

# Government Size, Decentralization and Growth: a BARS Curve Approach Based on Italian Regional Data

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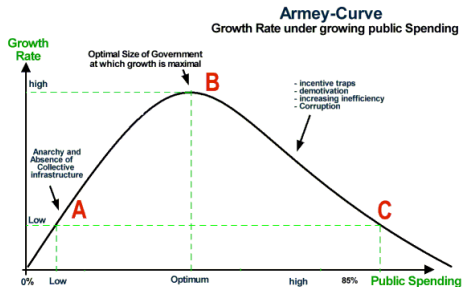
# BARS curve

## Introduction

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If the BARS curve holds, then there is a maximum value of the GDP growth rate in correspondence to the **optimal value of the government size (public expenditure/GDP ratio)**.

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### *AIM OF THE PAPER:*

- 1 To test the existence of the BARS curve on the basis of regional data instead of national data;
- 2 If the existence of the BARS curve will be empirically tested we will also study the effect of expenditure decentralization on growth by means of the estimated curve.

## Empirical research on BARS curve

One of the first estimates of the BARS curve was proposed by Vedder and Gallaway (1998) for the United States, Canada, Denmark, Italy, Sweden, and UK.



They suggest the following quadratic functional form which relate *government size* (G) to some output related to economic growth (Y) for their time series analysis:

In addition to government size, they include a control variable in order to capture business cycles, such as the variable unemployment ( $u$ ).

## Empirical research on BARS curve, decentralization and growth

"Classic" BARS curve literature:

- **Scully (2000, 2002, 2003)** found that economic growth rates are maximized when public expenditure is approximately equal to the fifth part of the aggregate income, as excessive increases in expenditure have a substantially depressive effect on economic growth.

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Decentralization literature :

- **Davoodi and Zou (1998)** and Woller and Philipps (1998) do not find a robust relationship between economic growth and decentralization, using different samples of countries.
- **Breauss and Eller (2004)** and Lin and Liu (2000) show a positive relationship between decentralization and economic growth.

## Econometric model and data

Starting from the recent work of **Forte and Magazzino (2011)** we use the following econometric specification (in a semi-matrix notation) as starting point of our estimations:

$$g_{it} = \alpha + \beta_1 \left( \frac{G}{GDP} \right)_{it} + \beta_2 \left( \frac{G}{GDP} \right)_{it}^2 + \gamma I_{it} + \delta D_{it} + \zeta V_{it} + \eta TREND + \theta C_{it} + \varepsilon_{it}, \quad (2)$$

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- $g$  is the growth rate of regional GDP,
- $G/GDP$  is the ratio expenditure-GDP,
- $D$  represents measures of expenditure decentralization
- $C$  a set of control variables which includes political and economic variables,
- $V$  are variables which indicates the degree of Vertical Fiscal Imbalance,
- In some econometric specifications we also include the vector of variables  $I$ . These variables are obtained by multiplying decentralization indices and the financial balance measure to the government size.

# Econometric model and data

## Data sources

Variable	Source
Regional real GDP	Regional Economic Accounts - ISTAT
Real public current expenditure	Territorial Public Accounts - ISTAT/OECD/RGS
Real public capital expenditure	Territorial Public Accounts - ISTAT/OECD/RGS
Real total public expenditure	Territorial Public Accounts - ISTAT/OECD/RGS
Total revenue	Territorial Public Accounts - ISTAT/OECD/RGS
Own tax revenue	Territorial Public Accounts - ISTAT/OECD/RGS
Decentralization index - Expenditure	Own computation
Vertical fiscal imbalance measure	Own computation
Population	DEMO ISTAT
Price consumption index (no tobacco)	ISTAT
Center/left government (dummy)	Italian Ministry of Interior
Seats in regional assembly	Italian Ministry of Interior
Export - Extra UE	Territorial Indicators - ISTAT
Import - Extra UE	Territorial Indicators - ISTAT



## Econometric model and data

## Descriptive statistics, 1996-2009

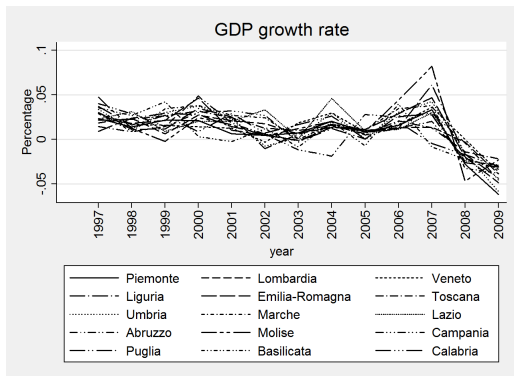
	N	mean	SD	min	max
Real regional GDP growth rate	195	0.01	0.02	-0.06	0.08
Government size (% GDP)	210	0.52	0.09	0.34	0.74
Expenditure decentralization index (% total expenditure)	210	28	4	14	36
Inverse measure of vertical fiscal imbalance (% total local expenditure)	196	0.43	0.15	0.11	1.00
Inflation rate	195	0.02	0.01	0.01	0.03
Export - Extra UE (%GDP)	135	17.97	9.69	0.91	34.39
Import - Extra UE (%GDP)	135	15.10	8.57	1.52	39.08
Centre-Left regional government (dummy)	210	0.62	0.49	0.00	1.00
Margin of victory (no. of seats in regional parliament)	210	12.30	4.69	6.00	25.00
Population (millions)	210	3.25	2.34	0.32	9.80
Population 0-14 (% total population)	195	0.14	0.02	0.10	0.19
Population over 65 (% total population)	195	0.19	0.03	0.13	0.26
Life expectancy over 65 (no. of years)	165	19.12	0.75	16.77	20.47
Infant mortality rate	165	10.37	4.23	0.00	26.57
Total expenditure CG (%GDP)	210	38	7	24	55
Total expenditure LG (%GDP)	210	6	1	4	0.10
Total expenditure RG (%GDP)	210	8	3	3	16
Own tax revenue CG (% total local expenditure)	210	26	2	21	32
Own tax revenue LG (% total local expenditure)	210	2	0	1	3
Own tax revenue RG (% total local expenditure)	210	3	1	0	7

Notes: CG: Central Government; RG: Regional Government; LG: Municipalities and Provinces

## Econometric model and data

The figure shows the graph of GDP growth rates<sup>1</sup> for 15 Italian regions considered over the period 1997-2009. Here, we observe the clear decline of GDP growth rates after 2007, corresponding to the financial crisis period. In general, all regions considered shows low levels of growth in the after-crisis period, too.

GDP growth rate over time, 15 Italian regions

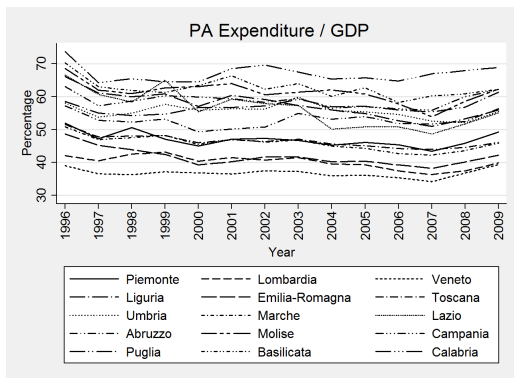


<sup>1</sup>Growth rates have been computed as log-differences of real GDP.

## Econometric model and data

The figure shows the evolution of the “government size” over time for the regions considered. Despite the fact that expenditure competencies are the same for all regions considered, they show very different levels of “government size”.

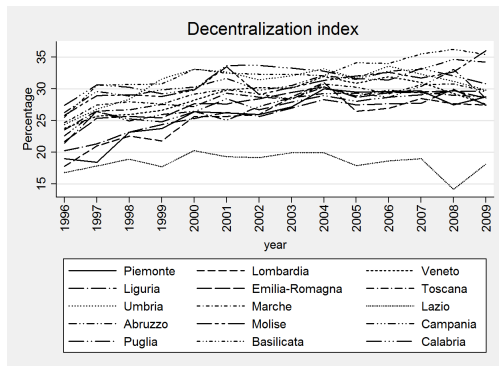
“Government size” over time, 15 Italian regions



## Econometric model and data

The last figure shows the evolution of the decentralization index over time for the regions considered. We can observe that region Lazio, which includes the capital Rome, is the less decentralized territory. All the other regions shows, on average, an increasing in the decentralization index over time.

Expenditure decentralization index over time, 15 Italian regions



## Empirical strategy

We estimate the same model with and without Lazio, using both difference GMM and Fixed Effect estimators. Lazio, in fact, could theoretically cause some problems due to the high presence of central administrations in its territory.

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The differences of the GDP growth rate, the government size and the squared government size, considered endogenous, are used as instruments starting from lag 3 (GMM-style instruments). We use as additional instruments the logarithm of population, the difference of seats between the majority and the minority in regional assemblies, the inflation rate and the degree of openness of the economy (IV-style instruments).



# Estimates and results

## Dynamic point estimates (Dependent variable: regional GDP growth rate - Part I)

VARIABLES	1 GMM-DIFF	2 GMM-DIFF	3 GMM-DIFF	4 GMM-DIFF	5 GMM-DIFF	6 GMM-DIFF
L.GDP growth rate	-0.170837 (0.125)	-0.149977 (0.121)	-0.099570 (0.128)	-0.128080 (0.128)	-0.124228 (0.140)	-0.126168 (0.145)
L2.GDP growth rate	-0.302936*** (0.096)	-0.313906*** (0.098)	-0.299247*** (0.085)	-0.360811*** (0.096)	-0.357631*** (0.098)	-0.362502*** (0.101)
L.Government size	0.089311 (0.085)	0.800439 (0.662)	0.578050 (0.669)	9.754416*** (3.260)	10.080415** (3.902)	10.251555** (3.964)
L.Squared government size		-0.630896 (0.577)	-0.430574 (0.580)	-9.188172*** (2.921)	-9.637898** (3.633)	-9.835981** (3.716)
L.Government size*Dec. index				-31.825793** (11.362)	-32.051995** (12.214)	-32.244210** (12.358)
L.Squared gov. size*Dec. index				30.180721*** (10.148)	30.599505** (11.154)	30.941034** (11.346)
L.Government size*VFI measure					-0.721946 (1.849)	-0.859969 (1.912)
L.Squared gov. size*VFI measure					0.855238 (1.870)	1.129247 (1.991)
L.Government size*VFI measure*Dec. index						-0.582088 (0.798)
Decentralization index			0.268133** (0.125)	9.970264*** (3.117)	9.985321*** (3.267)	10.462615*** (3.462)
Squared decentralization index				-2.609327** (0.998)	-2.614898** (0.995)	-3.182998** (1.137)

# Estimates and results

## Dynamic point estimates (Dependent variable: regional GDP growth rate - Part II)

VARIABLES	1	2	3	4	5	6
	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF
Vertical fiscal imbalance measure			0.047248** (0.017)	0.214338*** (0.065)	0.339617 (0.443)	0.444438 (0.473)
Squared vertical fiscal imbalance measure				-0.155442** (0.057)	-0.136940* (0.072)	-0.161835** (0.073)
Population	0.074335 (0.202)	0.126078 (0.210)	0.176645 (0.198)	-0.071841 (0.239)	-0.041688 (0.204)	-0.027708 (0.192)
L.Centre-Left Government	0.002125 (0.009)	0.001079 (0.008)	0.000410 (0.008)	0.000584 (0.008)	0.000885 (0.008)	0.000461 (0.008)
L.Difference Maj.-Min seats in reg. ass.	-0.000042 (0.001)	0.000020 (0.001)	-0.000045 (0.001)	-0.000141 (0.001)	-0.000161 (0.001)	-0.000113 (0.001)
L.Inflation rate	-1.692248*** (0.327)	-1.653902*** (0.320)	-1.912438*** (0.320)	-1.713992*** (0.555)	-1.765948*** (0.504)	-1.838342*** (0.482)
L.Openness	0.042960 (0.064)	0.053003 (0.063)	0.079606 (0.067)	0.077666 (0.060)	0.078320 (0.062)	0.086245 (0.062)
Year	2.254000** (0.869)	2.030517* (1.082)	2.534299** (0.988)	0.420865 (1.720)	0.632162 (1.589)	0.723633 (1.602)
Squared year	-0.000563** (0.000)	-0.000507* (0.000)	-0.000633** (0.000)	-0.000106 (0.000)	-0.000159 (0.000)	-0.000181 (0.000)
Observations	120	120	120	120	120	120
Number of Regions	15	15	15	15	15	15
AR(1) test statistic	-3.177	-3.263	-3.159	-3.064	-2.990	-2.971
P-value of AR(1) statistic	0.00149	0.00110	0.00158	0.00218	0.00279	0.00297
AR(2) test statistic	-1.557	-1.030	-0.272	-0.0727	-0.0306	-0.132
P-value of AR(2) statistic	0.120	0.303	0.786	0.942	0.976	0.895
Sargan statistic	107.4	112.0	109.4	108.6	109.3	109.4
Degrees of freedom for Sargan statistic	89	106	107	103	101	100
P-value of Sargan statistic	0.0897	0.325	0.418	0.333	0.270	0.244

Notes: Robust Standard Errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

## Estimates and results

The previous table reports the results of the estimation conducted using seven different specifications of the model. As we can see we observe significant coefficients associated to government size and squared government size in columns 4-6. **We can than confirm the existence of BARS curve in the Italian regional context.**

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**We will base the following analysis on model 6**, which is the more complete, since it includes the full polynomial function in terms of government size, decentralization and **VFI**, which in our estimates shows a negative coefficient.

## Simulations

We will study the impact of decentralization on the optimal size of the government and the correspondent theoretical maximum level of growth by means of simulations conducted using the polynomial function resulting from the estimates of model (7) in the estimates table.

The function considered takes the form:

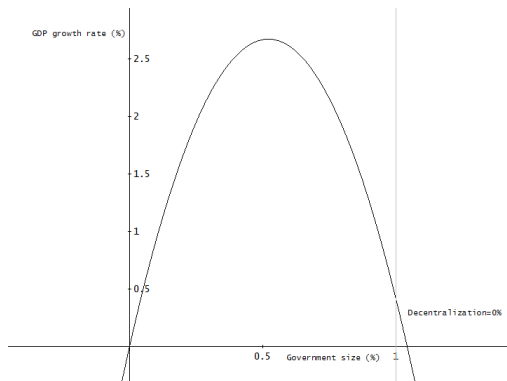
$$g = 10.251s - 9.835s^2 - 32.244ds + 30.941ds^2 + 10.462d - 3.182d^2, \quad (3)$$

where  $g$  is the GDP growth rate,  $s$  is the government size and  $d$  is the decentralization index. We are interested to the region of the domain in which  $s \in [0, 1]$  and  $d \in [0, 1]$ .

## Simulations

The figure reports the graph of the estimated BARS curve in absence of decentralization. The maximum of this curve is in correspondence of an optimal government size equal to 52.112% of the economy. The correspondent maximum value of the GDP growth rate is about 2.67%. This value is just a theoretical value without taking into account the impact of the other control variables included in the model.

Estimated BARS curve, No expenditure decentralization

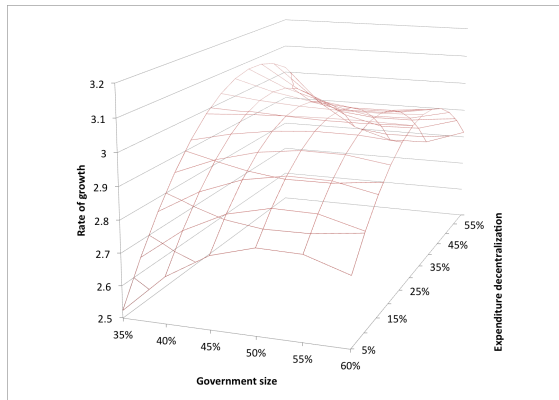




# Simulations

As long as the level of fiscal decentralization remains below the threshold of 32%, the inverted U-shaped relationship between the size of government and the rate of growth is verified and the optimal government size remain close to 52-53%.

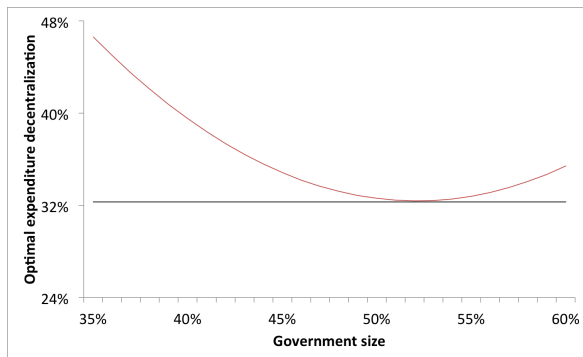
Estimated BARS curve with increasing decentralization



# Simulations

Moreover, our estimates show that, when government size remains close to 52-53%, we can also find the optimal value of fiscal decentralization; thus, when the BARS curve is validated, the combination  $govsize \simeq 52\%$  and  $fiscaldec \simeq 32\%$  provides the optimal government structure, which maximize the output growth.

Optimal expenditure decentralization and government size



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- when below the threshold value of 32%, the decentralization process attenuates the negative impact of sub-optimal expenditure policy on growth;
- when fiscal decentralization exceeds the 32%, the inverted U-shaped relationship between government size and growth disappears, showing that the theoretical framework of the BARS curve is not independent from the vertical structure of government.

## Conclusions

To conclude, decentralization is an important factor which could influence the effectiveness of public expenditure in enhancing growth. Our estimates suggest that expenditure decentralization has a positive effect on growth when the expenditure decentralized remain about one third of the total public expenditure.

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The main policy implication that can be drawn for Italy is that the composition of expenditure (across regions and sectors), rather than its size, should be taken into account to stimulate the economic growth. In fact, average figures show a government size close to 52% and a degree of expenditure decentralization of 28%.

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# Robustness Checks Tables

Dynamic estimations including year dummies (Dependent variable: regional GDP growth rate, GMM-Diff estimator) - Part I

VARIABLES	1	2	3	4	5	6
	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF
L.GDP growth rate	-0.145278** (0.064)	-0.126346 (0.081)	-0.112430 (0.085)	-0.105747 (0.089)	-0.105996 (0.098)	-0.106859 (0.097)
L2.GDP growth rate	-0.076813 (0.068)	-0.114053 (0.070)	-0.106249 (0.071)	-0.082144 (0.100)	-0.082160 (0.092)	-0.087325 (0.090)
L.Government size	0.174665* (0.092)	0.494897 (0.572)	0.523287 (0.588)	6.297545** (2.858)	6.719843* (3.635)	6.977849* (3.760)
L.Squared government size		-0.316559 (0.522)	-0.334468 (0.520)	-5.974701** (2.574)	-6.521542* (3.488)	-6.828067* (3.618)
L.Government size*Dec. index				-19.262458* (9.956)	-19.813001* (10.717)	-20.056757* (11.171)
L.Squared gov. size*Dec. index				18.980244* (8.925)	19.720125* (9.935)	20.212856* (10.358)
L.Government size*VFI measure					-0.765332 (1.905)	-0.010041 (1.992)
L.Squared gov. size*VFI measure					0.904124 (1.997)	1.363415 (2.107)
L.Government size*VFI measure*Dec index						-0.881612** (0.327)
Decentralization index			0.030026 (0.087)	5.623989* (2.762)	5.698412* (2.888)	6.387297** (2.995)
Squared decentralization index				-1.399.977 (0.906)	-1.359.382 (0.961)	-2.196757** (0.960)
Vertical fiscal imbalance measure			0.013639 (0.010)	0.067502 (0.048)	0.204433 (0.435)	0.368073 (0.454)
Squared vertical fiscal imbalance measure				-0.048404 (0.047)	-0.032662 (0.056)	-0.069147* (0.038)
Population	0.037591 (0.137)	0.071910 (0.149)	0.074684 (0.145)	-0.077066 (0.172)	-0.045582 (0.151)	-0.022363 (0.138)
L.Centre-Left Government	-0.006141 (0.008)	-0.005885 (0.007)	-0.005552 (0.007)	-0.005215 (0.008)	-0.005084 (0.008)	-0.005816 (0.008)

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## Robustness Checks Tables

Dynamic estimations including year dummies (Dependent variable: regional GDP growth rate, GMM-Diff estimator) - Part II

VARIABLES	1	2	3	4	5	6
	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF
L.Seats difference Maj.-Min.	0.000324 (0.001)	0.000386 (0.001)	0.000368 (0.001)	0.000315 (0.001)	0.000284 (0.001)	0.000353 (0.001)
L.Inflation rate	24.929821*** (3.415)	24.609583*** (3.153)	23.880310*** (3.486)	22.291257*** (4.059)	22.727495*** (4.100)	22.983780*** (3.935)
L.Openness	-0.008271 (0.067)	0.005671 (0.061)	0.019455 (0.056)	0.032424 (0.051)	0.027513 (0.055)	0.037459 (0.057)
Year = 2000	0.087931*** (0.012)	0.088894*** (0.010)	0.087984*** (0.013)	0.081156*** (0.013)	0.083625*** (0.011)	0.084690*** (0.011)
Year = 2001	-0.139864*** (0.024)	-0.137089*** (0.023)	-0.131955*** (0.025)	-0.125805*** (0.030)	-0.127189*** (0.031)	-0.128773*** (0.030)
Year = 2002	-0.225259*** (0.034)	-0.220482*** (0.033)	-0.213442*** (0.036)	-0.204563*** (0.042)	-0.207543*** (0.042)	-0.210697*** (0.041)
Year = 2003	-0.150185*** (0.023)	-0.147006*** (0.023)	-0.142266*** (0.025)	-0.137165*** (0.028)	-0.137659*** (0.029)	-0.138781*** (0.028)
Year = 2004	-0.163201*** (0.026)	-0.159376*** (0.025)	-0.153918*** (0.027)	-0.148927*** (0.031)	-0.151960*** (0.031)	-0.153889*** (0.030)
Year = 2005	-0.049572*** (0.011)	-0.048695*** (0.011)	-0.045339*** (0.012)	-0.044158*** (0.014)	-0.044461*** (0.014)	-0.045010*** (0.014)
Year = 2006	0.059901*** (0.006)	0.060295*** (0.005)	0.059201*** (0.005)	0.052435*** (0.008)	0.053674*** (0.008)	0.054730*** (0.007)
Observations	120	120	120	120	120	120
Number of regions	15	15	15	15	15	15
AR(1) test statistic	-3.034	-3.025	-2.963	-3.028	-2.993	-2.923
P-value of AR(1) statistic	0.00241	0.00249	0.00305	0.00247	0.00276	0.00346
AR(2) test statistic	-0.287	0.626	0.334	-0.347	-0.396	-0.397
P-value of AR(2) statistic	0.774	0.531	0.738	0.729	0.692	0.691
Sargan statistic	116.0	128.2	125.8	123.6	125.0	126.1
Degrees of freedom for Sargan statistic	84	101	102	98	96	95
P-value of Sargan statistic	0.0119	0.0351	0.0551	0.0410	0.0249	0.0182

Notes: Robust Standard Errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

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## Robustness Checks Tables

Dynamic estimations (Dependent variable: regional GDP growth rate, Fixed Effects estimator) - Part I

VARIABLES	1 FE	2 FE	3 FE	4 FE	5 FE	6 FE
L.GDP growth rate	-0.150983 (0.122)	-0.146151 (0.119)	-0.099570 (0.128)	-0.128080 (0.128)	-0.124228 (0.139)	-0.126168 (0.144)
L2.GDP growth rate	-0.309830*** (0.095)	-0.312409*** (0.098)	-0.299247*** (0.085)	-0.360811*** (0.095)	-0.357631*** (0.097)	-0.362502*** (0.101)
L.Government size	0.078290 (0.092)	0.804486 (0.644)	0.578050 (0.668)	9.754415*** (3.247)	10.080414** (3.883)	10.251553** (3.943)
L.Squared government size		-0.634482 (0.563)	-0.430574 (0.579)	-9.188171*** (2.910)	-9.637897** (3.616)	-9.835980** (3.696)
L.Government size*Dec. index				-31.825790** (11.320)	-32.051991** (12.155)	-32.244206** (12.292)
L.Squared gov. size*Dec. index				30.180719*** (10.110)	30.599502** (11.101)	30.941031** (11.285)
L.Government size*VFI measure					-0.721946 (1.840)	-0.859970 (1.902)
L.Squared gov. size*VFI measure					0.855238 (1.861)	1.129247 (1.980)
L.Government size*VFI measure*Dec index						-0.582088 (0.794)
Decentralization index			0.268133** (0.125)	9.970263*** (3.105)	9.985320*** (3.252)	10.462614*** (3.443)
Squared decentralization index				-2.609327** (0.994)	-2.614897** (0.990)	-3.182998** (1.131)
Vertical fiscal imbalance measure			0.047248** (0.017)	0.214338*** (0.064)	0.339617 (0.441)	0.444438 (0.470)
Squared vertical fiscal imbalance measure				-0.155442** (0.057)	-0.136940* (0.072)	-0.161835** (0.073)
Population	0.128261 (0.205)	0.128322 (0.215)	0.176645 (0.197)	-0.071841 (0.238)	-0.041688 (0.203)	-0.027708 (0.191)

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## Robustness Checks Tables

Dynamic estimations (Dependent variable: regional GDP growth rate, Fixed Effects estimator) - Part II

VARIABLES	1 FE	2 FE	3 FE	4 FE	5 FE	6 FE
L.Centre-Left Government	0.001377 (0.009)	0.001229 (0.008)	0.000410 (0.008)	0.000584 (0.008)	0.000885 (0.008)	0.000461 (0.008)
L.Difference Maj.-Min seats in reg. ass.	0.000099 (0.001)	0.000025 (0.001)	-0.000045 (0.001)	-0.000141 (0.001)	-0.000161 (0.001)	-0.000113 (0.001)
L.Inflation rate	-1.723128*** (0.332)	-1.656044*** (0.313)	-1.912440*** (0.319)	-1.713993*** (0.553)	-1.765948*** (0.501)	-1.838343*** (0.479)
L.Openness	0.033624 (0.064)	0.052771 (0.061)	0.079606 (0.067)	0.077666 (0.060)	0.078320 (0.062)	0.086245 (0.061)
Year	2.322124** (0.831)	2.058319* (1.038)	2.534307** (0.987)	0.420867 (1.714)	0.632165 (1.581)	0.723636 (1.594)
Squared year	-0.000580** (0.000)	-0.000514* (0.000)	-0.000633** (0.000)	-0.000106 (0.000)	-0.000159 (0.000)	-0.000181 (0.000)
Constant	-2325.301068** (831.295)	-2061.452635* (1,038.454)	-2538.203632** (987.123)	-420.058.086 (1,716.529)	-632.024.467 (1,583.171)	-723.968576 (1,595.554)
Observations	135	135	135	135	135	135
R <sup>2</sup>	0.248	0.256	0.332	0.410	0.412	0.414
Number of regions	15	15	15	15	15	15

Notes: Robust Standard Errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

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## Robustness Checks Tables

Dynamic estimations (Dependent variable: regional GDP growth rate, GMM-Diff estimator, region Lazio excluded) - Part I

VARIABLES	1	2	3	4	5	6
	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF	GMM-DIFF
L.GDP growth rate	-0.116790 (0.145)	-0.100190 (0.139)	-0.054366 (0.141)	-0.093306 (0.133)	-0.076436 (0.145)	-0.071928 (0.139)
L2.GDP growth rate	-0.347298** (0.131)	-0.357026** (0.128)	-0.335645*** (0.112)	-0.364301*** (0.112)	-0.352097*** (0.117)	-0.358449** (0.125)
L.Government size	0.051847 (0.156)	0.601815 (0.684)	0.440778 (0.714)	10.887804** (4.346)	11.623855** (4.823)	11.626997*** (3.754)
L.Squared government size		-0.459805 (0.592)	-0.302131 (0.614)	-10.473910** (4.119)	-11.163728** (4.705)	-10.779491*** (3.589)
L.Government size*Dec. index				-35.992127** (14.115)	-36.844888** (14.494)	-37.953465*** (11.752)
L.Squared gov. size*Dec. index				34.735803** (13.362)	35.646360** (13.986)	35.570224*** (11.084)
L.Government size*VFI measure					-0.989197 (2.027)	-1.100112 (1.775)
L.Squared gov. size*VFI measure					0.908135 (2.068)	-0.145620 (1.712)
L.Government size*VFI measure*Dec index						3.624341*** (1.197)
Decentralization index			0.217472 (0.132)	11.309597** (3.923)	11.453175** (4.044)	9.365806** (3.579)
Squared decentralization index				-3.274.542 (2.923)	-3.219.654 (3.125)	-0.054935 (3.188)
Vertical fiscal imbalance measure			0.043383** (0.018)	0.239711*** (0.080)	0.513813 (0.479)	0.254043 (0.424)
Squared vertical fiscal imbalance measure				-0.187771** (0.070)	-0.208321** (0.082)	-0.160117** (0.074)
Population	0.364336 (0.249)	0.384422 (0.229)	0.375221 (0.235)	0.212207 (0.231)	0.185383 (0.247)	0.241189 (0.240)

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## Robustness Checks Tables

Dynamic estimations (Dependent variable: regional GDP growth rate, GMM-Diff estimator, region Lazio excluded) - Part II

VARIABLES	1 GMM-DIFF	2 GMM-DIFF	3 GMM-DIFF	4 GMM-DIFF	5 GMM-DIFF	6 GMM-DIFF
L.Centre-Left Government	0.003503 (0.010)	0.002358 (0.010)	0.001561 (0.009)	-0.000528 (0.009)	-0.000634 (0.010)	0.000697 (0.010)
L.Difference Maj.-Min seats in reg. ass.	-0.000240 (0.001)	-0.000091 (0.000)	-0.000180 (0.000)	0.000019 (0.001)	0.000025 (0.001)	-0.000059 (0.001)
L.Inflation rate	-1.863785*** (0.367)	-1.847355*** (0.345)	-2.019100*** (0.316)	-2.122672*** (0.493)	-2.112805*** (0.491)	-1.818844*** (0.450)
L.Openness	0.045945 (0.064)	0.057967 (0.060)	0.073655 (0.069)	0.100561* (0.055)	0.096730 (0.056)	0.081311 (0.057)
Year	2.678392*** (0.898)	2.431116** (1.129)	2.749446** (1.081)	1.432.615 (1.495)	1.402.555 (1.507)	0.573988 (1.432)
Squared year	-0.000669*** (0.000)	-0.000607** (0.000)	-0.000687** (0.000)	-0.000358 (0.000)	-0.000351 (0.000)	-0.000144 (0.000)
Observations	112	112	112	112	112	112
Number of regions	14	14	14	14	14	14
AR(1) test statistic	-3.064	-3.061	-3.044	-2.927	-2.943	-2.905
P-value of AR(1) statistic	0.00218	0.00221	0.00234	0.00343	0.00325	0.00367
AR(2) test statistic	-1.451	-1.383	-0.395	-0.263	-0.404	-0.818
P-value of AR(2) statistic	0.147	0.167	0.692	0.793	0.686	0.413
Sargan statistic	99.41	103.5	100.9	99.56	99.35	100.9
Degrees of freedom for Sargan statistic	86	101	99	95	93	92
P-value of Sargan statistic	0.153	0.413	0.429	0.354	0.307	0.246

Notes: Robust Standard Errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1