

OECD Regional Development Working Papers 2013/12

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https://dx.doi.org/10.1787/5k43n1zv02g0-en

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QUALITY OF GOVERNMENT AND THE RETURNS OF INVESTMENT: EXAMINING THE IMPACT OF COHESION EXPENDITURE IN EUROPEAN REGIONS

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This paper sets out to examine the impact of the quality of local and regional governments on the returns of investment, focusing on the returns of EU structural and cohesion funds. Despite the widespread belief that the quality of government affects the returns of public investments, whether this is effectively the case has seldom been proved. Using primary data on quality of government collected by the Quality of Government Institute, combined with World Bank Global Governance Indicators data, we conduct a two-way fixed effect panel regression model for a total of 169 in European regions during the period 1996 to 2007. The results of the analysis underline the importance of the quality of government both as a direct determinant of economic growth, as well as a moderator of the efficiency of structural and cohesion funds expenditure. Our analysis finds that both EU investments targeting regions and quality of government make a difference for regional economic growth, but that above a significant threshold level of expenditure, the quality of government is the key factor determining the returns of public investment. In many of the regions receiving the bulk of structural funds, greater levels of cohesion expenditure would, in the best case scenario, only lead to a marginal improvement in economic growth, unless the quality of government is significantly enhanced.

JEL Classification: O43, R11

Keywords: quality of government, investments, regional development and growth, regions, European Union

1. Introduction

There has been much debate in policy and scholarly circles investigating whether the quality of institutions, in general, and the quality of government, in particular, affects the delivery and efficiency of public investment. The growing agreement is that institutions and quality of government make an important difference for the efficiency in the delivery of public policies and, consequently, for economic development (Amin and Thrift, 1995; Amin, 1999; Hall and Jones, 1999; Acemoglu et al, 2001; Rodrik et al, 2004). Places with weak and/or inefficient institutions suffer from a variety of problems which can range from pervasive corruption, rent-seeking, insider-outsider problems, clientelism and nepotism to principal agent or impacted information problems (Rodríguez-Pose and Storper, 2006). Different combinations of these problems lead to imperfectly functioning markets and institutional and government failure, reducing, in turn, the capacity of governments to adequately design and efficiently deliver public goods and policies.

The European Union (EU) has also adopted the view that poor institutions undermine the returns of public investments. As stated in the EU's Fifth Cohesion Report, "poor institutions can, in particular, hinder the effectiveness of regional development strategies" (EU, 2010: 65). The quality of local institutions is thus considered to mediate the potential returns of investment in regional cohesion: the weaker the institutional setting, the greater the problems in transforming European regional development investment into growth and development. Regions with weak institutions have been considered as incapable of absorbing regional development and cohesion funds and to make the most of the investments taking place in their territory. It comes therefore is no surprise that, as early as 1997 in its draft Agenda 2000, the European Commission sought to establish a ceiling of regional development expenditures, stating that in order "to avoid major problems with regard to absorption, the level of annual aid should increase gradually, subject to the general limit of 4% of national GDP, which would apply to the structural funds and the cohesion fund together" (EU, 1997, page 25).

Yet, despite the growing interest on institutional factors, the empirical literature on how the quality of government impinges on the returns of European public policies and public investments at a regional level is still in its infancy. While in development economics there has been a growing body of literature linking, for example, the institutions associated to colonial origins and economic outcomes (e.g. Acemoglu et al. 2001), there is still relatively little evidence about whether and how the quality of government has shaped the efficient implementation of public policies and the use of public investment at regional level. We know even less about the mechanisms at play in the interaction between regional political institutions – beyond social capital (Beugelsdijk and van Schaik, 2005a and 2005b) and culture (e.g. Tabellini, 2010) – and economic development. At the EU level there is to our knowledge no clear-cut evidence that the quality of government of the different regions affects the returns of European cohesion support and no proof that poor quality of government limits the absorptive capacity of European funds. There is also little evidence, beyond the work of Becker et al. (2012), that the returns of European cohesion efforts decline as cohesion investment increases and none that they diminish when regional transfers exceed a threshold of 4% of GDP.

In this paper we combine data on the investment undertaken by the EU in cohesion and structural policies targeting regions, with data on the quality of government gathered by the Quality of Government Institute at the University of Gothenburg. This allows us to assess whether different local combinations taking into account the rule of law, the control of corruption, government effectiveness, and voice and accountability affect the returns of European structural and cohesion fund investments across the regions of the EU during the period between 1996 and 2007. In particular, we are interested in whether and how the quality of government in any given European region mediates the returns of European investments and whether these effects are larger or smaller beyond a given threshold of cohesion investment.

The results indicate that, although at first sight the quality of government does not seem to affect the returns of European investment across the whole sample of regions considered, it does play a major role in determining whether the cohesion effort is connected to greater growth in those regions receiving the greatest amount of funds. For those regions receiving on average more than 80 euros of cohesion expenditure per capita per year, the quality of government is a basic determinant of whether greater cohesion investment is translated into greater growth. The importance of the quality of government increases significantly as the level of cohesion

expenditure rises. In addition, our analysis using interaction terms, finds that for regions receiving a considerable amount of funds and sharing a similar level of quality of government, greater expenditure does not necessarily translate into greater economic growth, unless the quality of government is improved.

2. Institutions, quality of government and economic development

Across all areas of the social sciences there is a growing scholarly consensus that institutions matter for economic development. Economic sociologists (Tönnies, 1887; Weber, 1921; Granovetter, 1973; Coleman, 1988) have for now more than a century been stressing the importance of institutions for the effectiveness of public policy and economic development. Different types of institutions not only create the rules of the game by which economic activities are governed, but also *de facto* shape the incentives and disincentives driving economic interactions, making them essential determinants for the economic outcomes in any given territory. The baton laid by economic sociologists has been taken over in recent decades by a raft of other social scientists. Geographers (Amin and Thrift, 1994; Amin, 1999), political scientists (Putnam, 1993, 2000) and economists (North, 1990; Acemoglu et al., 2001; Rodrik et al., 2004) have of late delved into how institutions shape and determine economic development, indicating that long-term economic outcomes tend frequently to be the result of institutional conditions more than of alternative economic factors (Rodrik et al., 2004).

One essential form of political institution is that related to the quality of government. Government, in general, and local and regional governments, in particular, are the key organisations determining the rules of the game at the local level. The quality of local governments is therefore likely to affect the efficiency and the returns of any type of public investment. Accountable and transparent governments, staffed by well-trained civil servants and led by trustworthy politicians who have the interests of the local community at heart will, in all likelihood, design and implement policies and public goods which benefit the whole community and result in inclusive sustainable development. Unaccountable governments, poorly staffed and with inept and/or corrupt politicians at the helm will, by contrast, deliver inefficient policies or, worse still, lead to situations where rent-seeking and insider-outsider problems become the norm.

The views that institutions matter and that the quality of local governments affects the effectiveness and returns of public policies has been assimilated by the EU in the application of its regional cohesion policy. This is important because, although all member states of the EU should have adopted the so-called, *Acquis Communautaire*[1] or the accumulated legislation and court decisions of the EU, it is plainly evident that the functioning of these formal institutions varies considerably from country to country and even within countries. This is because, as underlined by Vachudova (2009), especially in the case of former transition countries which have joined the EU since 2004, the requirements to improve the transparency and efficiency of state institutions have been adopted, rather than enforced. This leads to still considerable differences across the EU in the quality of formal institutions and, in particular, in those of informal institutions, with corruption and clientelism still representing major obstacles for the full establishment of the rule of law in many areas of the former transition countries of Central and Eastern Europe (Guasti and Dobovsek, 2011). Hence, across parts of Europe we find different combinations of corruption, pervasive rent-seeking, self-serving decision-makers, and low quality of bureaucracy – all indicators of the presence of weak governmental institutions and a low quality of government – which are likely to hurt the effectiveness of all types of public policies and, in the case of the EU cohesion effort, may undermine the assimilation of funds and affect the potential returns of EU expenditure in structural and cohesion funds. Furthermore, the quality of government at the local level is a key element in multilevel forms of government for coordinating actions across tiers of government, aligning policy objectives, enhancing the delivery of goods and services, and ensuring the local needs are represented and taken into account in the policy design across the different layers.

1. From an institutional perspective and following the Copenhagen criteria for EU membership, the *Acquis Communautaire* implies democracy, the rule of law, respect for human rights and the protection of minorities, and a functioning market economy.

From this perspective, the lower the quality of government, the lower the capacity to absorb development funds, and the lower the efficiency and returns of public investments. This sort of reasoning is at the heart of the 4% of GDP expenditure limit proposed in the Agenda 2000: if institutions and the quality of government of any given European region are deficient, more expenditure on development would not lead to the expected results, unless the institutional conditions which limit the effectiveness of expenditure are not improved.

3. Measuring the quality of government

Linking government quality to the returns of public policies is difficult and there is little empirical evidence so far that establishes such a nexus. Perhaps the main problem in this respect is that of defining and measuring the quality of government. Government quality is an elusive concept. It may mean different things to different people and it is likely to be affected by myriad of factors. Notwithstanding this, the number of studies and indices which have looked at issues of quality of government and governance at national level has not ceased to grow (e.g. Kaufman et al., 2009). However, subnational regions, cities and localities remain – despite the perception of wide internal variations in quality of government within countries – virtually uncharted territories. Some studies have ventured more in depth into how the quality of governmental institutions affects economic performance in different parts of the country. This type of analysis been very prevalent for the case of Italy, where a large number of local *Meridionalisti* (e.g. Trigilia, 1992; Diamanti et al., 1995; Bodo and Viesti, 1997) and many foreign scholars (e.g. Putnam, 1993) have delved for the roots of the differences in development between the North and the South of the country, among other factors, in the variation in the efficiency of local governments between diverse parts of Italy. But analyses covering subnational entities beyond the borders of the nation-states are conspicuously absent.

This lack of comparable data on the quality of government across national borders for Europe has recently been addressed by a report by the Quality of Government Institute of the University of Gothenburg (Quality of Government Institute, 2010). This study resorts to survey data from 34,000 respondents, living in 172 NUTS1 and NUTS2 regions (NUTS2 is largely equivalent to the OECD's Territorial Level 2)[2] in 18 EU states[3] in order to measure the perception of the quality of regional and local governments across Europe. In the report, following Rothstein and Teorell (2008), the quality of government is assimilated to the concept of impartial government institutions, that is "when public officials who implement policies do not take anything about the citizen/case into consideration that is not beforehand stipulated in the policy or the law" (Quality of Government Institute, 2010, page 9). In order to operationalise this concept, the Quality of Government Institute resorts to decomposing the idea of quality of government into four components: a) rule of law; b) corruption; c) quality of the bureaucracy or bureaucratic effectiveness; and d) democracy and the strength of electoral institutions (Quality of Government Institute, 2010, page 21).

Thirty-four questions regarding all these four components were included in a survey which – after the thematic and geographical aggregation of the different answers by the 34,000 respondents – resulted in the formation of a regional-level quality of government index and to the first mapping of regional government quality across regions of the EU in the year 2009 (Figure 1).

2. There are five countries: Belgium, Germany, Greece, the Netherlands and the UK where TL2 corresponds to NUTS1 regions. In the rest of European countries, TL2 corresponds to NUTS2.

3. The 27 states of the EU are covered when the World Bank Global Governance Indicators are included in the main index.

Figure 1. Regional quality of government index, 2009

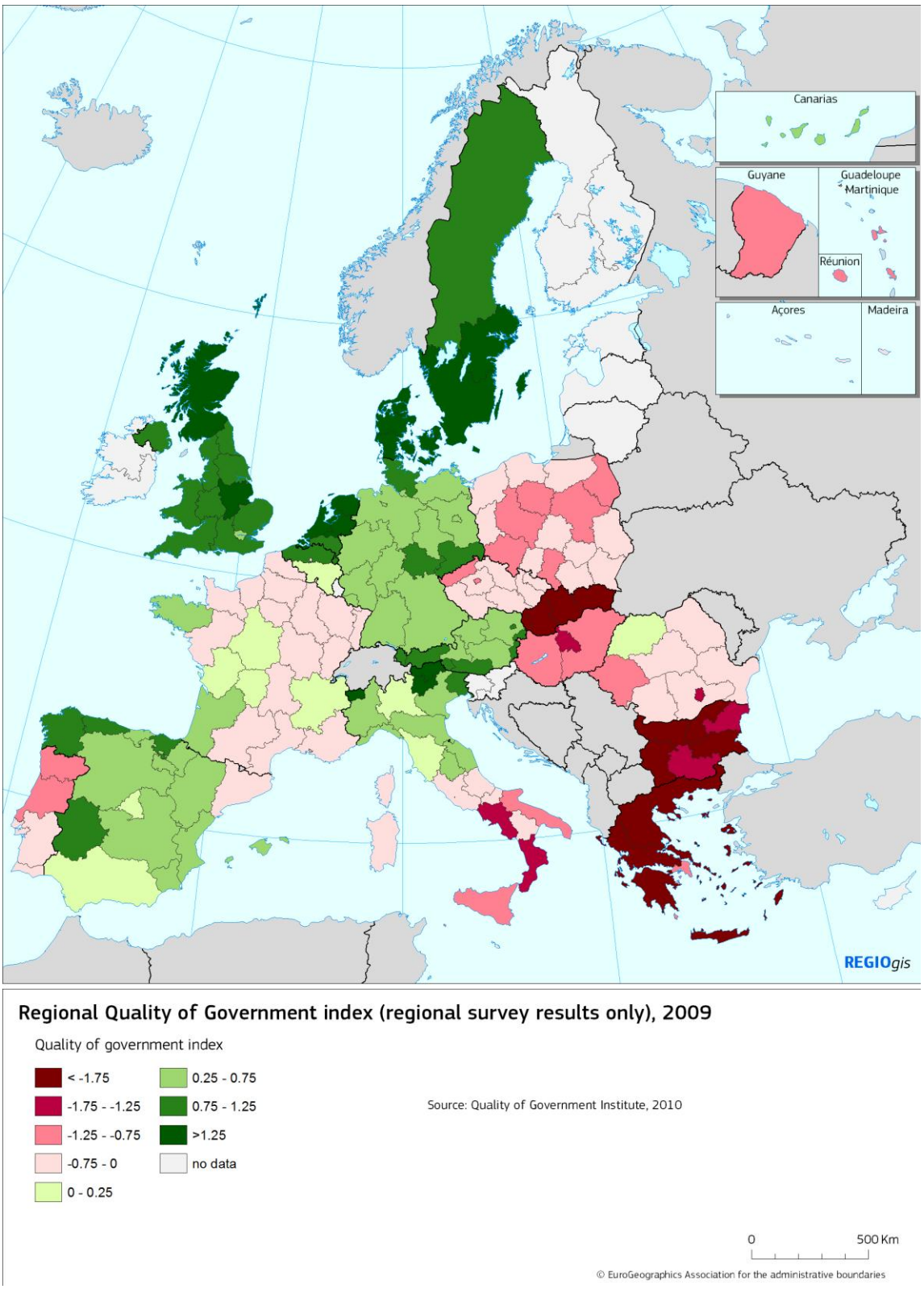
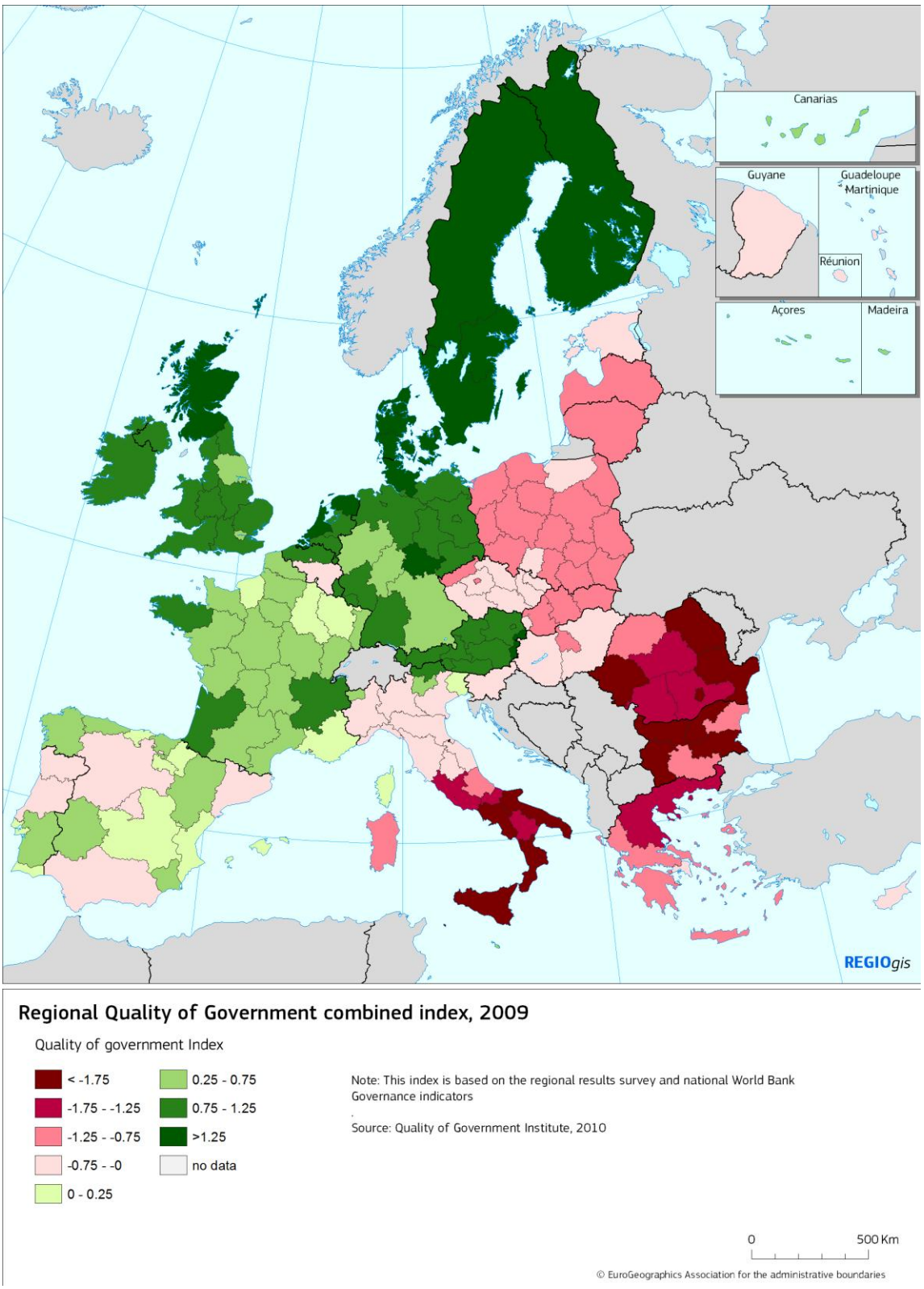


Figure 1 reveals the presence of a West/East and, to a much lesser extent, North/South divide in the subnational quality of government in Europe. Regions in Sweden, Denmark and the Netherlands rank among those with the best quality of government in Europe, as do Scotland and the East Midlands in the UK. Among the regions in the South, Trentino-Alto Adige and Valle d'Aosta are also amongst the best performers. Some Spanish regions, such as Asturias, the Basque Country, Extremadura or Galicia also score highly in the index, as is the case of Friuli-Venezia Giulia in Italy. The worst scores are found in the South East of Europe. Bulgarian, Greek and Slovakian regions have, according to the results of the survey, the worst quality of government. Some southern Italian regions, such as Calabria and Campania, are also perceived to be in the same category.

Internal contrasts are visible in a number of countries. This is more evident in countries with an overall low subnational quality of government (Slovakia being the main exception). Italy represents the most extreme case. While some northern regions have levels of quality of government matching those of Scandinavian countries or the Netherlands, there is very little difference in the perception of the quality of government between regions in the South of the country and those of Bulgaria or Romania. In Romania some regions in the west of the country – Nord Vest and Centru – perform relatively well, whereas the quality of government for Bucharest is regarded to be well below the national mean. Strong internal variation can also be observed in Belgium, Bulgaria, Portugal, or Spain.

The data provided by the Quality of Government Institute are only available for a single year (2009). Following Charron et al. (2012), we interpolate values across a longer time period by combining the data with the World Bank's World Governance Indicators, available at the national level. The assumption is that regional variations within countries are relatively stable; and variations at the national level are captured by the World Bank World Indicators. Details on how this indicator is calculated can be found in Charron et al. (2012). The combined interpolated data for 2009 is presented in Figure 2. It displays a picture of quality of government in Europe which is strongly associated to the levels of socio-economic development and social trust of the regions of the EU, but uncorrelated to other factors, such as population and area size (Charron et al., 2012). The strong West/East divide in quality of government of Figure 1 is maintained, but the North/South divide becomes even more pronounced (figure 2). The introduction of the World Bank Global Governance indicators in the resulting regional index drags down the scores for the quality of government fundamentally in Romanian, Italian and Spanish regions, while the highest scores remain concentrated in Scandinavia, West and North Netherlands, Scotland, Schleswig-Holstein, Thuringia, and Burgenland. Slovakian regions, by contrast, no longer rank amongst those with the lowest quality of government in Europe.

Figure 2. Regional quality of government combined index, 2009



4. Model and data

Given that "good governance is a necessary requirement for countries to foster economic development" (Quality of Government Institute, 2010, page 19) and government quality determines the capacity to transform investment into economic activity and development, this implies that the quality of government mediates the returns of public policy.

Our analysis explores whether this is the case in Europe: do the economic returns of structural funds and cohesion investment in Europe depend on the quality of government of the regions where the investment takes place? Our aim is to assess the extent to which the quality of local or regional governments might mitigate or enhance the effects of structural and cohesion fund investment on regional economic performance.

Model specification

Our econometric model uses panel data and aims to assess the returns of European investment in economic and social cohesion at a regional level and, more specifically, to determine whether these returns are affected by the quality of the government of the regions receiving funds, while controlling for a series of regional factors deemed to affect economic performance. In this interactive model, the growth of GDP per capita across regions in Europe between 1996 and 2007 is specified by the following equation:

$$\Delta y_i = \alpha + \beta y_i + \delta Cohesion_i + \phi QGov_i + \gamma Cohesion * QGov_i + \boldsymbol{\varphi}\mathbf{X}_i + \upsilon_i \qquad (1)$$

Where:

Δy is the average annual growth of real GDP per capita of region i over the period 1996-2005;

y_i is the GDP per capita in the previous period in region *i*;

Cohesion is our main independent variable of interest and represents the per capita investments undertaken by the European Union in region *i* under the structural and cohesion policy framework;

QGov is our moderator, proxied by the composite indicator of the quality of government in any given European region collected by the Quality of Government Institute at the University of Gothenburg;

*Cohesion*QGov* is the interaction term between the previous two variables;

X denotes a vector of variables controlling for other factors assumed to influence growth, including the level of education and training of the adult population of the region, measures of infrastructure endowment, levels of employment, and agglomeration effects and finally

υ is the corresponding disturbance term.

Our main interest lies in the coefficients δ, ϕ, and γ, which intend to capture the connection between the level of investments of the EU on regional cohesion, the quality of regional and local governments, and the interaction of both terms, respectively, with economic growth.

By expanding model (1), we obtain the following specification, which is used as our empirical model:

$$\ln\left(\frac{GPDpc_{i,t}}{GDPpc_{i,t-1}}\right) = \alpha + \beta_1 \ln(GDPpc_{i,t-1}) + \beta_2(CohesionExp_{i,t-1}) + B_3(QualGov_{i,t-1}) + \beta_2 \ln(InfrastDen_{i,t-1}) + \beta_4 \ln(Primary\ Education_{i,t-1})$$
$$+ \beta_5 \ln(Tertiary\ Education_{i,t-1}) + \beta_6(Emp\ Rate_{i,t-1}) + \beta_7 \ln(Emp\ Density) + \beta_8 \ln(Pop\ Density) + \gamma_j C_j + \varphi_t T_t + u_i + e_{i,t} \quad (2)$$

Data

As mentioned previously, our dependent variable represents the average annual growth of real GDP per capita of region i over the period 1996-2007. The main independent variable of interest is structural fund and cohesion investments undertaken by the European Union targeting NUTS2 regions. Quality of government is our moderating variable and we control for the interaction between cohesion investments and quality of government.

The public investments financed by the European Union (*CohesionExp*) are measured over the period between 1996 and 2007, and represent the actual payments – rather than the commitments, as in a number of prior studies on the impact of structural and cohesion funds – to European regions. Unfortunately, these data do not cover public investments financed by regions and by national governments. Such data exist only for a very limited number of countries. The variable thus represents a fraction of all public investment, and a highly variable fraction at that, as there are large differences in the degree to which regions draw on EU financing. These differences are explicitly addressed in some of the models below.

The quality of institutions is proxied by the use of a quality of government (*QualGov*) composite index. As indicated earlier, this index is constructed for 172 European regions by the Quality of Government Institute at the University of Gothenburg (see QGI, 2010, for full details of its construction). The measure is a composite indicator of government quality based on survey data of public perceptions of four components of governance. These components include (1) the rule of law, (2) corruption (3) the quality of the bureaucracy and (4) democracy and the strength of electoral institutions. The main problem with this indicator is that it was collected in 2009/2010 and only for that year. This implies that there are no time series of quality of government data at the regional level, making it problematic to introduce this indicator in a panel data analysis. We are therefore left with an option which includes a rather strong assumption.

The option used in order to circumvent the problem of lack of time series in quality of government data across European regions is to assume that the quality of government detected in every region in 2009 has evolved in a similar way as changes in governance at the national level over time. We therefore follow Charron et al. (2012) and interpolate the quality of government composite index with a national governance variable extracted from the World Bank Governance Data. The components included in the World Bank national governance indicators encompass (1) rule of law (2) governance effectiveness (3) control of corruption (4) voice and accountability. Mixing both indices gives us a regional indicator of quality of government which varies for the whole period of analysis. This means that we are using the Quality of Government Institute's (2010) combined with the quality of government index (see Figure 2) as an independent variable, rather than the regional quality of government index (Figure 1).

Our third key independent variable of interest is the interaction term for public investment and the quality of government (*CohesionExp*QualGov*). The introduction of this interaction represents an effort to discern to what extent, if any, the impact of public investments depends on quality of government.

In addition, a number of control variables which, according to the theoretical and empirical literature, may affect regional economic performance in Europe are also included in the analysis. Data for the control variables are taken from the OECD Regional Database. The key control variables are:

InfrasDen: Infrastructure density defined by motorway kilometres by population;

Education: The percentage of adults having either only completed primary school (*Primary Education*) or with a university degree (*Tertiary Education*) represent our proxies of the level of human capital of the workforce.

Emp Rate: The rate of employment in the region;

Density: Employment density (*Emp Density*) and population density (*Pop Density*) capture agglomeration effects and are measured as employment per square kilometres and population per square kilometres, respectively

GDP t-1 is the previous level of GDP *per capita*.

Our model specification considers a two-way fixed effect panel regression model, with heteroskedasticity robust estimators and country (*C*) and time (*T*) controls. Our sample of regions totals 169 (three regions had to be dropped from the analysis) in 18 different countries in the European Union. Most data are gathered – following the territorial division used in order to compile the Quality of Government indicator – at NUTS2 level, with the exception of data for Belgium, Germany, Greece, the Netherlands and the UK, which refers to NUTS1 regions. The time period covered in the analysis is limited to the years between 1996 and 2007, due to the lack of availability World Bank Global Governance Indicators before 1996.

5. Results of the analysis

As mentioned earlier, the analysis is conducted – in order to take advantage of the panel dimension of the data – following the assumption that the quality of government in every EU region has evolved in a similar way to changes in the quality of governance at the national level. By interpolating the quality of government regional index with a national governance variable extracted from the World Bank Governance Data, we achieve a continuous variable of quality of government (*QualGov*) which can be used both as a moderator of the returns of cohesion investment and main effect, and as one of the two components of the interaction.

Using these variables, we are capable of examining the link between investments in EU cohesion policy (Table 1, model 1) and quality of government (Table 1, model 2), on the one hand, and economic growth, on the other, separately; of both factors together (Table 1, model 3); and of both main components with their interaction (Table 1, model 4)

The empirical model is estimated first including all regions considered in the analysis, regardless of the level of expenditure in each of the regions by the EU (Table 1). This analysis provides evidence that EU-financed public investment has had a positive and statistically significant link with regional growth, regardless of the quality of local and regional government. The coefficient of the average expenditure per head per region in cohesion funds is always positive and significant, whereas that referring to the quality of government remains statistically insignificant (with the exception of model 3), despite having a positive sign. The interaction between cohesion investments by the EU and the quality of government is also insignificant, pointing to the possibility that the investment efforts by the EU may work regardless of the quality of the government of the region where the expenditure takes place.

Table 1. Impact of public investment and quality of government on regional growth, no threshold

Dep. Variable GDP pc growth	model 1	model 2	model 3	model 4
ln GDPpc	0.00119	0.00693	0.00076	0.00078
	(0.00848)	(0.00976)	(0.00878)	(0.00877)
Cohesion expenditure pc	3.16e-05**		3.05e-05**	3.10e-05**
	(0.00001)		(0.00001)	(0.00001)
Quality of government		0.00384	0.00380*	0.00392
		(0.00277)	(0.00217)	(0.00243)
Cohesion exp x quality gov				0.00000
				(0.00001)
Primary education	-0.0847*	-0.0670**	-0.0804**	-0.0807**
	(0.04110)	(0.02810)	(0.03790)	(0.03730)
University education	-0.01250	-0.02010	-0.00525	-0.00543
	(0.05030)	(0.04530)	(0.04870)	(0.04830)
ln Transport density	0.00275**	0.00238**	0.00253**	0.00253**
	(0.00124)	(0.00110)	(0.00116)	(0.00115)
Employment rate	0.00061	-0.00142	0.00075	0.00075
	(0.00075)	(0.00156)	(0.00070)	(0.00076)
ln Employment density	-0.05440	0.03140	-0.07020	-0.06990
	(0.04460)	(0.08410)	(0.04050)	(0.04350)
ln Population density	0.05660	-0.03090	0.0726*	0.07230
	(0.04480)	(0.08480)	(0.04070)	(0.04380)
Constant	-0.03030	0.10900	-0.05590	-0.05530
	(0.11500)	(0.13900)	(0.10900)	(0.11300)
Time controls	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes
Observations	972	1,017	972	972
R-squared	0.261	0.238	0.264	0.264
No. of countries	18	18	18	18

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

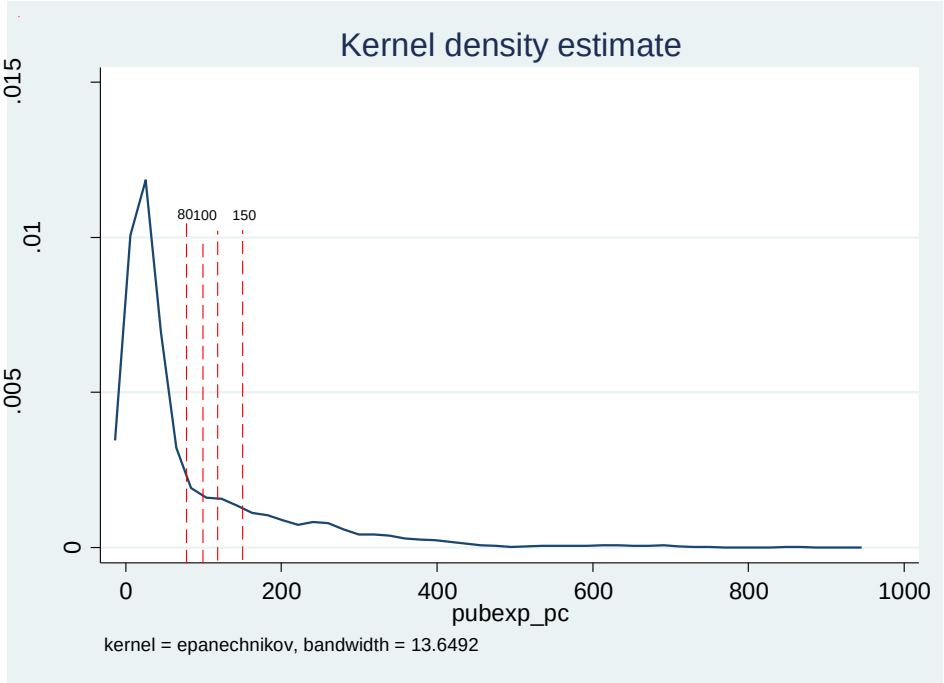
The relationship between the control variables and regional economic growth are generally as expected. The presence of low skilled workers – proxied by the percentage of the adult population with low levels of educational attainment – influences growth negatively and infrastructure endowment has a positive impact. The stock of the total population with university education, employment rates, and employment density are insignificant across all specifications of the model. Population density is only positive and significant in regression 3.

However, the results presented in Table 1 may be somewhat misleading, as the sample includes all regions in the EU and is not particularly focused on those regions which receive the bulk of the cohesion effort. Hence, the presence of a large number of regions that are relatively well-off, where EU intervention in order to achieve greater cohesion is very limited, and where the overwhelming majority of public expenditure is bound to come from local, regional and national sources, rather than from the EU, may bias the results. EU structural fund and cohesion intervention in most of these regions would be insufficient to make any real difference in economic performance.

As can be seen in Figure 3, EU-financed public investment varies widely across regions and this variation is decidedly non-linear. The great majority of European regions are located on the left-hand side of the distribution and receive funds that normally range between 0 and 60 euros per inhabitant per year. By contrast, a much smaller number of regions (represented by the long tail to the right of expenditure

axis), following the principle of concentration of funds in those regions with the greatest need, are allocated the bulk of cohesion resources. These regions include the so-called 'convergence' regions – formerly known as 'Objective 1' regions – which, by definition, are considerably poorer and, in general, also tend to have greater government quality problems. These regions are, moreover, concentrated in specific parts of Europe – mainly in central and eastern and southern Europe – which, as we saw in Figures 1 and 2, are precisely those with the lowest levels of quality of government. Consequently, there is some reason to believe that there may be a good deal of covariation in the expenditure and government quality variables – that is, highly supported regions tend to be more prevalent in countries where the quality of government scores are lower.

Figure 3. Distribution of EU funds per capita: Kernel density estimate



Given the very unequal distribution of cohesion funds across the regions of the EU, we assume that quality of government may only make a real difference in the impact of European cohesion expenditure in those regions which received a considerable amount of funding per head per year. We therefore divide the sample following a series of thresholds according to the amount of money received by each region in any given year. These thresholds are established at 80, 100, 120 and 150 euros of regional expenditure per capita, allowing us to discriminate between the effects of public investment and quality of government on regional performance on regions benefiting from different levels of public intervention. We take the threshold of a minimum of 100 euros of structural and cohesion fund expenditure per capita as our benchmark model for those regions receiving the bulk of the funds (Table 2) and look at whether the results of the interaction between structural fund expenditure and the quality of government change as the level of transfers per head increases (Table 3).

Table 2. Impact of public investment and quality of government on regional growth, threshold 100 EUR

Dep. variable GDP pc growth	model 1	model 2	model 3	model 4
ln GDPpc	-0.0494**	-0.0116	-0.0603**	-0.0621**
	(0.02070)	(0.01570)	(0.02020)	(0.01970)
Cohesion expenditure pc	2.12E-05		1.41E-06	1.72e-05**
	(0.00002)		(0.00002)	(0.00001)
Quality of government		0.0136**	0.0125***	0.0225***
		(0.00514)	(0.00336)	(0.00633)
Cohesion exp x quality gov				-4.39e-05**
				(0.00002)
Primary education	-0.328***	-0.105*	-0.281***	-0.286***
	(0.08980)	(0.05380)	(0.06070)	(0.06150)
University education	-0.189	0.0587	-0.121	-0.129
	(0.11400)	(0.05930)	(0.07690)	(0.07770)
ln Transport density	0.0124**	0.00398	0.0111**	0.0119**
	(0.00474)	(0.00365)	(0.00401)	(0.00379)
Employment rate	0.000967	0.00057	0.000933	0.000987
	(0.00138)	(0.00155)	(0.00117)	(0.00124)
ln Employment density	-0.104	-0.114	-0.120*	-0.135**
	(0.08050)	(0.07760)	(0.05660)	(0.05330)
ln Population density	0.111	0.12	0.128*	0.144**
	(0.08250)	(0.07760)	(0.05740)	(0.05380)
Constant	0.546**	0.00242	0.596**	0.595**
	(0.23500)	(0.20000)	(0.21500)	(0.22400)
Time controls	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes
Observations	218	263	218	218
R-squared	0.336	0.379	0.355	0.362
No. of countries	10	14	10	10

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

The results for those regions receiving a substantial amount of structural and cohesion fund expenditure per capita (Table 2) differ considerably from those for the whole sample (Table 1). Although the coefficients for the control variables are, with exception of the initial GDP per capita of the region and some of the coefficients for employment and population density, virtually unchanged, the results for cohesion expenditure per capita, quality of government and their interaction tell a very different story:

- In regions where, given the level of expenditure, structural and cohesion fund investments may make a real difference, the quality of government trumps cohesion expenditure as the main variable of interest determining economic growth.

- Above a threshold of a 100 euros expenditure on structural and cohesion funds per person and per annum, any greater investments on cohesion is not translated into greater economic growth (Table 2, model 1).

- By contrast, for those regions receiving the bulk of the European cohesion effort (Table 2, model 2), the quality of the local or the regional government is an essential factor influencing economic growth.

- When both factors are considered together (Table 2, model 3), the coefficient for quality of government remains positive and significant while that for cohesion expenditure is still insignificant.

- The introduction of both factors together with their interaction in Table 2, model 4, makes the coefficient of all three variables significant, although quality of government remains by far the most significant of the three variables. Cohesion expenditure becomes positive and significant – although the coefficients are very close to zero – whereas the interaction between cohesion expenditure and quality of government seems to point in the direction of a very marginal reduction of the effect of quality of government as cohesion expenditure increases.

In order to check whether these results are robust, in Table 3 we consider different expenditure thresholds for structural and cohesion funds (no threshold, 80, 100, 120, and 150 euros per capita per annum in any given region). It is worth noting that, as the threshold of structural and cohesion investments per capita per annum increases, the number of observations and the number of countries affected declines rapidly. Whereas the whole sample included a total of 972 observations and 18 countries for which a full set of variables are available, when the 80 euro threshold is applied only 252 observations in 11 countries remain. By the time we reach the 150 euro threshold, the sample is limited to 165 observations in 10 countries.

Table 3. Impact of public investment and quality of government on regional growth, different thresholds

Dep. Variable GDP pc growth	model 1 No threshold	model 2 >80€	model 3 >100€	model 4 >120€	model 5 >150€
ln GDPpc	0.00078	-0.0472**	-0.0621**	-0.0816***	-0.0720***
	(0.00877)	(0.01820)	(0.01970)	(0.02400)	(0.02210)
Cohesion expenditure pc	3.10e-05**	1.71e-05***	1.72e-05**	2.54e-05*	1.48E-05
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00002)
Quality of government	0.00392	0.0186**	0.0225***	0.0258***	0.0315***
	(0.00243)	(0.00611)	(0.00633)	(0.00627)	(0.00721)
Cohesion exp x quality gov	-9.94E-07	-4.07e-05**	-4.39e-05**	-5.49e-05**	-6.83e-05***
	(0.00001)	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Primary education	-0.0807**	-0.273***	-0.286***	-0.311***	-0.280***
	(0.03730)	(0.05040)	(0.06150)	(0.04910)	(0.05020)
University education	-0.00543	-0.127	-0.129	-0.156**	-0.0967
	(0.04830)	(0.07290)	(0.07770)	(0.06600)	(0.06740)
ln Transport density	0.00253**	0.00998**	0.0119**	0.0134***	0.0144***
	(0.00115)	(0.00363)	(0.00379)	(0.00397)	(0.00332)
Employment rate	0.000746	0.000532	0.000987	0.000774	-0.000369
	(0.00076)	(0.00149)	(0.00124)	(0.00101)	(0.00119)
ln Employment density	-0.0699	-0.112	-0.135**	-0.113*	-0.0646
	(0.04350)	(0.06770)	(0.05330)	(0.05170)	(0.06690)
ln Population density	0.0723	0.119	0.144**	0.122**	0.0715
	(0.04380)	(0.06880)	(0.05380)	(0.05220)	(0.06820)
Constant	-0.0553	0.496*	0.595**	0.842**	0.844**
	(0.11300)	(0.22300)	(0.22400)	(0.30400)	(0.31900)
Time controls	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes
Observations	972	252	218	193	165
R-squared	0.264	0.342	0.362	0.35	0.346
No. of countries	18	11	10	10	10

Note: Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The application of the different thresholds corroborates the results of the regressions for the more than 100 euros threshold reported in Table 2:

- Above an expenditure threshold of 80 euros per head per annum, the coefficient for the cohesion expenditure variable is always very close to 0 and keeps on losing significance as the threshold increases.

- For those regions receiving more than 150 euros per person additional investments in structural and cohesion funds becomes totally dissociated from greater economic growth (Table 3, model 5).

Hence, the positive and significant association between this variable and economic growth reported in Table 1 (and also in Table 3, model 1) gradually evaporates, leading to a much stronger and significant connection between government quality and regional economic performance. Indeed, at relatively high levels of cohesion expenditure per capita, the quality of local or regional government always dominates the level of expenditure per head as the key predictor of the returns of cohesion investment. Beyond 80 euros of expenditure in regional development per capita per annum, the coefficient for quality of government is always highly positive and significant. And this relationship becomes progressively reinforced as the threshold of expenditure is increased (Table 3, models 2 to 5). The association between quality of government and regional economic performance is considerably stronger when the threshold of expenditure is above 120 euros per head per annum in any given region than when the threshold is limited to 80 euros. It is strongest for those regions receiving more than 150 euros per inhabitant per year.

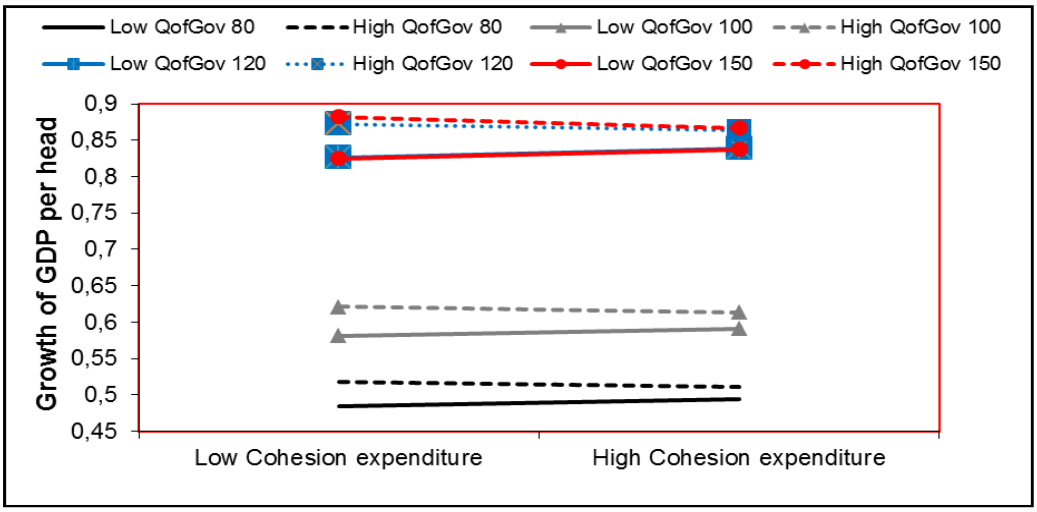
The introduction of the interaction between public investment and quality of government (Table 3) further reinforces the importance of the quality of government variable in determining the returns of cohesion expenditure. As seen in Table 2 and reproduced in all regressions for Table 3 – with the exception of when the no expenditure threshold is applied (model 1) – the introduction of the interaction term not only reinforces the positive and significant coefficients associated to the quality of government variable, but also renders the cohesion investment variable positive and significant, with the only exception of the regression where the threshold is set at 150 euros.

However and against expectations, the coefficient of the interaction term between cohesion investment and quality of government above the 80 euro per head investment threshold is always negative and significant, and very close to 0 (Tables 4, models 2 to 5).

In order to correctly interpret the interaction between regional government quality and EU investments in cohesion and structural policies, we plot in Figure 4 the two-way interaction effects for the unstandardized variables using the procedures of Aiken and West (1991) and Dawson and Richter (2006).[4]

4. The webpage *www.jeremydawson.co.uk/slopes.htm* contains various Excel worksheets which help interpret the interaction effects.

Figure 4. Two-way interaction effect for quality of government and cohesion expenditure



Note: unstandardized values

Figure 4 plots the returns of EU investments (low- and high-cohesion expenditure in the x-axis) in terms of economic growth per capita (y-axis), taking into account the quality of government at the different thresholds of cohesion expenditure considered in the analysis. Several conclusions can be extracted from this Figure.

First of all, it is evident that the returns of European investment in regional cohesion increase as the threshold of investment per capita per annum increases. The returns are higher at a 100 euro threshold than at an 80 euro threshold. In turn, regions which receive more than 120 euros of structural and cohesion fund expenditure per annum do better in growth terms than those getting a minimum of 100 euros. However, the increase seems to stop at 120 euros, as there is virtually no difference between the returns experienced by regions receiving more than 120 euros and those receiving more than 150 (please note that the two lines for low quality of government for expenditure thresholds of 120 and 150 euros overlap). In this respect, our results confirm that poor quality of government may be at the root of what Becker et al. (2012) describe as declining returns of regional development funds in Europe as the transfer intensity increases. These authors, using a radically different method, reach the conclusion that in a considerable number of European regions the transfer intensity of European regional funds exceeds what can be considered the efficiency maximising level. They even highlight that, in some cases, a reduction of transfers would not affect regional economic performance (Becker et al. 2012).

Second, in all categories considered, regions with a higher quality of government perform significantly better at the same level of cohesion expenditure than those with a lower quality of government.

Third, although increasing cohesion investment helps reduce the gap in the economic returns experienced by high quality government and low quality government regions, this reduction is marginal and does not suffice to overcome the quality of government gap which is the main explanation behind the difference in the returns from cohesion expenditure of regions benefiting from a similar level of European regional cohesion support.

To give a more precise idea of the dimension by which differences in quality of government trump the potential effects of additional cohesion investment on regional growth, we have performed some calculations based on Figure 4. The results indicate that above a certain threshold of cohesion expenditure per capita, investing more in cohesion expenditure has positive, but very limited returns on the growth of GDP per head. At levels of more than 80 euros in cohesion expenditure per head per annum, increasing the amount of cohesion funds by one standard deviation in a region with a low quality of government yields an added growth of a mere 1.9% above what would have been achieved had that additional investment not taken place. The positive influence of any further cohesion investment declines as the investment threshold rises: the additional impact on growth is of 1.7% above 100 euros of expenditure; 1.6% above 120; and 1.5% above 150. By contrast, increasing the quality of government by that same standard deviation would lead to significantly higher rises in growth. The additional impact of improving the quality of government hovers just below 7% across all categories, with the exception of the 120 euro threshold (5.6%). The positive impact of improvements in quality of government is somewhat lower for those regions which benefit from levels of support which are considerably higher than the pre-established threshold. Yet, even in those cases, improving the quality of government would yield greater returns than continuing to increase cohesion expenditure. The additional effect of improving quality of government by one standard deviation in these cases ranges between a minimum of 2.9% additional growth (above 120 euros) and a maximum of 3.9% (above 100 euros).

6. Conclusions

In this paper we have analysed the extent to which the returns of European regional development and cohesion investment across the whole of Europe are affected by the quality of the government of the regions receiving the funds. The capital role played by government quality on the returns of public policy has been strongly posited by the literature dealing with the economic implications of institutions. It has also been indirectly presumed by the EU in its structural and cohesion policy by the mere fact of having discussed a cap on the amount of resources which could be channelled to specific regions on the basis of their capacity to absorb and adequately use funds. However, to date there has been no empirical demonstration that quality of government is a strong mediator of the returns of European cohesion investment and that regions with lower quality governments experience greater difficulties in transforming structural and cohesion funds into greater economic growth and development.

Using the quality of government index of the Quality of Government Institute at the University of Gothenburg (Quality of Government Institute, 2010) and complementing it with the World Bank Global Governance indicators, the results of our panel data analysis for the period between 1996 and 2007 demonstrate that, although at first sight quality of government does not appear to affect the returns of European investments for all the regions in Europe, its effect as a moderator kicks in above a certain threshold of expenditure. When a region receives a level of investment in cohesion and regional development which can be considered more than testimonial, the quality of the local government becomes a vital factor in determining the extent to which the regional development investment is transferred into economic growth. This is clearly evident for regions where structural and cohesion funds represent more than 80 euros per head per year. In these regions the importance of quality of government, both as a factor for economic growth on its own and as a mediator for an efficient use of structural cohesion funds, increases as the expenditure threshold rises. Beyond levels of cohesion expenditure which exceed 120 euros per person and per year the most efficient way to increase the returns of the European effort on territorial cohesion is best done by an improvement of the quality of government of any given region. Pouring more funds into the region will simply not do the trick.

Hence, it can be said that both EU investments targeting regions and quality of government make a difference for regional economic growth, but above a certain threshold of expenditure (which our analysis establishes at levels of cohesion expenditure of around 120 euros per person per annum), the quality of

government becomes the basic factor determining the returns of public investments. In many of the regions receiving the bulk of structural funds, greater levels of cohesion expenditure would, in the best case scenario, only lead to a marginal improvement in economic growth, unless the quality of the government is significantly improved.

Overall, our analysis has contributed to the rapidly expanding literature on how institutions shape economic performance and the returns of economic policy at a regional level in Europe (Rodríguez-Pose, 2013). As in the case of Beugelsdijk and van Schaik (2005a, 2005b) and Tabellini (2010), it demonstrates how regional institutions in Europe are key shapers of economic performance. In particular, in has shown that, in the case of European cohesion investment aiming at the development of regions, there are no shortcuts: the returns to investment do not come necessarily from the degree of investment itself, but from the quality of government of the region receiving the support. Improvements in the quality of government are thus likely to lead to greater returns to public investment. In addition, the need to address quality of government bottlenecks in order to maximise the returns of cohesion investment becomes all too evident the greater the level of investment. In these regions, simply throwing greater amount of funds at areas with inefficient and/or corrupt governments will lead to waste, unless the quality of government is seriously improved.

Our findings give thus support to the broad thrust of recent EU Cohesion Policy changes, aimed at shifting to 'softer' forms of infrastructure, while simultaneously setting up systems and incentives (linked to results indicators, conditionalities, and greater monitoring) targeting the improvement of local governance and institutions. They also raise warning signs for development policies elsewhere around the world. If development policies are to be successful, they should build in an institutional component, including promoting transparency and accountability and dealing with corruption as ways to improve the quality of government, as an essential part of the strategic planning process. Otherwise the implementation of one-size-fits-all policies may not yield the expected results. Taking into account place-based institutional conditions and learning how institutional quality can be consistently improved hence needs to become a basic element for any development strategy (Barca et al. 2012).

Acknowledgements

We are grateful to Lewis Dijkstra, Philip McCann, Attila Varga, two anonymous referees and participants at seminars in Newcastle, Glasgow and Bratislava for comments to earlier versions of the paper. Lewis Dijkstra provided a clean and fit-to-publish version of the two maps. We would also like to acknowledge the generous financial support of the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013)/ERC grant agreement nº 269868.

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