate for the presidency of the regional council.
- ▶ The leading member is elected directly by the voters, so that his or her resignation leads to early elections.
- ▶ The regional presidents appoint the members of the executive committee, who can also be outside the regional council

### Multiple parties & bipolarization of the system is due to:

- ▶ the plurality system for the election of the President,
- ▶ the majority premium assigned to the coalition supporting the winning presidential candidate



## The empirical analysis:

The empirical analysis: newly and specifically assembled panel dataset

- ▶ annual observations of Italy's Ordinary Statute Regions, OSRs
- ▶ for the period 2001 to 2011.

## The empirical model

### Baseline model

$$\log(F_{it+1}^{PC}) = ENP_{it} + \sum_{p=1}^P C_{pit}^{\text{Political}} + \sum_{s=1}^S \log(C_{sit}^{\text{Structural}}) + \sum_{t=1}^{10} \delta_t + u_{it} \quad (2)$$

Effective Number of Parties according to ?

$$ENP_{Gol} = \sum_1^x \frac{s_i}{s_i + (s_1^2) - s_i^2} \quad (3)$$

## The empirical model

### Baseline model

$$\log(F_{it+1}^{PC}) = ENP_{it} + \sum_{p=1}^P C_{pit}^{\text{Political}} + \sum_{s=1}^S \log(C_{sit}^{\text{Structural}}) + \sum_{t=1}^{10} \delta_t + u_{it} \quad (2)$$

### Effective Number of Parties according to ?

$$ENP_{Gol} = \sum_1^x \frac{s_i}{s_i + (s_1^2) - s_i^2} \quad (3)$$

Dependent Variable <b>RF</b>	Regional real health care cash-basis grants in real <i>per capita</i> terms	
<b>Independent variables</b>		<b>expected sign</b>
REN <sub>Gol</sub> <sup>Maj</sup>	Effective number of parties in the regional majority, as in Golosov (2010)'s formulation in terms of seats detained by each party in a coalition.	+
REN <sub>Gol</sub> <sup>Opp</sup>	Effective number of parties outside the majority, formulated as above	-
GVT_ENF <sub>Gol</sub> <sup>Maj</sup>	Effective number of parties supporting the central government at the Senate, formulated as in Golosov (2010).	
SAME	Dummy variable equals to 1 in regions and years where the coalitions supporting the regional and national governments are the same (0 otherwise). It captures the alignment effect.	+
TENURE	Number of year in office of a regional President.	+
ELR	Dummy variable equals to 1 if, in a region, there are elections in the second half of year $t$ or in the first half of the year $t + 1$ (zero otherwise).	+
<b>Political control variables</b>		
SWING	Dummy variable equals to 1 if there was at least one change in the political color of the regional government in the last 15 years (and zero otherwise).	+
ADJDEF	Cyclically adjusted structural deficit of public administrations at the national level.	-
<b>Structural control variable</b>		
RGDP	Regional Gross Domestic Product in real <i>per capita</i> terms.	
RHCE	Regional real public <i>per capita</i> health care expenditure at time $t-1$ .	
RU <sub>15</sub>	Regional percentage of unemployed people older than 15.	
RP <sub>75</sub>	Regional percentage of population older than 75.	
RPOP	Regional population in absolute values.	

## Pooled-OLS results

	Mod(1) Coef./se	Mod(2) Coef./se	Mod(3) Coef./se	Mod(4) Coef./se
REN <sub>Gol</sub> <sup>Maj</sup>	.013*** .004	.014*** .005	.007* .004	.015*** .005
REN <sub>Gol</sub> <sup>Opp</sup>		.016* .010		
SAME	.033** .015	.026* .015	.014 .012	.031** .014
ELR				.018 .017
TENURE	.001 .003	.001 .003	.007*** .002	.002 .002
SWING			.126*** .015	.083*** .030
Macro-area dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No
Region-specific trend	No	No	No	Yes
R-Square	.94	.94	.95	.99
No. of cases	150	150	150	150

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

## Pooled-OLS results

	Mod(1) Coef./se	Mod(2) Coef./se	Mod(3) Coef./se	Mod(4) Coef./se
RU <sub>15</sub>	.016*** .002	.015*** .002	.015*** .002	.010*** .002
log(RGDP)	-1.022*** .066	-1.007*** .061	-1.070*** .064	-.942*** .118
RP <sub>75</sub>	.077*** .007	.077*** .007	.094*** .007	.075*** .013
log(RHCE)	.180 .135	.115 .146	-.064 .129	.081 .138
log(RPOP)	-.034*** .007	-.034*** .007	-.026*** .007	-.042*** .013
ADJDEF	-.022*** .005	-.010 .008	-.014*** .003	-.008 .012
Constant	15.429*** .686	15.725*** .782	17.365*** .728	14.691*** 1.188
Macro-area dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	No
Region-specific trend	No	No	No	Yes
R-Square	.94	.94	.95	.99
No. of cases	150	150	150	150

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

## Fixed Effect estimates

	Mod(5) Coef./se	Mod(6) Coef./se	Mod(7) Coef./se	Mod(8) Coef./se	Mod(9) Coef./se	Mod(10) Coef./se
REN <sup>Maj</sup> <sub>Gol</sub>	.013*** .004	.011** .005	.007** .003	.006* .004	.006* .003	.004 .004
REN <sup>Opp</sup> <sub>Gol</sub>	.001 .015	-.022* .013			-.012 .012	-.028*** .009
SAME	.017 .014	.019 .013	.018 .013	.010 .013	.018 .013	.014 .013
ELR	.029** .014		.026** .010		.028** .011	
TENURE	.004* .002	.008*** .002	.004** .002	.006*** .002	.005** .002	.007*** .002
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
Region-specific trend	Yes	No	Yes	No	Yes	No
Year dummies	No	Yes	No	Yes	No	Yes
Autoregressive AR(1) $\rho$	.31	–	.26	–	.26	
R-Square	.99	.96	.99	.97	.99	.97
No. of cases	150	150	150	150	150	150

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

## Fixed Effect estimates

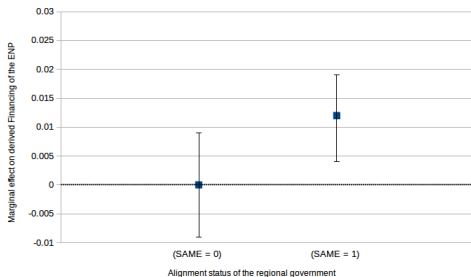
	Mod(5)	Mod(6)	Mod(7)	Mod(8)	Mod(9)	Mod(10)
RU <sub>15</sub>			.004**	.008***	.005**	.010***
			.002	.002	.002	.002
ln(RGDP)			.246	.703**	.300	.790**
			.203	.358	.209	.346
P75			-.012	-.039	-.007	-.027
			.031	.049	.032	.048
log(RHCE)			.003	-.157	.001	-.157
			.147	.188	.145	.158
log(RPOP)			1.263	.941	1.308*	.970
			.776	.882	.783	.888
ADJDEF			-.016**	-.003	-.017**	-.023**
			.007	.010	.007	.011
Constant	4.805***	6.884***	-16.675	-13.098	-17.812	-14.482
	.185	.046	11.870	15.710	12.000	15.634
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
Region-specific trend	Yes	No	Yes	No	Yes	No
Year dummies	No	Yes	No	Yes	No	Yes
Autoregressive AR(1) $\rho$	.31	-	.26	-	.26	
R-Square	.99	.96	.99	.97	.99	.97
No. of cases	150	150	150	150	150	150

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.



## Interaction model: Fragmentation X Alignment

$$\widehat{ME}_{REN P} = \frac{\partial \log(F)}{\partial REN P_{Gol}^{Maj}} = \begin{cases} \widehat{\beta}_{REN P_{Gol}^{Maj}} & \text{for SAME} = 0 \\ \widehat{\beta}_{REN P_{Gol}^{Maj}} + \widehat{\beta}_{Interaction} & \text{for SAME} = 1 \end{cases} \quad (4)$$

Figure: Interaction between  $REN P^{Maj}$  and SAME.

## Empirical model: Interaction btw fragmentation and alignment 2

**Table:** Marginal Effects of the ENP conditioned on the “alignment effect” (variable SAME)

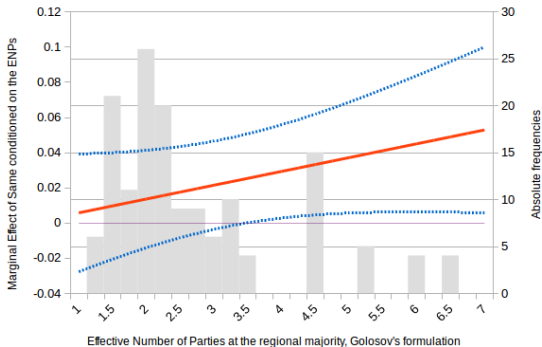
Model	$\hat{ME}$	(St. Err.)	p-value	95% confidence interval	
I3					
(SAME = 0)	-.000	.005	0.97	-.009	.009
(SAME = 1)	.012***	.004	0.00	.004	.019
I4					
(SAME = 0)	.004	.004	0.35	-.004	.011
(SAME = 1)	.011**	.005	0.02	.020	
I5					
(SAME = 0)	.002	.005	0.72	-.007	.010
(SAME = 1)	.014***	.004	0.00	.006	.022
I6					
(SAME = 0)	.004	.004	0.25	-.003	.011
(SAME = 1)	.012***	.005	0.01	.002	.021

MEs refer to Model presented in Table ???. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

† Only variable  $RU_{15}$  included as control.

## Empirical model: Interaction btw fragmentation and alignment 2

$$\widehat{ME}_{RENP} = \frac{\partial \log(F)}{\partial RENP_{Gol}^{Maj}} = \begin{cases} \widehat{\beta}_{RENP} + \widehat{\beta}_{GVT\_ENP \times RENP} \times GVT\_ENP^{Maj} & \text{for SAME} = 0 \\ \widehat{\beta}_{RENP} + (\widehat{\beta}_{GVT\_ENP \times RENP} + \widehat{\beta}_{Interaction}) \times GVT\_ENP^{Maj} & \text{for SAME} = 1 \end{cases}$$

Figure: Marginal Effect of the variable SAME conditioned on  $RENP^{Maj}$ .

## Interaction model: Fragmentation X Alignment

	I3	I4	I5	I6	I7
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
REN <sub>Gol</sub> <sup>Maj</sup>	-.000	.003	.002	.004	.003
	.005	.004	.004	.004	.015
SAME	-.015	-.002	-.020	-.002	.159**
	.022	.021	.025	.022	.065
GVT_ENP <sub>Gol</sub> <sup>Maj</sup>					.578***
					.091
REN <sub>Gol</sub> <sup>Maj</sup> × SAME	.012**	.008	.012**	.008	-.039**
	.005	.005	.006	.006	.019
GVT_ENP <sub>Gol</sub> <sup>Maj</sup> × SAME					-.090***
					.032
REN <sub>Gol</sub> <sup>Maj</sup> × GVT_ENP <sub>Gol</sub> <sup>Maj</sup>					.000
					.005
REN <sub>Gol</sub> <sup>Maj</sup> × GVT_ENP <sub>Gol</sub> <sup>Maj</sup> × SAME					.027***
					.010
REN <sub>Gol</sub> <sup>Opp</sup>	-.028***	-.012			
	.009	.012			

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

† Only variable RU<sub>15</sub> included as control.

## Interaction model: Fragmentation X Alignment

	I3	I4	I5	I6	I7
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
TENURE	.007***	.005**	.006***	.004**	.007***
	.002	.002	.002	.002	
ELR		.028***		.027***	
		.011		.010	
Constant	-15.788	-18.826	-14.490	-17.698	
	15.464	12.014	15.482	11.823	
Regional dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	No	Yes	No	Yes
Control variables	Yes	Yes	Yes	Yes	Yes <sup>†</sup>
Region-specific Trend	No	Yes	No	Yes	Yes
Autoregressive AR(1) $\rho$	-	.27	-	.29	-
R-Square	.97	.99	.97	.99	
No. of cases	150	150	150	150	150

The dependent variable is the *per capita* level of derived financing (expressed in logarithmic terms). The estimation method is fixed effects with panel corrected standard errors reported below the coefficients. Asterisks indicate significance level at the 10% (\*), 5% (\*\*), 1% (\*\*\*) percent level.

<sup>†</sup> Only variable RU<sub>15</sub> included as control.

## Conclusions

we empirically found that

- ▶ is the fragmentation of the aligned receiving government that affect the final amount of resources rather than alignment itself.
- ▶ The estimation of interaction terms confirms that formulas do not suspend the arbitrariness that allows politically motivated targeting.

## Conclusions

GRAZIE