Council Size Effects in Italian Municipalities: a Natural Experiment

Paolo Bianchi

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MOTIVATIONS

1. Early discussion on the size of legislatures contained in the 'Federalist Papers'
2. Nowadays the discussion is open in US, UK, Australian territories, and, of course, in Italy.
3. The extent of academic interest is large.
4. Common sense: large legislatures $\Longrightarrow$ large government spending.
5. In the early 80's formalization of the intuition.
6. Bulk of empirical literature find evidence of positive relation.
7. Recent theoretical developments and empirical studies suggest the impact can be negative.
8. Impact of legislature size on government size is an open question.

MOTIVATIONS

1. I study the causal effect of council size on government size.
2. Exogenous source of variation: a population based rule for Italian municipality councils.
3. Both between and within identification is feasible. I compare the results of the two approaches.
4. Also, I perform analysis of disaggregated expenditures data, to improve understanding of the phenomenon.

Outline of the presentation

1. Review of the Literature
2. Institutional Details and Data
3. Evaluation Approach and Results
   - Regression Discontinuity
   - Panel Data
   - Disaggregated expenditure regressions
4. Conclusions

Review of the Literature

1. "Common pool" arguments: Weingast, Shepsle and Johnsen (1981) formalize the idea.
2. Supportive empirical studies: Bradbury and Crain (2001) and Perotti and Kontopoulos (2002); Gilligan and Matsusaka (1995,2001); Baqir (2002); Fiorino and Ricciuti (2007)
3. Primo and Snyder (2008) develop a model where the causal effect can be zero or even negative.
4. Supportive empirical studies: Petterson-Lidbom (2008).

Review of the Literature

1. Political institutions shaping economic policies
   - Electoral rules: Persson and Tabellini (1999), Lizzeri and Persico (2001) and Millesi-Ferretti et al. (2002).
   - Parliamentary versus presidential in Persson and Tabellini (2000, 2003 and 2004)
2. Population based rules for Municipalities: Petterson-Lidbom (2008); Bordignon and Tabellini (2008) and Gagliarducci and Nannicini (2008). Some paper on Brazilian municipalities.
3. More on Italian data: Fiorino and Ricciuti (2007)

Institutional Details and Data
Italian Local Governments

1. In 2006, 8101 municipalities (*Comuni*) in Italy.
2. The duties of the municipalities includes provision of social services, primary education, economic development and planning land use.
3. Each municipality has a mayor (*Sindaco*), a cabinet (*Giunta*), and a municipality council (*Consiglio Comunale*).
4. A national law prescribes the number of council members, on a (census) population based rule.
5. Every 10 years, ISTAT carries out the census; the last two in 1991 and 2001.

2001 census figures were officially released in March 2003.

From 2003, newly elected municipality council had its size determined by the 2001 census population.

Most of the municipalities kept their council size unchanged while others were **forced by law** to increase or decrease the number of elected councilors.

The council size law is displayed in Table 1.

Institutional Details and Data

Table 1: Council-size law for Italian Local Governments

Population size	Number of council members (including the mayor)
0-3.000	13
3.001-10.000	17
10.001-30.000	21
30.001-100.000	31
100.001-250.000	41
250.001-500.000	47
500.001-1.000.000	51
1.000.001-	61

Institutional Details and Data
Data

Two measures of the size of local government:

1. the current expenditures per capita,
2. tax and tariffs revenues per capita

Municipalities' balance sheets available at the Italian Ministry of Internal Affairs website; from 1998 to 2006; also disaggregated.

Population censuses data and the end-of-the-year population are available at ISTAT

The proportion of people under 15 and above 65 years of age are elaborations from ISTAT.

Institutional Details and Data
Data - 2

Legislatures characteristics: archive of local and regional elected administrators (*Anagrafe Amministratori Locali e Regionali*)

Usually the information includes:

1. the date of election, size of cabinet, size of council etc.
2. information at individual level on date of birth, gender, position, education, profession, electoral list, electoral list position, etc.

Some information provided on a voluntary base.

In the between analysis the selection is led by cross-validation methods.

Important for within analysis: two divergent requirements in selecting the municipalities for the empirical analysis:

1. decent statistical power and to appeal to asymptotic inference: include a sufficiently large number of observations crossing the threshold;
2. it is crucial to compare the treated group with a good control; restrict sample.

Institutional Details and Data
Sample Selection - 2

The Italian law allows for 7 thresholds of the population sizes.

Within analysis: I choose to restrict the population interval around each of the discontinuity points to a $\pm$ 5% interval.

Table 2 reports the number of municipalities crossing the thresholds:

Institutional Details and Data

Table 2: number of localities within a $\pm 5\%$ interval from thresholds in 2001 and law induced changes in council size (within 2006)

Threshold	below	above	from above to below	from below to above
3,001	82	135	23	51
10,001	40	69	5	38
30,001	10	18	1	8
100,001	4	2	1	0
250,001	0	1	0	0
500,001	0	0	0	0
1,000,001	0	1	0	0

Institutional Details and Data
Sample Selection - 3

1. Wider interval around the threshold;
   - increase the number of observations crossing the threshold;
   - lower matching quality between the 'treated' and the control group.
2. from Table 2, very few observations near higher thresholds;
3. perform the analysis on the first three population thresholds;
4. check the robustness of the results to different interval width.

Evaluation Approach and Results

1. Regression Discontinuity - between approach
2. Panel Data - within approach

Between approach

Pool together the observations over time of all the municipalities

The identification obtains from the discontinuity between regression functions at the cutoff point, LP_k^c.

$$\tau_{RDD,k} = \lim_{LP \to LP_k^{c(+)}} E[Y|LP = LP_k^c, X] - \lim_{LP \to LP_k^{c(-)}} E[Y|LP = LP_k^c, X]$$

the following model is estimated separately for each interval:

$$Y_{kit} = \gamma_0^k + \gamma^k(\widetilde{LP}_{kit}) + I_{kit}(\delta_0^k + \delta^k(\widetilde{LP}_{kit})) + \zeta_{kit} \quad (1)$$

Where $\gamma^k(\widetilde{LP}_{kit})$ and $\delta^k(\widetilde{LP}_{kit})$ are polynomial functions,I_{kit} is the indicator function for $LP_k it \geq LP_k^c$.

$\tau_{RDD,k}$ is estimated by the coefficient δ_0^k, $k \in 1, 2, 3$.

Table 3: Results from regression discontinuity - council size effect

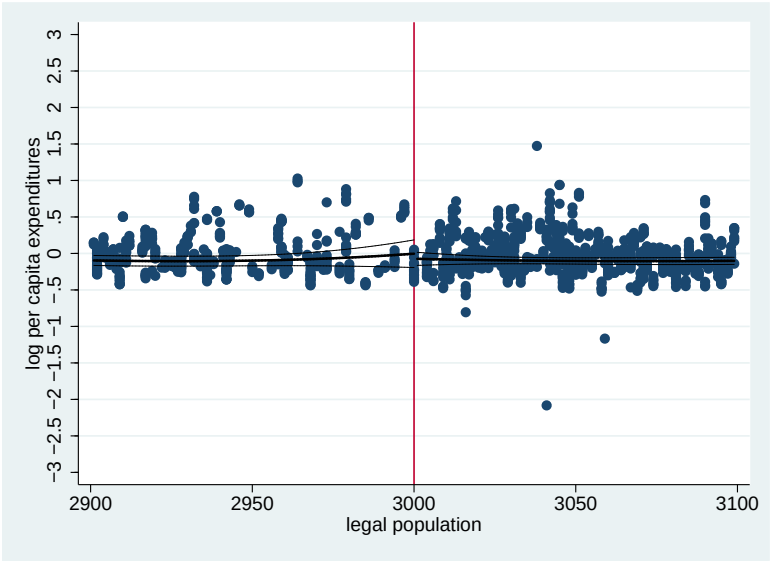
	log(spending per capita)			log(revenues per capita)		
Threshold	3,001	10,001	30,001	3,001	10,001	30,001
$\hat{\delta}_0^k \equiv \hat{\tau}_{RDD}$	-0.0736	0.130	0.252	-0.280*	0.0257	0.298
	(0.107)	(0.0867)	(0.170)	(0.147)	(0.133)	(0.268)
bw	300	1100	4500	450	1500	4500
Observations	3651	2697	756	5272	2627	718

Notes: the effects are relative to an increase of 4 council members for the 3,001 and 10,001 thresholds, while it is relative to an increase of 10 council members for the 30,001 threshold. Estimation method: split polynomial approximation on an interval around the threshold. *bw*: optimal symmetric bandwidths are chosen with cross-validation methods. Clustered standard errors at the local government level in parentheses.

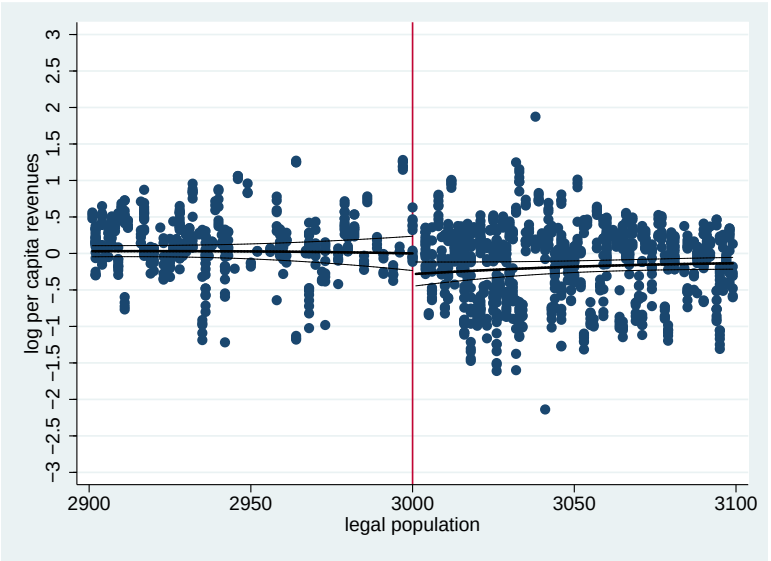
Graph: 3,001 threshold

FIGURE: Local government size around the threshold

expenditures



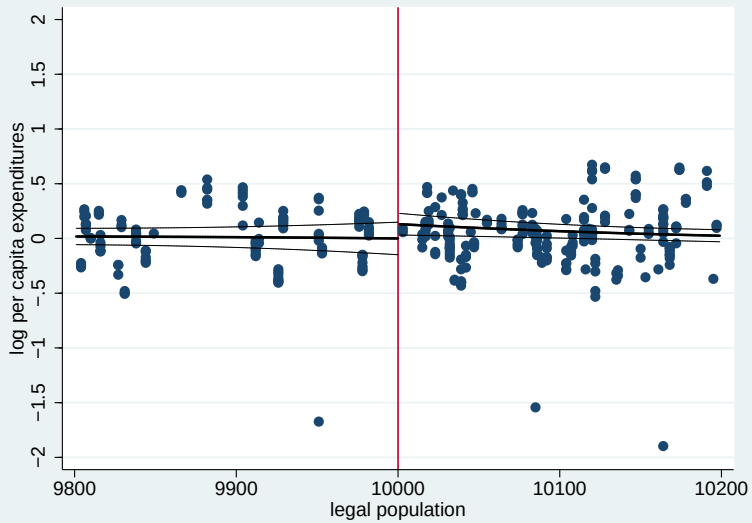
revenues



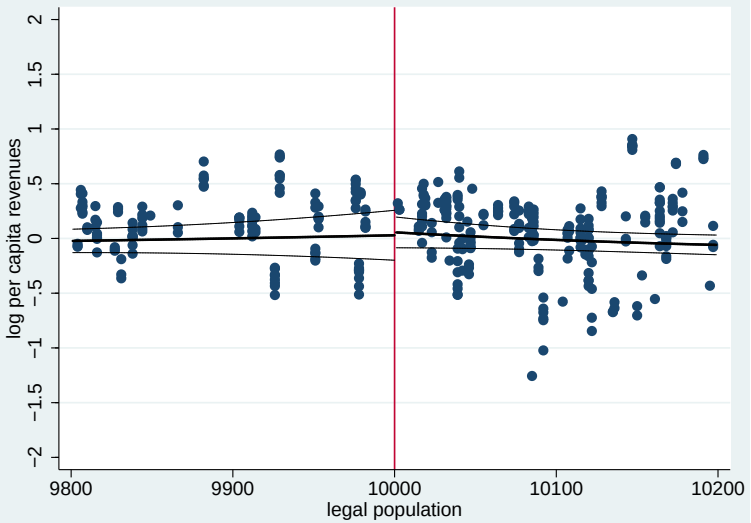
Graph: 10,001 threshold

FIGURE: Local government size around the threshold

expenditures



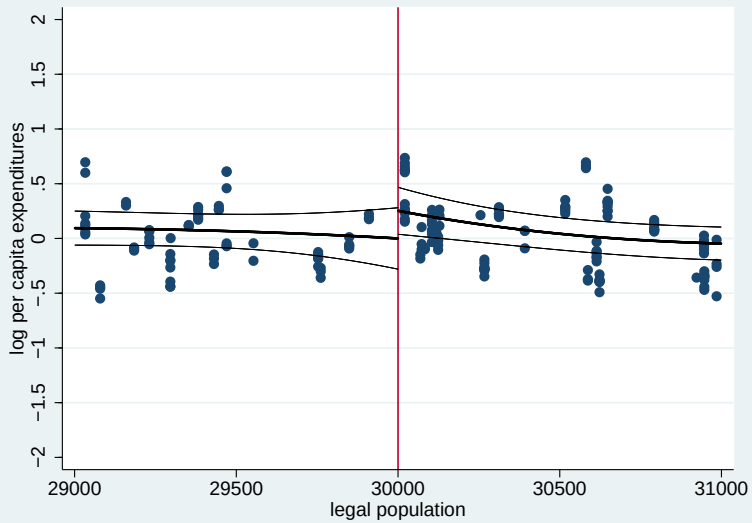
revenues



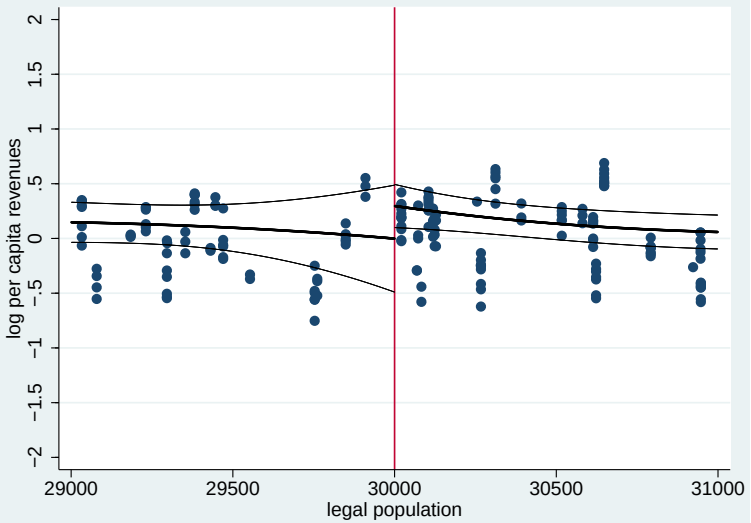
Graph: 30,001 threshold

FIGURE: Local government size around the threshold

expenditures



revenues



Within approach

Considering the selection described previously, the data form a panel of around 300 observations and of 6 years (from 2001 to 2006). First three year used in falsification test.

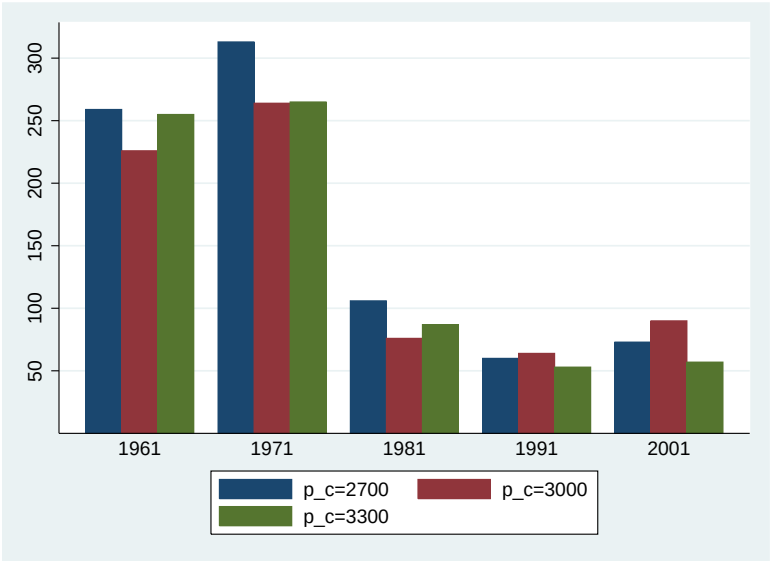
The main assumption: the variation in the census population is exogenous (with respect to unobserved determinants of the local government size).

Information in the variation *within* the municipalities to estimate the desired causal effect.

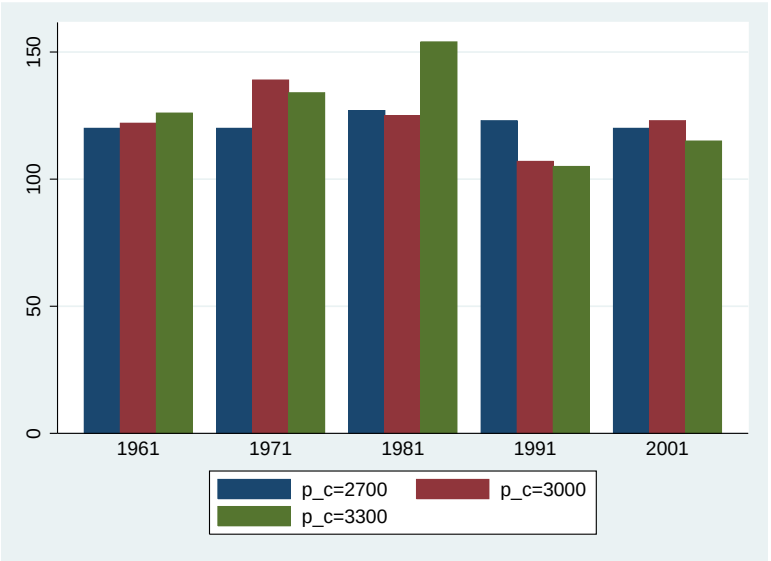
Graph: 3,001 threshold

Figure: Number of municipalities whose legal population crossed the threshold $\pm$ 10%

from above to below



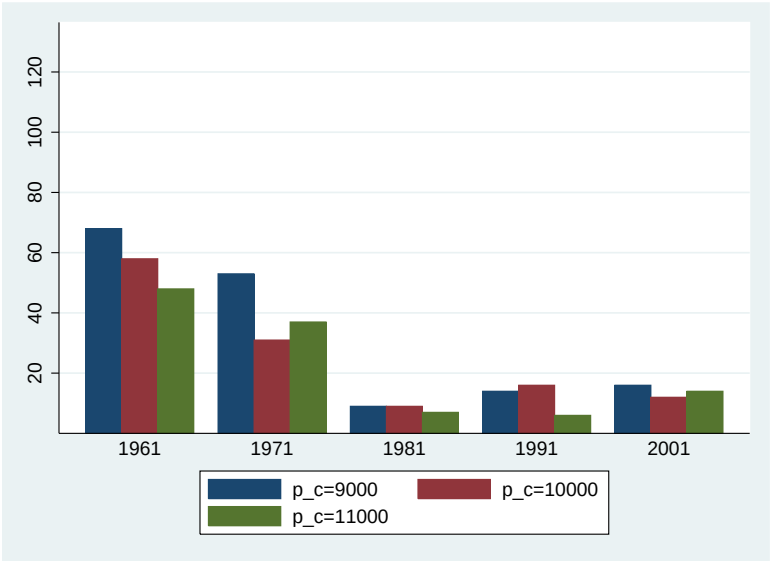
from below to above



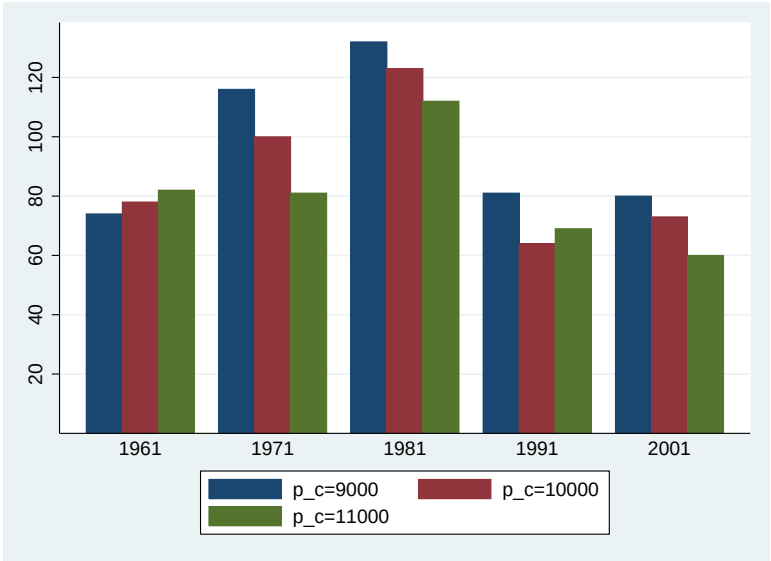
Graph: 10,001 threshold

Figure: Number of municipalities whose legal population crossed the threshold $\pm$ 10%

from above to below



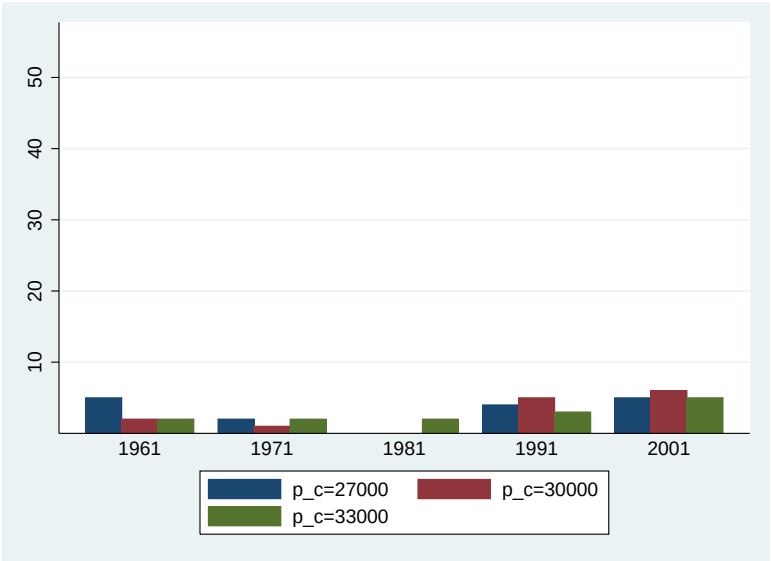
from below to above



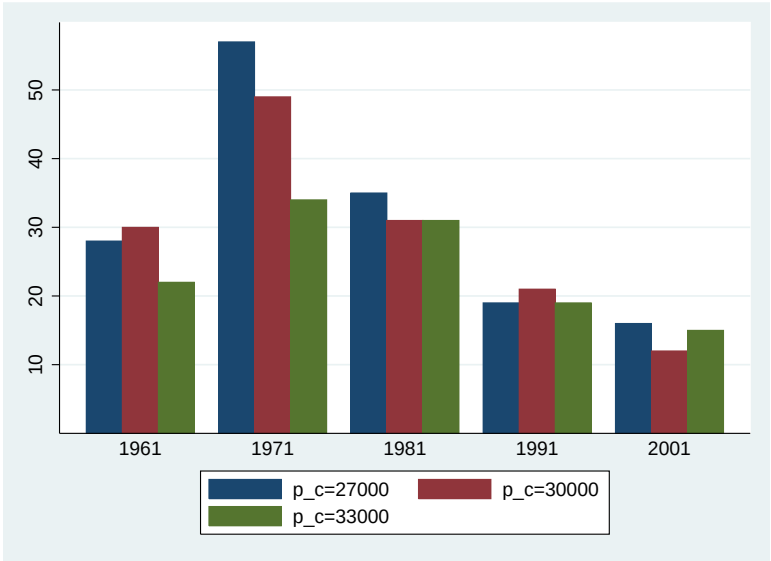
Graph: 30,001 threshold

Figure: Number of municipalities whose legal population crossed the threshold $\pm$ 10%

from above to below



from below to above



The econometric model is defined as

$$y_{it} = \alpha \cdot CouncilSize_{it-1} + x'_{it}\beta + \psi_t + \phi_i + \varepsilon_{it}. \quad (2)$$

Where the dependent variable is either the log of per capita current expenditures or the log of the current expenditures as a share of income.

The variable *CouncilSize* assumes value in { 13, 17, 21 and 31}, depending on the Legal Population.

Including fixed and year effects allows the interpretation of α as the average causal effect.

Law induces a council-size change in combination with the first election following the official publication of Census data.

Lagged timing of the legislature's variables.

Other time-varying control variables: demographic structure.

Table 4: Influence of the number of council members on expenditures and revenues.

	log(current expenditures per capita)			log(tax/tariffs revenues per capita)		
	(1)	(2)	(3)	(4)	(5)	(6)
$CouncSize_{i,t-1}$	-0.00595***	-0.00304	-0.00441*	-0.00285	-0.00109	-0.00173
	(0.00205)	(0.00195)	(0.00226)	(0.00402)	(0.00392)	(0.00346)
$electionyear_{i,t}$	-0.00849	-0.00853	-0.00199	-0.00682	-0.00745	-0.00202
	(0.00710)	(0.00714)	(0.00815)	(0.0108)	(0.0109)	(0.0105)
$\log(populationunder15)_{t-1}$	-0.0464	0.00976	0.0280	-0.0894	-0.0555	0.00283
	(0.0441)	(0.0374)	(0.0397)	(0.0746)	(0.0698)	(0.0689)
$\log(populationover65)_{t-1}$	-0.0636*	-0.0562	-0.0418	-0.0882	-0.0780	-0.0647
	(0.0376)	(0.0376)	(0.0405)	(0.0551)	(0.0508)	(0.0534)
$\log(population_{i,t-1})$		-1.199***			-0.921***	
		(0.232)			(0.264)	
$\log(population)^2_{i,t-1}$		-0.308***			-0.305***	
		(0.104)			(0.109)	
Region $\times$ Year effect [prob $\leq$ F]			[0.00]			[0.00]
Observations	1928	1928	1917	1952	1952	1941
Number of municipalities	325	325	325	329	329	329

Table 5: Robustness checks, education and political cycle.

	log(curr. expenditures p.c.)		log(tax/tariffs revenues p.c.)	
	(1)	(2)	(3)	(4)
$CouncSize_{i,t-1}$	-0.00465**	-0.00575***	-0.00196	-0.00341
	(0.00226)	(0.00210)	(0.00388)	(0.00408)
$electionyear_{i,t}$	-0.00595	-0.00963	-0.00733	-0.00724
	(0.00758)	(0.00712)	(0.0111)	(0.0105)
$\log(populationunder15)_{t-1}$	-0.0323	-0.0420	-0.0754	-0.0887
	(0.0425)	(0.0443)	(0.0749)	(0.0745)
$\log(populationover65)_{t-1}$	-0.0486	-0.0610	-0.0814	-0.0892
	(0.0372)	(0.0379)	(0.0548)	(0.0550)
Mayor bachelor graduate$_{i,t-1}$	0.0199		-0.0294	
	(0.0162)		(0.0189)	
Mayor high school$_{i,t-1}$	0.0251		-0.0252	
	(0.0191)		(0.0197)	
(% council members ba. grad.)$_{i,t-1}$	0.0347		0.0767	
	(0.0422)		(0.0506)	
(% council members h. school)$_{i,t-1}$	0.0489		0.106**	
	(0.0312)		(0.0517)	
$pre - electionyear_{i,t}$		-0.0108		-0.0425**
		(0.0155)		(0.0178)
$post - electionyear_{i,t}$		0.00205		0.0445*
		(0.0173)		(0.0267)
Observations	1673	1928	1856	1952
Number of municipalities	282	325	316	329

Sensitivity analysis: matching quality concerns

1. First, I estimate the empirical model including municipalities from different intervals around the legal population threshold.
2. Then I include municipalities which experienced a similar legal population growth (reduction) but that did not cross the threshold.

Table 6a: legal population interval sensitivity.

	log(current expenditures per capita)		
	(1)	(2)	(3)
	[2,700-3,300] ∪ [9,000-11,000] ∪ [27,000-33,000]	[2,800-3,200] ∪ [9,250-10,750] ∪ [28,000-32,000]	[2,900-3,100] ∪ [9,750-10,250] ∪ [29,000-31,000]
$CouncSize_{i,t-1}$	-0.00503***	-0.00387**	-0.00453*
	(0.00189)	(0.00193)	(0.00274)
$electionyear_{i,t}$	-0.00869*	-0.00703	-0.00543
	(0.00451)	(0.00537)	(0.00990)
$\log(populationunder15)_{t-1}$	-0.0983*	-0.0545	-0.00209
	(0.0509)	(0.0452)	(0.0398)
$\log(populationover65)_{t-1}$	-0.0602*	-0.0489	-0.0139
	(0.0350)	(0.0353)	(0.0412)
Observations	3521	2599	1246
Number of municipalities	595	438	210

Table 6b: legal population interval sensitivity.

	log(tax/tariffs revenues per capita)		
	(4)	(5)	(6)
	[2,700-3,300] ∪ [9,000-11,000] ∪ [27,000-33,000]	[2,800-3,200] ∪ [9,250-10,750] ∪ [28,000-32,000]	[2,900-3,100] ∪ [9,750-10,250] ∪ [29,000-31,000]
$CouncSize_{i,t-1}$	-0.00312	-0.00333	-0.00184
	(0.00288)	(0.00337)	(0.00553)
$electionyear_{i,t}$	-0.00601	-0.00799	0.00715
	(0.00694)	(0.00852)	(0.0138)
$\log(populationunder15)_{t-1}$	-0.182**	-0.126*	-0.0542
	(0.0806)	(0.0756)	(0.0770)
$\log(populationover65)_{t-1}$	-0.0859	-0.0726	-0.0687
	(0.0578)	(0.0558)	(0.0657)
Observations	2634	1262	
Number of municipalities	601	444	213

Table 7: population change 'matching'.

TABLE: Results from panel data approach - council size effect for Italian municipalities - population change sensitivity

	log(current expenditures per capita)			log(tax/tariffs revenues per capita)		
$CouncSize_{i,t-1}$	-0.0029			-0.0002		
	(0.0021)			(0.0039)		
$change3k_{i,t}$		0.00715			0.0251	
		(0.0111)			(0.0195)	
$change10k_{i,t}$		-0.0606***			-0.0159	
		(0.0218)			(0.0424)	
$change30k_{i,t}$		-0.0864***			-0.0290	
		(0.0233)			(0.0785)	
$changeMinus_{i,t}$			-0.0116***			-0.00789
			(0.00343)			(0.00855)
$changePlus_{i,t}$			-0.00218			0.00461
			(0.00273)			(0.00497)
$electionyear_{i,t}$	-0.00571	-0.00653	-0.00576	-0.00940	-0.00172	-0.000886
	(0.00483)	(0.00444)	(0.00445)	(0.00753)	(0.00710)	(0.00714)
$\log(populationunder15)_{t-1}$	-0.292***	-0.288***	-0.295***	-0.314**	-0.322**	-0.331**
	(0.0887)	(0.0875)	(0.0876)	(0.134)	(0.133)	(0.133)
$\log(populationover65)_{t-1}$	-0.128**	-0.132**	-0.136***	-0.149*	-0.157**	-0.161**
	(0.0518)	(0.0518)	(0.0516)	(0.0766)	(0.0757)	(0.0760)

Table 8: Dynamic panel.

	log(current expenditures per capita)			log(tax/tariffs revenues per capita)		
Estimation method	Fixed Effects	OLS	LSDVC	Fixed Effects	OLS	LSDVC
LaggedDep.Variable	0.157	0.879***	0.341***	0.0785	0.860***	0.320***
	(0.123)	(0.044)	(0.045)	(0.069)	(0.030)	(0.041)
$CouncSize_{i,t-1}$	-0.0053**	-0.0003	-0.0082**	-0.0031	-0.0014*	-0.0036
	(0.0021)	(0.0008)	(0.0033)	(0.004)	(0.001)	(0.004)
$electionyear_{i,t}$	-0.0101	-0.00894	-0.0026	-0.0104	-0.0243**	-0.0149
	(0.007)	(0.008)	(0.009)	(0.011)	(0.012)	(0.016)
$\log(populationunder15)_{t-1}$	-0.044	-0.039	-0.001	-0.095	-0.265***	-0.112
	(0.040)	(0.034)	(0.046)	(0.072)	(0.067)	(0.107)
$\log(populationover65)_{t-1}$	-0.0580*	0.0495***	-0.021	-0.0841	-0.124***	-0.0965
	(0.0350)	(0.0150)	(0.064)	(0.0525)	(0.0374)	(0.099)
Observations	1866	1866	1866	1902	1902	1902
Number of municipalities	313	313	313	319	319	319

Table 9: Falsification test.

	log(current expenditures per capita)		log(tax/tariffs revenues per capita)	
	Baseline	Falsification	Baseline	Falsification
$CouncSize_{i,t-1}$	-0.00595***	-0.0028	-0.00285	-0.003
	(0.0021)	(0.0025)	(0.004)	(0.0026)
$electionyear_{i,t}$	-0.0085	0.0108	-0.0068	-0.0059
	(0.007)	(0.0098)	(0.011)	(0.014)
$\log(populationunder15)_{t-1}$	-0.0464	0.125	-0.0894	-0.383*
	(0.044)	(0.174)	(0.0746)	(0.219)
$\log(populationover65)_{t-1}$	-0.0636*	-0.294	-0.0882	0.362
	(0.038)	(0.317)	(0.055)	(0.232)
Observations	1928	990	1952	990
Number of municipalities	325	330	329	330

WHY LEGISLATURE SIZE MATTERS: DISAGGREGATED EXPENDITURE REGRESSIONS

The empirical evidence seems to support clearly that larger councils are associated with lower spending. Since the reason for this counterintuitive result finds unsatisfactory answers in the theoretical work, I think it is beneficial to further explore the effects on the different components of the municipal expenditures.

In this section I try to cast some light on the causes of the legislature size effect by estimating separate regressions for disaggregated spending.

WHY LEGISLATURE SIZE MATTERS: DISAGGREGATED EXPENDITURE REGRESSIONS

The focus is on the following disaggregation: (1) personnel, (2) services, (3) transfers, and (4) all other expenditures.
And I will show the findings in Table 10.

WHY LEGISLATURE SIZE MATTERS: DISAGGREGATED EXPENDITURE REGRESSIONS

Table 10 displays the results of fixed effects panel regressions of the expenditures chapters.

Variable	Personnel	Services	Transfers	All Other Interventions
$CouncilSize_{i,t-1}$	-0.0145*	-0.0841***	0.0917	-0.0337
	(0.0087)	(0.0226)	(0.0658)	(0.0346)
Election Year	-0.0061	0.00296	-0.0387	0.0141
	(0.0067)	(0.0147)	(0.0373)	(0.0202)
$\log(population under 15)_{t-1}$	0.00666	0.0567	-0.117	0.0134
	(0.0166)	(0.0712)	(0.282)	(0.0658)
$\log(population over 65)_{t-1}$	0.0332**	0.0448	-0.226	0.0371
	(0.0146)	(0.0775)	(0.323)	(0.0536)
Observations	1928	1928	1952	1952
Number of municipalities	325	325	329	329

DISAGGREGATED EXPENDITURE REGRESSIONS

Some important results provided by Table 10 are:

1. The most robust result is that the size of the council has a negative and statistically significant effect on services expenditures.
2. The council size also has a negative effect on the personnel category which is significant at the 10 percent level.
3. The effect on transfers is positive but not statistically different from zero, so it is the estimated effect on the residual category.

Conclusions

- Between and within approaches using population based laws do provide different answers.
- Using more credible within variation approaches I show that the council size has a negative effect on local government expenditures.
- The effect on local government expenditures is not statistically significant, possible influence of unobserved factors.
- Analysis on disaggregated data shows that the negative effect is strong on expenditures for goods and services.

Conclusions

Results are robust

- to the inclusion of observable characteristics of the legislators.
- to various selection of the treatment and control groups.
- to dynamic specification of the dependent variable.
- a performed falsification test corroborate the identification strategy.