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## Decentralization and the quality of local governments: Evidence in European regions with a dose-response approach

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**Are decentralized regions better ruled? Evidence using a dose-response approach in 171 European region**

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**Abstract**

Are decentralized regions better ruled? This argument at the core of the theory of decentralization and fiscal federalism has been mostly analysed at the country level. We investigate the relationship between regional authority and the quality of government over a sample of 171 European regions. We introduce a novel dose-response approach that allows us to identify the distribution of the effect of decentralization on government quality. We find a u-shaped relationship between decentralization and the quality of regional government. Decentralized regions are clearly superior in providing services in an impartial way, but not in terms of quality. We also find that horizontal competition strengthens the quality of government, particularly in more decentralized regions and when local officers are more accountable.

**JEL:** P48; R1; R5; H7

**Keywords:** quality of regional governments; Decentralization; European regions; dose-response approach

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## 1. Introduction

Are decentralized regions better ruled? A key argument of decentralization theory is that decentralization increases the quality of local governments, both in terms of the efficiency and the level in the provision of public good (Hayek, 1945; Olson, 1993; Tiebout, 1956), accountability to citizens' preferences (Oates, 1972), and control of the public expenditure (Brennan and Buchanan, 1980). More recent research has raised some counter-arguments. Inter-jurisdictional competition may lead to a race to the bottom at the expenses of government quality, local governments can be more easily captured, fiscal "over-grazing" might occur when citizens are less capable of attributing merits or blame to different governments level (e.g. Breton, 2002; Kyriacou and Roca-Sagalés, 2011; Oates, 2005; Tanzi, 2001; Treisman, 2007).

This paper explores empirically this issue providing two main contributions. Firstly, we take the region - and the regional government - as a unit of analysis, using a sample of 171 European regions. Secondly, we introduce a novel methodological approach based on a dose-response approach that has relevant advantages compared to traditional regression models.

Among works which examine the relationship between decentralization and government quality, most of them are based on cross-country and country based analysis (e.g. Bartolini and Santolini, 2012; Fisman and Gatti, 2002; Kyriacou and Roca-Sagalés, 2011; Thornton, 2007a).<sup>2</sup> One of the reasons is that we want to test whether decentralization improves the quality of governments overall, and not limited to sub-national governments (Treisman, 2007). Another reason can be that data on government quality are quite rich at the country level and scarce at the region level. A number of indicators are provided for a large set of countries and quite a long span of time, such as in the case of the Worldwide Governance Indicators (WGI) developed by World Bank which is quite popular in these types of studies.

However, conducting the analysis at the country level also raises some issues. Firstly, in order to increase observations quite often countries profoundly different under several dimensions are used. In these cases results can be driven by some groups of countries. For example, negative effects of decentralization are very often found in developing countries (Blanchard and Shleifer, 2000; O'Dwyer and Ziblatt, 2006). Secondly, studying the effect of decentralization on the overall quality of government implies a long causal chain which can take some time to be effective. Thirdly, and more importantly, the essence of fiscal decentralization theory claims that in more decentralized contexts *local governments* will provide to local resident public service more efficiently, and more adherent to citizens' preferences. In addition, the strong theoretical argument in favour of decentralization put forward by political economy theorizing on decentralization is that it will improve the accountability and responsiveness of government, by altering its structure so as to increase citizen voice, and change the incentives that public officials face (Faguet, 2014; Weingast, 2014).

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<sup>2</sup> Those works looking at the sub-national level tend to be based on a case study approach (Enikolopov and Zhuravskaya, 2007; Faguet, 2004). (PER STUDI MICRO VEDI RODRIGUEZ POSE). Commentare brevemente I risultati empirici.

Another problem related to country level analysis, is that it hides within country heterogeneity both in the quality of government as well as in the degree of decentralization. As for the former, as we will show, variability within country is not negligible, and in some cases it is remarkably relevant. As for the degree of decentralization, some countries are characterized by *asymmetric federalism*, in that they exhibit differences in the degree of autonomy of their sub-national governments (Congleton et al., 2003). In Spain, specific arrangements have been made for Navarra and Basque communities regarding financial autonomy, while Galicia and Catalonia have special authority over education, language and culture. In the United Kingdom, Scotland and Wales are also more autonomous, and the Scottish Parliament has significantly more autonomy in policy making than the Welsh Parliament. Other examples are the autonomous regions in Italy and Portugal.

This paper takes a regional perspective on the effect of decentralization on the quality of governments. The latter is measured employing a survey about the satisfaction of citizens with the provisions of local public goods and services. As Serrano and Rodriguez-Pose (2011) argue, the primary aim of decentralization has never been about delivering greater economic growth, lowering inequality or increasing social capital. Rather, “the original aim of decentralization is fundamentally to improve the delivering of public goods and services to individuals by the creation of a more legitimate tier of government [...] decentralization thus first and most about improving the delivering of public policies and, consequently, the level of satisfaction of the population with government” (p. 2). As the authors continue, this argument has been completely overlooked by the literature. Using micro data from the European social survey in 29 European countries, they find that political and fiscal decentralization have a positive and significant effect on individuals’ overall happiness, as well as satisfaction with political and economic institutions and with the education and health systems.

As far as the empirical strategy is concerned, we employ a novel dose-response approach whose merit is that of overcoming some limits of traditional regression models. In particular, dose-response models: (1) they allow for going beyond the (single) average effect, by providing an estimation of the effect in the form of a function (i.e., the dose-response function) defined along the values taken by the dose variable; (2) they offer a clear-cut and easy-to-read graphical representation of results based on the plot of the dose-response function, thus making more clear the pattern of the causal link under analysis; (3) they allow to study the entire distribution of the causal effect, thereby providing grounds for a more precise understanding of the observed pattern of the treatment effect; (4) finally, they are embedded in a counterfactual design, lending to results a more reliable causal interpretation.

A last issue is that of measuring decentralization and the quality of governments. Basically, empirical studies tend to employ indirect measures of government quality, such as for instance outcomes in education or public works, public deficit, the degree of corruption, infant mortality.<sup>3</sup> Several studies have used the WGI indicator developed by the World Bank (Kaufmann et al., 2011), which assesses the citizens’ perception of government effectiveness, regulatory quality, rule of law, and control of corruption (Bartolini and Santolini, 2012; Kyriacou and Roca-Sagalés, 2011; O’Dwyer and Ziblatt, 2006). In line with the latter approach, we employ a measure of the quality of local governments provided by the Quality of Government Survey (Charron et al., 2014; Quality of Government

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<sup>3</sup> (Bardhan and Mookherjee, 2006; Enikolopov and Zhuravskaya, 2007; Faguet, 2014; Fisman and Gatti, 2002; Rodden, 2003).

Institute, 2010). We envisage two added values of this indicator. The first is that it takes the regional government as a unit of analysis. The second is that it addresses the provisions of those local public goods which can be more directly linked with the quality of local government.

Measuring decentralization is also not so straightforward. Most of the studies use the share of sub-national revenues (or expenditures) on total revenues (expenditure) as a proxy for the degree of decentralization, that is, fiscal decentralization. There are a number of problems associated to these measures, since in some cases these measures tend to overestimate the degree of fiscal autonomy (Stegarescu, 2005). In addition, they disregard the multifaceted nature of the decentralization process, and the several complementarities at work among the different dimensions. Administrative and political decentralization, together with the fiscal dimension, define the country's functioning in terms of distribution of power, responsibility, and resources among different tiers of government as well as their legitimacy degree. As also pointed out by Thornton (2007b), "[a] serious problem with much of the literature on the macroeconomic impact of fiscal decentralization is that it fails to make an appropriate distinction between "administrative" and "substantive" decentralization" (p. 65). In order to take this problem into account, we employ a comprehensive measure of decentralization, the *Regional Authority Index (RAI)* (Hooghe et al., 2008a, 2008b), which includes fiscal, political, and administrative measures of the authority of a regional government.

The rest of the paper is organized as follows. Next section discusses the data, while Section three presents our empirical strategy. Section four presents and discusses the results, while section five concludes.

## 2. Data

### The quality of regional government

In order to measure the quality of government at the regional level, we employ a composite indicator – *regqog* – developed by 'The QoG Institute' (Charron and Lapuente, 2011; Quality of Government Institute, 2010).<sup>4</sup> The *regqog* is a perception-based indicator built from a 34,000-respondents survey from 172 regions within 18 EU member states. This constitutes the largest survey ever undertaken to measure QoG at the sub-national level to date. The EU regional survey was undertaken between 15 December, 2009, and 1 February, 2010. The survey consisted of 34 QoG and demographic-based questions to the approximately 200 respondents per region. Regarding the QoG questions, the respondents were asked about three general public services in their regions – education, health care and law enforcement – which are often administered or financed by regional authorities to maximize the amount of within-country variation. In focusing on these three services, respondents were asked to rate their public services with respect to three related concepts of QoG – the quality, impartiality and level of corruption of said services. In addition two further questions were included in the index – one about the fairness of regional elections and the other about the strength and effectiveness of the media in the region to expose corruption (the complete questionnaire can be found in the Appendix of Quality of Government Institute, 2010). A series of extensive sensitivity tests to see whether changes in the model alter the final data was done. It

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<sup>4</sup> We want to thank Nicolas Charron and Victor Lapuente of 'The QoG Institute' of the University of Goteborg for their help.

arises that data constructed here are highly robust to multiple changes in weighting and aggregation schemes, the removal of individual questions or alterations in the demographic make-up of the respondents (Quality of Government Institute, 2010).

The Report suggests the presence of significant within-country variation from country to country (see Figure 1). As explained by Charron and Lapuente (2011) the data show that the indicator of *QoG* is either equally or more important than variation between EU countries themselves. For example, some regions in Italy and Belgium perform like those in the best performing countries, while others rank similarly to low-performing regions in Hungary and Greece. The first point to stress is therefore the importance of going beyond national level when analyzing the role of institutions.

--- Figure 1 ---

The second point that is worth noting is the connection of regional *QoG* and political decentralization. In particular, the level of regional variation within the country is not highly correlated to the degree of political decentralization (federalism). It is easy to check that there is large variation within highly centralized countries (e.g. Portugal) as well as in highly decentralized countries (e.g. Belgium). Conversely, one can also observe low variation in the *regqog* index both in highly centralized countries (Denmark) and highly decentralized ones (e.g. Germany).

### **The degree of political decentralization**

In order to measure the degree of political decentralization we employ the 'Regional Authority Index' developed by (Hooghe et al., 2008b, 2008b).<sup>5</sup> The Regional Authority Index – *rai* - is a measure of the authority of regional governments in 42 democracies or quasi-democracies on an annual basis over the period 1950–2006. The countries included are twenty-nine OECD countries, the 27 countries that are members of the European Union, plus Albania, Bosnia and Herzegovina, Croatia, Macedonia, Russia, and Serbia and Montenegro. Regional authority is measured along eight dimensions: institutional depth, policy scope, fiscal autonomy, representation, law making, executive control, fiscal control, constitutional reform.<sup>6</sup>

In figure 2 we plot the degree of political decentralization and sub-national variation in the year 2000. Large differences in the degree of political decentralization arise between European countries, in particular federal-types countries such as Austria, Belgium, and Germany stand out with high figures. As for sub-national variation, a quite mixed picture emerges. Several countries show no variation, while others show moderate variation (e.g. Belgium, Spain, and Italy), as well as high variation (e.g. Portugal and United Kingdom).

--- Figure 2 ---

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<sup>5</sup> For more details see: [http://www.unc.edu/~gwmks/data\\_ra.php](http://www.unc.edu/~gwmks/data_ra.php).

<sup>6</sup> For a discussion of the reliability of the data and a preliminary analysis see the Special issue on "Measuring Regional Authority", *Regional and Federal Studies* (2008), 18, 2-3: 111-302.

### 3. Methodology

In this paper, we are interested in studying the causal effect of  $rai$  on  $regqog$ . To this purpose, we rely on the econometric literature on treatment effects estimation (Imbens and Wooldridge, 2009), and more specifically on that estimating dose-response models (Hirano and Imbens, 2004; Cerulli, 2014; Bia and Mattei, 2008; Guardabascio and Ventura, 2014). Dose-response models are well suited in socio-economic contexts where a “cause” takes the form of a continuous exposure to a certain treatment.

In such a setting what matters is not only the binary treatment status of observations (i.e., treated vs. untreated), but also the level of exposure (or “dose”) undergone. This is also in tune with the language of epidemiology, where dose-response functions are usually estimated in order to check patients’ resilience to different levels of drug administration (Robertson et al., 1994; Royston and Sauerbrei, 2008).

Dose-response models have relevant advantages compared to traditional regression models: (1) they allow for going beyond the (single) average effect, by providing an estimation of the effect in the form of a function (i.e., the dose-response function) defined along the values taken by the dose variable; (2) they offer a clear-cut and easy-to-read graphical representation of results based on the plot of the dose-response function, thus making more clear the pattern of the causal link under analysis; (3) they allow to study the entire distribution of the causal effect, thereby providing grounds for a more precise understanding of the observed pattern of the treatment effect; (4) finally, they are embedded in a counterfactual design, lending to results a more reliable causal interpretation.

In this paper we are interested in estimating the causal effect of the dose variable  $rai$  on an outcome  $regqog$   $y$ , by assuming that units may respond differently both to specific observable confounders (that we collect in a vector  $x$ ), and to the “intensity” of the treatment  $rai$ . We wish to estimate a dose-response function of  $regqog$  on  $rai$ , either when the treatment is assumed to be conditionally exogenous, namely, when selection-into-treatment depends only on observable-to-analyst factors.

We briefly present the model setting out with some notation. Consider two different and exclusive outcomes: one referring to a unit  $i$  when it is treated,  $y_{1i}$ ; and one referring to the same unit when it is untreated,  $y_{0i}$ . Define  $w_i$  as the treatment indicator, taking value 1 for treated and 0 for untreated units, and  $x_i = (x_{1i}, x_{2i}, x_{3i}, \dots, x_{Mi})$  as a row vector of  $M$  exogenous and observable characteristics (confounders) for unit  $i = 1, \dots, N$ . Let  $N$  be the number of units involved in the experiment,  $N_1$  be the number of treated units, and  $N_0$  the number of untreated units with  $N = N_1 + N_0$ .

Define two distinct functions,  $g_1(x_i)$  and  $g_0(x_i)$ , as the unit  $i$ ’s responses to the vector of confounding variables  $x_i$  when the unit is treated and untreated respectively. Assume  $\mu_1$  and  $\mu_0$  to be two scalars, and  $e_1$  and  $e_0$  two random variables having zero unconditional mean and constant variance. Finally, define  $t_i$  – taking values within the continuous range  $[0;100]$  – as the continuous-treatment indicator, and  $h(t_i)$  as a general derivable function of  $t_i$ . In what follows, in order to simplify notation, we’ll get rid of the subscript  $i$  when defining population quantities and relations.

Given previous notation, we assume a specific population generating process for the two exclusive potential outcomes<sup>7</sup>:

$$\begin{cases} w = 1: & y_1 = \mu_1 + g_1(\mathbf{x}) + h(t) + e_1 \\ w = 0: & y_0 = \mu_0 + g_0(\mathbf{x}) + e_0 \end{cases} \quad (1)$$

where the  $h(t)$  function is different from zero only in the treated status. Given this, we can also define the causal parameters of interests. Indeed, by defining the treatment effect as the difference  $TE = (y_1 - y_0)$ , we define the causal parameters of interests, as the population Average Treatment Effects (ATEs) conditional on  $\mathbf{x}$  and  $t$ , that is:

$$\begin{aligned} ATE(\mathbf{x}; t) &= E(y_1 - y_0 \mid \mathbf{x}, t) \\ ATET(\mathbf{x}; t > 0) &= E(y_1 - y_0 \mid \mathbf{x}, t > 0) \\ ATENT(\mathbf{x}; t = 0) &= E(y_1 - y_0 \mid \mathbf{x}, t = 0) \end{aligned} \quad (2)$$

where ATE indicates the overall average treatment effect, ATET the average treatment effect on treated, and ATENT the one on untreated units. By the law of iterated expectation (LIE), we know that the population unconditional ATEs are obtained as:

$$\begin{aligned} ATE &= E_{(\mathbf{x}; t)} \{ATE(\mathbf{x}; t)\} \\ ATET &= E_{(\mathbf{x}; t > 0)} \{ATE(\mathbf{x}; t > 0)\} \\ ATENT &= E_{(\mathbf{x}; t = 0)} \{ATE(\mathbf{x}; t = 0)\} \end{aligned} \quad (3)$$

where  $E_z(\cdot)$  identifies the mean operator taken over the support of a generic vector of variables  $z$ . By assuming a linear-in-parameters parametric form for  $g_0(\mathbf{x}) = \mathbf{x}\delta_0$  and  $g_1(\mathbf{x}) = \mathbf{x}\delta_1$  the Average Treatment Effect (ATE) conditional on  $\mathbf{x}$  and  $t$  becomes:

$$ATE(\mathbf{x}, t, w) = w \cdot [\mu + \mathbf{x}\delta + h(t)] + (1 - w) \cdot [\mu + \mathbf{x}\delta] \quad (4)$$

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<sup>7</sup> Such a model is the representation of a treatment random coefficient regression as showed by Wooldridge (1997; 2003). See also Wooldridge (2010, Ch. 18). For the sake of simplicity, as we refer to the population model, here we avoid to write the subscript  $i$  referring to each single unit  $i$ 's relationships.



where  $\mu=(\mu_1-\mu_0)$  and  $\delta=(\delta_1-\delta_0)$  and the unconditional Average Treatment Effect (ATE) related to model (1) is equal to:

$$ATE = p(w = 1) \cdot (\mu + \bar{\mathbf{x}}_{t>0} \boldsymbol{\delta} + \bar{h}_{t>0}) + p(w = 0) \cdot (\mu + \bar{\mathbf{x}}_{t=0} \boldsymbol{\delta})$$

where  $p(\cdot)$  is a probability, and  $\bar{h}_{t>0}$  is the average of the response function taken over  $t>0$ . Since, by LIE, we have that  $ATE = p(w=1) \cdot ATET + p(w=0) \cdot ATENT$ , we obtain from the previous formula that:

$$\begin{cases} ATE = p(w = 1)(\mu + \bar{\mathbf{x}}_{t>0} \boldsymbol{\delta} + \bar{h}_{t>0}) + p(w = 0)(\mu + \bar{\mathbf{x}}_{t=0} \boldsymbol{\delta}) \\ ATET = \mu + \bar{\mathbf{x}}_{t>0} \boldsymbol{\delta} + \bar{h}_{t>0} \\ ATENT = \mu + \bar{\mathbf{x}}_{t=0} \boldsymbol{\delta} \end{cases} \quad (5)$$

where the dose-response function is given by averaging  $ATE(x, t)$  over  $x$ :

$$ATE(t) = \begin{cases} ATET + (h(t) - \bar{h}_{t>0}) & \text{if } t > 0 \\ ATENT & \text{if } t = 0 \end{cases} \quad (6)$$

that is a function of the treatment intensity  $t$ . The estimation of equation (6) under different identification hypotheses is the main purpose of our study.

To this aim, we consider the conditions for a consistent estimation of the causal parameters defined in (2) and (3) and thus of the dose-response function in (6). What it is firstly needed, however, is a consistent estimation of the parameters of the potential outcomes in (1) – we call here “basic” parameters – as both ATEs and the dose-response function are functions of these parameters.

Under previous definitions and assumptions, and in particular the form of the potential outcomes in model (1), to be substituted into Rubin’s potential outcome equation  $y_i = y_{0i} + w(y_{1i} - y_{0i})$ , the following baseline random-coefficient regression can be obtained (Wooldridge, 1997; 2003):

$$y_i = \mu_0 + w_i \cdot ATE + \mathbf{x}_i \boldsymbol{\delta}_0 + w_i \cdot (\mathbf{x}_i - \bar{\mathbf{x}}) \boldsymbol{\delta} + w_i \cdot (h(t_i) - \bar{h}) + \eta_i \quad (7)$$

where

$$\eta_i = e_{0i} + w_i \cdot (e_{1i} - e_{0i})$$

The equation sets out in (12), provides the baseline regression for estimating the basic parameters ( $\mu_0$ ,  $\mu_1$ ,  $\delta_0$ ,  $\delta_1$ , ATE) and then all the remaining ATEs. Both a semi-parametric or a parametric approach can be employed as soon as a parametric or a non-parametric form of the function  $h(t)$  is assumed. In both cases, however, in order to get a consistent estimation of basic parameters, we need some additional hypotheses. In this paper, we assume Unconfoundedness or Conditional Mean Independence (CMI), sufficient to provide parameters' consistent estimation. Unconfoundedness states that, conditional on the knowledge of the true exogenous confounders  $x$ , the condition for randomization are restored, and causal parameters become identifiable. Given the set of random variables  $\{y_{1i}, y_{0i}, w_i, x_i\}$  as defined above, Unconfoundedness (or CMI) implies that:

$$E(y_{ij} | w_i, x_i) = E(y_{ij} | x_i) \quad \text{with } j = \{0,1\}$$

CMI is a sufficient condition for identifying ATEs and the dose-response function in this context. Indeed, this assumption entails that, given the observable variables collected in  $x$ , both  $w$  and  $t$  are exogenous in equation (7), so that we can write the regression line of the response  $y$  simply as:

$$E(y_i | w_i, t_i, \mathbf{x}_i) = \mu_0 + w_i \cdot \text{ATE} + \mathbf{x}_i \boldsymbol{\delta}_0 + w_i \cdot (\mathbf{x}_i - \bar{\mathbf{x}}) \boldsymbol{\delta} + w_i \cdot (h(t_i) - \bar{h}) \quad (8)$$

and Ordinary Least Squares (OLS) can be used to retrieve consistent estimation of all parameters. Once a consistent estimation of the parameters in (8) is obtained, we can estimate ATE directly from this regression, and ATET, ATENT and the dose-response function by plugging the estimated basic parameters into formula (5) and (6). This is possible because these parameters are functions of consistent estimates, and thus consistent themselves. Observe that standard errors for ATET and ATENT can be correctly obtained via bootstrapping (see Wooldridge, 2010, pp. 911-919).

To complete the identification of ATEs and the dose-response function, we finally assume a parametric form for  $h(t)$ :

$$h(t_i) = at_i + bt_i^2 + ct_i^3 \quad (9)$$

where  $a$ ,  $b$ , and  $c$  are parameters to be estimated in regression (8).

Under CMI, an OLS estimation of equation (8) produces consistent estimates of the parameters, we indicate as  $\hat{\mu}_0, \hat{\delta}_0, \hat{ATE}, \hat{\delta}, \hat{a}, \hat{b}, \hat{c}$ . With these parameters at hand, we can finally estimate consistently the dose-response function as:

$$\hat{ATE}(t_i) = w[\hat{ATE}T + \hat{a}(t_i - \frac{1}{N} \sum_{i=1}^N t_i) + \hat{b}(t_i^2 - \frac{1}{N} \sum_{i=1}^N t_i^2) + \hat{c}(t_i^3 - \frac{1}{N} \sum_{i=1}^N t_i^3)] + (1-w)\hat{ATE}T \quad (10)$$

where:

$$\hat{ATE}T(t_i) = \hat{ATE}(t_i)_{t_i > 0}$$

A simple plot of the curve  $\hat{ATE}(t_i)_{t_i > 0}$  over the support of  $t$  returns the pattern of the dose-response function. Moreover, for each level of the dose  $t$ , it is also possible to calculate the  $\alpha$ -confidence interval around the dose-response curve. Indeed, by defining  $T_1=t-E(t)$ ,  $T_2=t^2-E(t^2)$  and  $T_3= t^3-E(t^3)$ , the standard error of the dose-response function is equal to<sup>8</sup>:

$$\hat{\sigma}_{\hat{ATE}(t)} = \left\{ T_1^2 \hat{\sigma}_a^2 + T_2^2 \hat{\sigma}_b^2 + T_3^2 \hat{\sigma}_c^2 + 2T_1 T_2 \hat{\sigma}_{a,b} + 2T_1 T_3 \hat{\sigma}_{a,c} + 2T_2 T_3 \hat{\sigma}_{b,c} \right\}^{1/2} \quad (11)$$

This means that the  $\alpha$ -confidence interval of  $\hat{ATE}(t)$  for each  $t$  is then given by:

$$\left\{ \hat{ATE}(t) \pm Z_{\alpha/2} \cdot \hat{\sigma}_{\hat{ATE}(t)} \right\}$$

that can be usefully plotted along the dose-response curve for detecting visually the statistical significance of the treatment effect along the support of the dose  $t$ .

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<sup>8</sup> This comes from the variance/covariance properties where  $T_1 T_2 T_3$  are taken as constant and  $a, b$  and  $c$  as random variables.

## 4. Results

### *Decentralization and regional quality of government*

In this section we present the results of the dose-response analysis. Table 1 reports the OLS robust estimates in which the dependent variable is the *euqog*, while control variables include several control variables at the region level. The first column reports the estimates for the *euqog*, while columns 2, 3 and 4 report the estimates for the three pillars of *euqog*, namely impartiality, corruption, and quality of public services. Our key explanatory variable is the *rai* Index, whose results can be interpreted looking at Figure 3.

Our key results are shown in the charts displayed in Figure 3, where the dose-response functions for each of the pillars are reported. The chart relative to the *equqog index* shows a u-shaped form. This suggests that the levels of decentralization exert a positive impact on the quality of government even at the two extremes. Therefore, either when regions are centralized, or a very decentralized, we see a higher level of the quality of government. By contrast, regions having an average level of decentralization are associated with the lower level of government quality.

By looking at the charts related to each pillars of the *equqog index*, the only case in which a clear positive relationship between decentralization and the quality of government arises is that of *impartiality*. The dose-response function related to *corruption* shows instead a flat form and not statistically significant, while that on *quality* shows a moderate negative trend.

[Table 1 about here]

[Figure 3 about here]

### *Looking for horizontal competition effects*

As stated in the introduction, the positive effect of horizontal competition on the performance of local government is one of the most prominent arguments of fiscal decentralization theory. In this section we explore the presence of an effect of horizontal competition on the quality of government. We include among the regressors the variable *spill* that account for a *contiguity spillover* effect. The variable is built as a contiguity matrix weighted for the *euqog index*. That is, it represents the average value of the *euqog index* of the regions that are contiguous to the region. It can be interpreted as a variable accounting for the spillover effect of the *euqog index*, or in other words, of a spatial correlation effect.

The idea is that the spillover effect should be larger (smaller) when regions are more (less) decentralized. In other words, given the same average level of the quality of government of contiguity regions, its effect on region *i* quality of government should be larger if regions are more decentralised. This depends on the fact that decentralization should increase horizontal competition.

In order to test this hypothesis we have included the joint effect of the spillover variable with *rai* (using *margins* command in STATA). The results are shown in Table 3. Our variable of contiguity spillover is positive and strongly significant either when it is considered alone, thus suggesting the presence of a spatial correlation effect, and when it is interacted with *rai*, thus indicating the

presence of a strong effect for higher decentralized regions.<sup>9</sup> This is also confirmed by looking at the chart in Figure 4 displaying the marginal effect of contiguity spillover over values of decentralization. The impact of contiguity spillover grows steadily as far as decentralization increases.

[Table 2 about here]

[Figure 4 about here]

### ***Horizontal competition and political accountability***

In this last section another key prediction of the decentralization theory is tested: the role of the representation of local officers. As explained above, the idea that a direct election of local officers increases responsiveness and accountability via a better system of incentive is at the core of the political economy approach to fiscal decentralization. In this case we take advantage of the fact that the *rai index* includes an indicator of *representativeness* (see Section 2).

The *representativeness* variable takes values from 0, 1, 3, and 4. Since there are a few regions in values 0 and 1, we have grouped them into one group, ending up with three groups of regions. Also in this case we have included among the regressors interactions variables between representation and our variable of spillover. We only report the marginal effect in Figure 5 below. An increase in the role of spillover arises along higher values of political representativeness. In line with fiscal federalism theory, this suggests that horizontal competition is more effective when political representative are more accountable to citizens.

[Figure 5 about here]

## **5. Concluding remarks: Decentralization theory and the role of institutional complementarities**

The main aim of this paper was to test some central predictions formulated by the theory of decentralization and fiscal federalism about the functioning of local governments. In particular, we have explored the relationship between decentralization and the quality of government at the region level. This allowed us to capture the functioning of this relationship at its core level, also by exploiting the variation present at subnational level both in terms of degree of decentralization and the quality of government. Our second contribution was to introduce a novel approach which goes further standard regression analysis by giving us the distribution of the effect of decentralization on the quality of regional government.

When we look at the relationship between decentralization and the aggregate quality of government we obtain a u-shaped relationship. We also find support for the presence of horizontal competition in more decentralized regions. By looking at the different pillars of the quality of

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<sup>9</sup> We have also tested this prediction by splitting our sample in two groups by taking the median level of decentralization and running the same models as before. Results show a higher role of spillover for the group of high decentralized regions.

governments, we also find a clear positive monotonic relationship between decentralization and the impartiality of local public service provisions. By contrast, there is no evidence that decentralization increases the effectiveness of local public services or reduces corruptions of local governments.

Taken all together, this evidence leads to two main conclusions. Firstly, decentralization comes with some clear benefits on some aspects of the quality of government and some drawbacks. Therefore, whether to decentralize or not has clear political implications. Countries characterized by high heterogeneity in the population, might attach great importance to the impartiality of public service provision for political and social stability. If instead the political target is just that of increasing the efficiency of local public services, decentralization does not seem to be the best option. Therefore, since increasing decentralization seems to have different impact on different aspects of government quality and the way they work, deciding whether to decentralize or not depends on the characteristics of the country as well as on the objectives of the policy makers. The other main finding is when policy makers decide to decentralize, they should do that boldly, both in increasing *self-rule* and *shared-rule*.

In this last part of the paper we would discuss some implications that our evidence might have for the theory of decentralization. While ours is an empirical study, the presence of a u-shaped form of the relationship between decentralization and quality of government seems to suggest something that is different from an *optimal level of decentralization* or a solution such as *the higher the level of decentralization the better the impact on the quality of governments*. By contrast, our results suggest the presence of two “optimal” areas in which the degree of decentralization has a positive effect on the quality of governments. Those areas are characterized wither by low decentralization, or by high decentralization, therefore discouraging middle ways reforms.

Within this respect, we believe that decentralization theorizing would benefit from taking on board some key lessons developed in comparative political economy studies, and particularly from the concepts of *institutional complementarities* and *institutional coherence* (Amable, 2000; Hall and Gingerich, 2009; Hall and Soskice, 2001). This literature shows that institutional settings can be very different and work in an efficient way at the same time. What matters is the coherence of the institutional settings. Our evidence is consistent with the presence of institutional complementarities at work also for decentralization. In fact, decentralization encompasses a number of dimensions, fiscal, political, administrative. It could be that both countries characterized by low decentralization and high decentralization have a better institutional coherence than those with a medium level of decentralization. For example, in the latter case fiscal decentralization could be coupled with low or weak political decentralization. Or regional autonomy could be coupled with a weak power of the regional governments with respect to the central government, i.e. high self-rule with low share-rule. This could result into an incoherent institutional setting with a negative impact on the quality of local government. We believe this represents a fruitful avenue for future research in this area.

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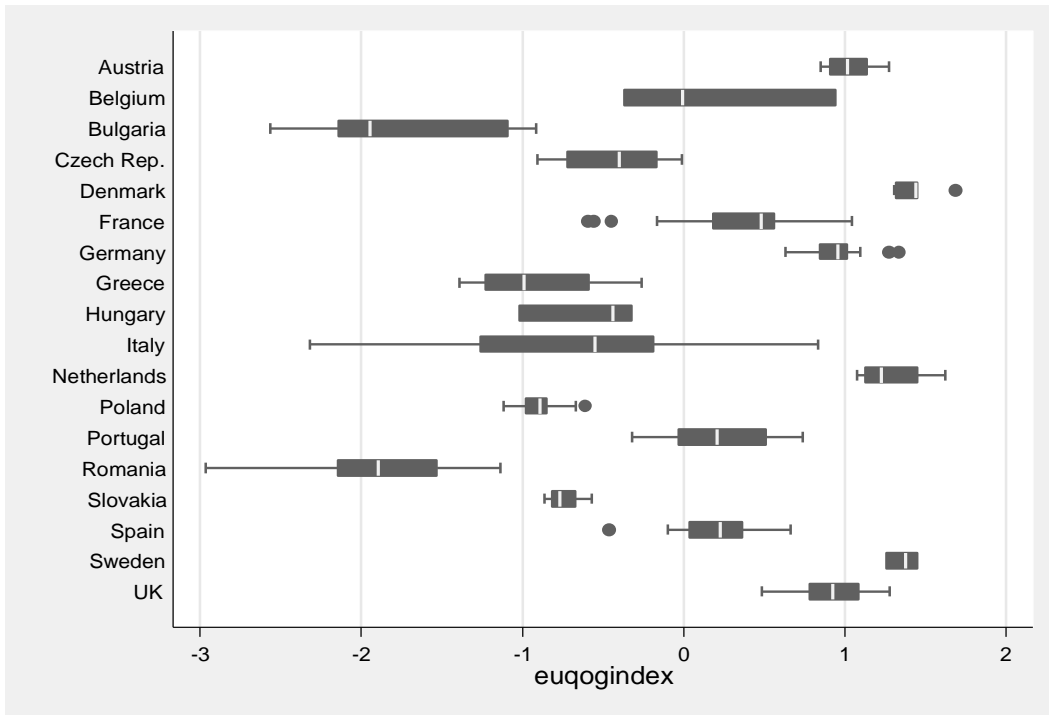
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## Tables and Figures for the text

**Figure 1:** regional quality of governance and sub-national variation



**Figure 2:** degree of political decentralization and sub-national variation

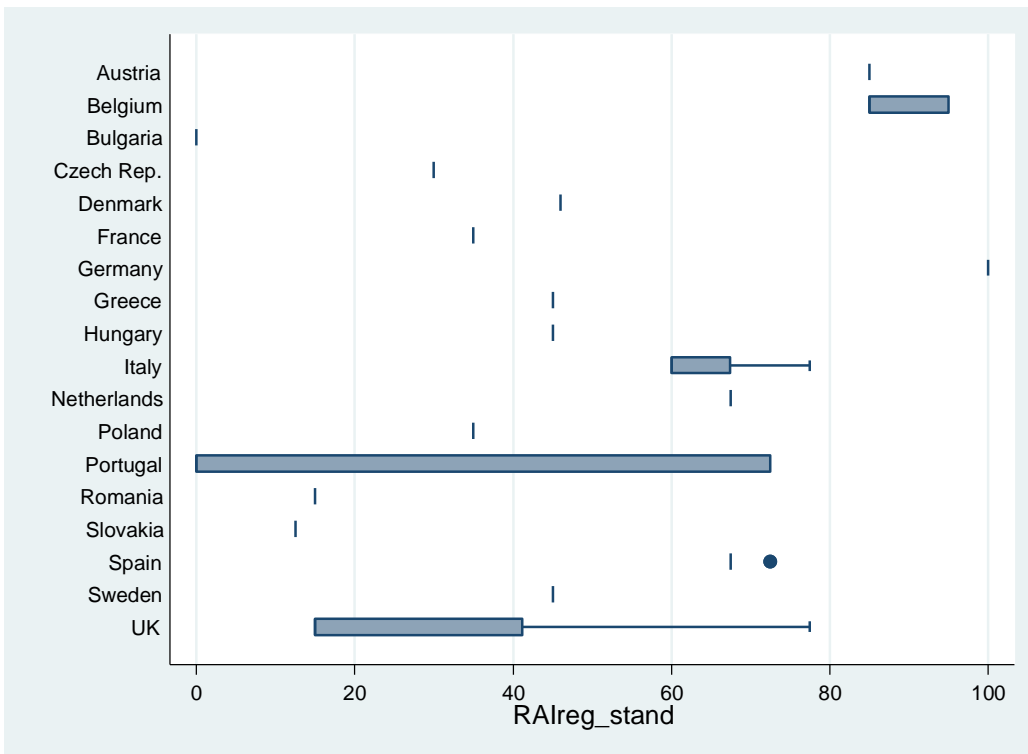


Table 1 - Dose response function of decentralization on the quality of government index and its three pillars

	(1) index	(2) impartiality	(3) corruption	(4) quality
income per capita	1.201*** (0.126)	0.545*** (0.174)	0.964*** (0.159)	1.860*** (0.166)
bilingual region	0.275 (0.229)	0.464 (0.331)	0.372** (0.164)	-0.0173 (0.255)
autonomous region	0.0110 (0.241)	-0.183 (0.263)	-0.0243 (0.164)	0.463 (0.284)
capital region	-0.413* (0.234)	-0.327 (0.248)	-0.618** (0.288)	-0.748*** (0.208)
population of the region	-0.179** (0.0777)	0.0266 (0.0986)	-0.0494 (0.0751)	0.0127 (0.108)
size of the region	0.167*** (0.0606)	0.0701 (0.0906)	0.0965 (0.0595)	0.0969 (0.0765)
infant mortality	-0.0510** (0.0207)	0.0186 (0.0334)	-0.0370 (0.0239)	0.192*** (0.0323)
Constant	-11.79*** (1.411)	-6.350*** (1.979)	-9.824*** (1.681)	-20.41*** (1.900)
Observations	171	171	171	171
R-squared	0.658	0.425	0.529	0.527

Note: Standard errors in parentheses; \* p<0.10; \*\* p<0.05; \*\*\* p<0.01

Figure 3 – Dose response function of decentralization on the quality of government index and its three pillars – impartiality, corruption, and quality of local services.

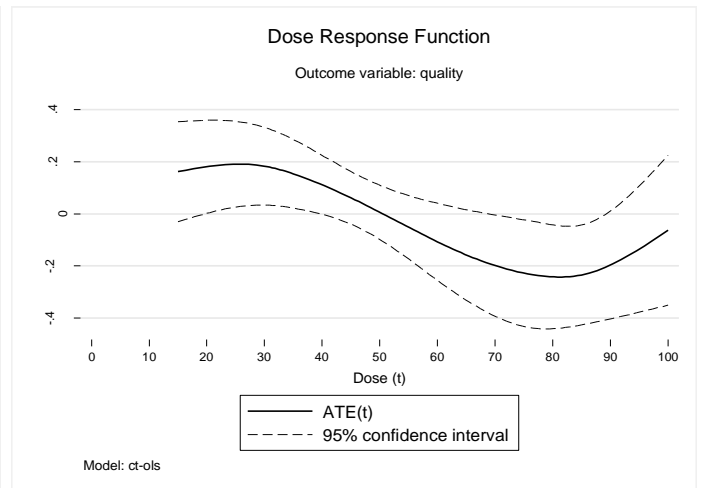
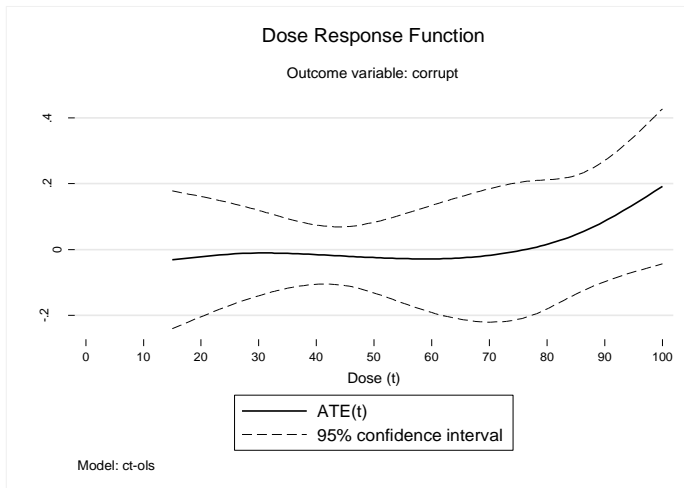
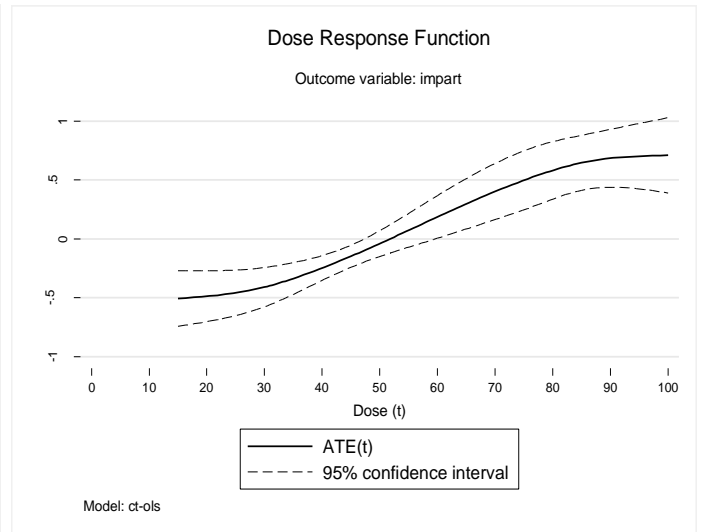
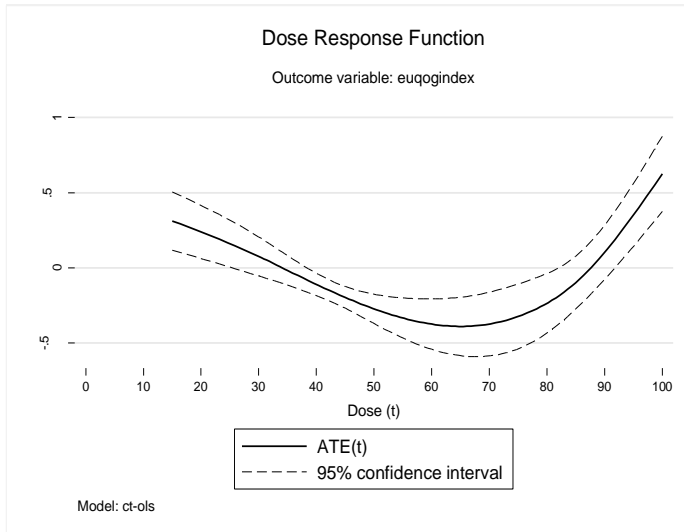


Table 2 – Dose response function and the role of spatial proximity

	(1) index
raireg_l	-0.0292 (0.0632)
spill	0.677*** (0.0892)
c.raireg_l#c.spill	0.0751** (0.0327)
gdp_capita_2008	0.00000890 (0.00000591)
bilingual	0.00233 (0.306)
autonomous	0.116 (0.229)
capitalregion	-0.231 (0.136)
logpop	-0.0762 (0.106)
logarea	0.0519 (0.0400)
infantmort	-0.0350** (0.0139)
Constant	0.107 (0.593)
Observations	171
R-squared	0.824

Note: Standard errors in parentheses; \* p<0.10; \*\* p<0.05; \*\*\* p<0.01

Figure 4 – The role of spatial spillover of decentralization on the quality of regional governments – marginal effect of the variable contiguity spillover at different values of decentralization (raireg\_l)

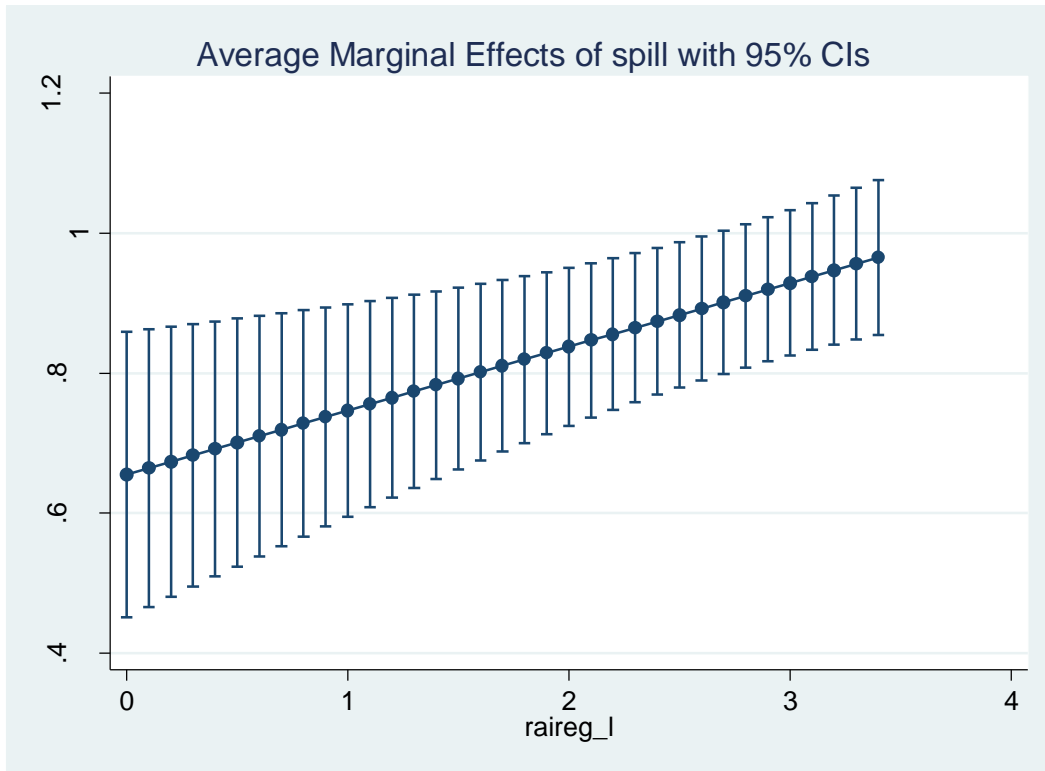


Figure 5 - The role of spatial spillover of decentralization on the quality of regional governments – marginal effect of the variable contiguity spillover at different values of political representativeness

