

RESEARCH ARTICLE

Individual trust and quality of regional government

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Abstract

The impact of trust on economic performance has been widely explored, but the reasons for its variability across countries are not well understood. We analyse the effect of the quality of government at the regional level on individual generalized trust in a multi-country context across regions in Europe. Social phenomena are often subnational and a number of public services are provided at a subnational level; the trust of individuals living in the same country may, therefore, differ by region depending also on the quality of the local government. As a proxy of the quality of institutions, we use the European Quality of Government Index, calculated at the regional level over 27 European Union (EU) countries. The analysis conducted on data extracted from the European Social Survey 2012 refers to 142 regions from 15 EU member states. Considering the clustered nature of the data, a multilevel approach is used. The findings show that living in a region with high-quality local government positively influences individual trust. This positive association survives the inclusion of several contextual regional variables.

Keywords: Trust; regional institutions; European regions; multilevel model

1. Introduction

The impact of generalized trust (GT hereafter) on economic performance has been widely explored. A number of studies concluded that trust is essential for cooperation in economic, social and political relationships both at the individual and aggregate levels. At the individual level, trust is related to higher rates of subjective well-being. At the aggregate level, trust improves a country’s economic performance by its capacity to reduce transaction costs.

GT in other people concerns beliefs about ‘generalized others’ when no specific information exists (Yamagishi, 2001). Although it is not obvious what people mean when they say that they trust others in general, one possible interpretation is that people express their perception of the moral standard in the society they live in (Uslaner, 2002). If one perceives the moral standard to be high, cooperating with unknown others is easier. According to Gambetta (1988), for example, trust can be considered as the subjective probability with which an individual assesses that another individual or group of individuals will perform a given action. Trusting people one does not know leaves the trustee exposed to the possibility of betrayal. However, if collective beliefs about the good-will of generalized others are in some way fostered, society overall can benefit from the advantages of cooperation. Trust in people known personally, the so-called particularized trust (Uslaner, 2002), instead, implies that an individual only trusts close friends and relatives, but is distrustful of people outside her/his social network. This mind set, therefore, is able to resolve only reasonably small-scale problems and, sometimes, it may produce undesirable effects for those outside the social network.

Comparative studies reveal important differences in GT between countries around the world. In Denmark, Norway and the Netherlands, for example, around 65% of people declare that they believe ‘most other people can be trusted’, whereas in countries such as Brazil and Turkey, only about 10%

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agreed with the statement. In Great Britain, Germany, Italy, Spain and the United States, the percentage is about 35 (Rothstein and Eek, 2009).

As pointed out by Arrow (1972), almost every economic transaction requires trust. When transactions involve an unknown counterpart, when they are not completed on the spot, but take place over a period of time, GT is, in effect, particularly important (Guiso *et al.*, 2006). It favours cooperative behaviour and hence facilitates exchanges in the presence of imperfect information and incomplete contracts. Recent empirical studies (Zak and Knack, 2001, among others; see Algan and Cahuc, 2014 for a review) confirm what Arrow theorized: trust appears to be a key determinant of growth. A positive relation between trust and investment (e.g. Bjornskov, 2012) and between trust and innovation (e.g. Barrutia and Echebarria, 2010) is also documented in the literature. At the individual level, the list of positive correlations between GT and desirable outcomes is quite long: education, health, income, personal happiness and tolerance towards minorities (Rothstein and Eek, 2009).

Given that GT is a key resource, it is important to know the reasons for the disparity in trust levels around the world. Individual-level studies usually ignore contextual effects and find that trust is much higher among richer, well-educated, healthy individuals and married persons and that men are slightly more trusting compared to women. If the variance in individual characteristics across countries is small, however, variability in GT might be largely influenced by institutional differences (Graafland, 2020). Indeed, there is a growing consensus that individual-specific attributes, as well as aggregate factors, shape levels of trust.

Yet, although Axelrod (1984) had already stated that trust could develop due to the quality of the legal system and several scholars have taken into account the quality of institutions, at a theoretical level there is no unique explanation of trust, and at an empirical level there is not concordance as regards the results of studies (Robbins, 2012).

The extant theoretical explanations of trust revolve around the role of institutions, that of society or of cultural norms. The institutions-centred strand of the literature sees institutions as having a causal effect on trust; it considers government exogenous and causally prior to GT. Within this strand of the literature, however, the lack of theoretical consensus over how the state impacts trust has led to two competing perspectives. From the *political-institutional perspective*, state institutions are a stimulus to trust; not corrupt, impartial government institutions based on norms of universality, implement policies in an equitable manner, thereby contributing to the growth of GT (Freitag and Bühlmann, 2009; Robbins, 2012). From the *crowding-out perspective*, on the contrary, institutions crowd out the need for trust. In other words, well-functioning institutions are a substitute for trust (Gellner, 1988).¹ Findings from cross-national research tend to support the former (Robbins, 2011). In fact, since institutions are not everlasting, inviolable or infallible, it is unrealistic to think that they make trust redundant (Rothstein and Stolle, 2008).

The society-centred approach emphasizes trust as a personal trait inherited over generations largely through parental socialization (e.g. Ljunge, 2014; Putnam, 1993). Social interaction, through voluntary associations, is the most important mechanism for the generation of social capital. However, as affirmed by Nannestad (2008), skills and attitudes people learn through membership in voluntary associations can only be used in the group context; membership in voluntary associations, therefore, does not of itself create GT. Empirical support for the approaches based on the role of social networks is, in fact, mixed (Newton and Norris, 2000). For instance, Herreros (2004) finds support for the civic society explanation, whereas Delhey and Newton (2005) find that membership in voluntary associations have little effect on GT.

Closely linked to the society-centred approach, the cultural approach sees trust as influenced by cultural norms transmitted through interaction and, therefore, as relatively stable.

¹Zucker (1986) argues that, when in late nineteenth century the traditional bases for interpersonal trust were eroding because of a high immigration into the United States and growing economic uncertainties, trust was re-established through the rise of institutions such as banks. To the rise of banks, i.e. corresponded a shift from interpersonal trust to institutional trust. It could be inferred that what institutions crowd out is interpersonal trust, not GT. We thank a reviewer for this observation.

This paper is related to the institutions-centred strand of the literature, more specifically to the political-institutional perspective. Because of the impossibility of knowing the trustworthiness of most people in a society, individuals rely on imperfect information when forming their beliefs about GT. They draw personal conclusions from the actions of others and if they cannot trust judges, policeman, physicians and teachers, it is very difficult to trust others in general. People living in societies characterized by the presence of corrupt and unjust institutions seem, in fact, to develop mistrust and pessimism towards others (Csepeli *et al.*, 2004). People living in society where institutions provide sanctions and incentives that reduce uncertainty, and create expectations of commitment (Herreros and Criado, 2008), have an optimistic outlook for future interactions with general others; institutions perceived as fair, instil in individuals a feeling of inclusiveness which fosters GT.

To take the quality of institutions into account, empirical studies have usually aggregated individual-level data for trust to the national level (Delhey and Newton, 2005; Knack and Keefer, 1997; Zak and Knack, 2001) or the regional level (Charron and Rothstein, 2018). A few scholars, conceding that individual trust is affected by micro-level and macro-level factors, analyse these two levels simultaneously in the same framework (e.g. Freitag and Bühlmann, 2009; Wang and Gordon, 2011). As in Freitag and Bühlmann (2009) and Wang and Gordon (2011), our aim is to estimate both the influence of contextual, especially quality of government (QoG hereafter), and individual-level factors simultaneously, focusing in particular on the regional context in a multi-country framework. Indeed, evidence on how sub-national institutions affect trust at a micro-level is scarce. To the best of our knowledge, only Camussi and Mancini (2019) have tried to answer a similar question, but they focus on just one country, Italy.

The influence of the quality of regional institutions is important because, although citizens have a relationship with the national government in the sense that they are bound by its laws, their everyday relationships with institutions are most likely to be local. A number of public services are, in fact, provided at a sub-national level and people interact with representatives of local institutions, such as health care workers and teachers. As GT might be interpreted as people's moral evaluation of the society they live in, the behaviour of public officials observed in frequent interactions may become a sort of proxy used to form beliefs about the extent to which people in general can be trusted (Rothstein and Stolle, 2008).

Within a country, public services such as education, health care and law enforcement may well differ widely in quality depending on the region. By examining the European regional ranking provided by Charron *et al.* (2014), a cross-cutting diversity in institutional endowment emerges, with the differences among regions, within the same country, often being larger than those between countries. For instance, the gap between Northern and Southern regions of Italy is well-known (Putnam, 1993), but there are also less-known variations within other European countries (EC hereafter), including Belgium, Portugal, Romania and Spain (Charron *et al.*, 2014).²

Because of the heterogeneity in the quality of regional government in Europe, analysing the relationship between QoG and GT in a regional framework for a number of EC is of particular interest. In fact, unlike comparisons at the country level, the regional focus seems to be a suitable way to tap into this variability, and yield additional insights into the effect of QoG on individual trust.

The structure of the data, where individuals are nested in regions and regions in countries, brings out the need for a multilevel approach. This approach estimates both the influence of contextual and individual-level factors simultaneously, in a statistically accurate way, thereby obviating the problem of the wrong level.³

²The differences in trust between regions in Europe are also marked. The highest proportion of people reporting that they generally trust others is found in the Copenhagen region (80%), whereas the lowest proportion is found in a region in Slovakia (8%). Thus, a 10-fold difference in trust can be found between different regions within Europe (Charron and Rothstein, 2018).

³Indeed, the studies based on aggregation of individual-level data ignore the within-group information and are subject to the ecological fallacy that occurs when a result obtained at an aggregate level may not be confirmed by the analysis on an individual basis. Micro-founded analysis is preferable since it controls for any potential aggregation bias. However, working

To analyse the effect of the quality of regional institutions on individual trust in a multi-country context we consider countries within the European Union (EU). As a proxy for institutional quality, we use the European Quality of Government Index (EQI), calculated at the regional level for 27 EU countries (Charron *et al.*, 2014). The analysis is conducted on data extracted from the European Social Survey (ESS) 2012 and refers to 142 regions in 15 EU countries selected from the information in both data sets.

The paper is structured as follows. Section 2 reviews the literature. Data are presented in section 3 and the econometric strategy in section 4. In section 5, results are presented and some concluding remarks are proposed in section 6.

2. A brief literature overview

In the literature, a much debated question is whether trust is mostly a cultural trait transmitted from one generation to the next or the result of living in a law-abiding institutional environment.

In the cultural perspective, latent features of the individual, such as optimism or norms learned through socialization, explain variations in GT (Uslaner, 2002). Alesina and Giuliano (2015), for example, argue that GT is a cultural trait⁴ and that culture may evolve in differing ways depending on the type of institutions, but the same institutions may function differently in different cultures; culture and institutions interact and evolve in a complementary way.

The society-centred approach emphasizes that memberships in voluntary associations and civil society engagement are the main drivers of social capital. Several scholars, including Putnam (1993) and Fukuyama (1995), argue that social capital determines the performance of a society's institutions. Putnam (1993), for example, considers social capital as a determinant of the performance of local government across Italian regions. He finds that the regions in which individuals participate in civic activities are also the regions where local governments record better objective measures of performance, such as in the provision of public goods.

From an alternative perspective, trust might be the result of the institutional environment in which individuals are embedded (Robbins, 2011). Within this literature, however, there is little agreement among state-centred scholars on the way in which institutions impact trust. In particular, in the political-institutional perspective, state institutions are a great stimulus to trust, whereas in the crowding-out perspective, they destroy traditional social relationships and informal institutions amplifying individuals' dependence on the state.

A number of scholars consider political institutions and the overall character of the state as a possible explanation for variations in GT and, focusing on one country or a number of countries, find confirmation of the political-institutional perspective (Rothstein and Eek, 2009; Rothstein and Stolle, 2008). In particular, among the empirical studies on one country, Rothstein and Stolle (2003) and Kumlin and Rothstein (2005) find that GT in Sweden might be explained by trust in law enforcement agencies as well as by the perceived impartiality of welfare-state institutions.

Among the authors that try to establish how GT, in a number of countries, might be explained, Bjørnskov (2004) shows that a high level of GT is strongly correlated with a low level of corruption. Bidner and Francois (2011), using the International Property Rights Index, try to establish why people are more trusting in some places than others and find that well-functioning institutions build trust. Delhey and Newton (2005) conduct a comparative analysis of GT in 60 countries. They find that trust is high in countries characterized by good government and affirm that uncorrupted government seems to create a framework in which people can act in a trustworthy manner and expect others to do the same. Furthermore, they find that high levels of trust are associated with ethnic homogeneity, Protestantism and wealth and income equality.

with micro-data may lead to the absence of any link between individual-level and group-level relationships and, thus, to the atomistic fallacy.

⁴Guiso *et al.* (2008) show how individual beliefs are firstly acquired through cultural transmission and then gradually updated, after experiencing the real world, from one generation to the next.

However, among those conducted at the country level, alongside studies where institutional quality is found to produce GT, there are others that find a reverse causality (e.g. Bjørnskov, 2010) or a reciprocal relationship (e.g. Robbins, 2012).

Among studies adopting a multilevel strategy, Wang and Gordon (2011) estimate to what extent the variance in reported trust is due to individual specificities and how much depends on the country itself. By using the Fraser Institute's Legal System and Property Rights index as an indicator of formal institutions, they find that both the context and institutions matter. Freitag and Bühlmann (2009) analyse differences among respondents in 58 countries and variations in levels of trust between countries with different institutional configurations simultaneously. They find that citizens are more likely to trust each other in countries whose authorities are perceived as honest and whose welfare institutions reduce income disparities. Herreros and Criado (2008) find that the efficacy of state institutions fosters individual GT in 22 EC.

Charron and Rothstein (2018) aggregate data of a survey over 85,000 citizens living in 206 regions of 24 EC and use an empty hierarchical model with the regional level of trust as dependent variable and country-level random intercepts to account for how much of the total variation in GT is explained at the regional and country levels. They find that, although the country context is highly relevant, a sizeable portion of the variation is left unexplained if one ignores the regional level, particularly in countries with high levels of regional variation, such as Belgium, Germany and Italy. Moreover, they find evidence that institutional quality is the strongest determinant of regional variations in trust within countries.

As in Charron and Rothstein (2018), our aim is to study the role of the QoG at the regional level, but our focus will be on individual trust rather than on regional values.

To the best of our knowledge, only Camussi and Mancini (2019) analyse how the quality of local public services in Italy influences individual trust. Using data from the Istat survey Aspects of Daily Life, they build a quality of local services indicator at the level of the local labour market areas and estimate its effect on GT, controlling for individual and local labour market characteristics and provincial fixed effects. They find a positive relationship between the quality of local services and individual GT.

Our study falls within the political-institutional strand of the literature, but differs from the previous studies because we focus on the regional context and, using a multilevel approach, examine how the quality of local institutions influences individual GT across regions in 15 EC.

3. Data

The data used in the paper come from the ESS, a biennial cross-sectional survey that provides a representative sample of individuals for a large number of EC. The questionnaire aims to monitor values, attitudes, behavioural patterns and opinions on a wide range of social items; it also includes the demographic and socio-economic characteristics of the respondents. ESS Multilevel Data version is used with reference to year 2012. This version contains data on individuals (ESS respondents), regions (data mainly collected from EUROSTAT) and countries (different sources).

The dependent variable Trust is measured according to the standard survey question 'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?' This question, adapted from Rosenberg's (1956) misanthropy index, has been used in many surveys, e.g. the European Values Survey, the World Values Surveys and the British Household Panel Study. The exact formulation of the question and the response categories offered to participants vary between surveys. Respondents in the original measure have to choose between 'most people can be trusted' and 'you cannot be too careful'.

The question has been criticized for being imprecise (Hardin, 2006; Nannestad, 2008), for reducing a presumably continuous characteristic to a dichotomous answer obliging the respondent to choose between trust and caution (Lundmark *et al.*, 2015) and for failing to capture any meaningful concept of trust. Some authors contend that it is unclear what this question really measures (e.g. Sobel, 2002) and that, since it does not specify conditions or provide a reference group, it leaves a number of interpretations open to the respondent (Hardin, 2006). In particular, it leaves the interpretation of who

'most people' are to the survey respondents, who may interpret this differently under different circumstances in different societies (Glaeser *et al.*, 2000). Respondents might, i.e. base their answers on their own situations, often, culturally conditioned. If this was the case, estimates across countries obtained by using the responses to the trust question would be not very reliable. Furthermore, the external validity of the trust question might be questioned since it may not have predictive power for people's trusting behaviour as measured in experiments. Glaeser *et al.* (2000), for example, tested whether trust questions from surveys predict actual, incentivized trusting behaviour in the trust game and did not find any relation between the answers in survey questions and trustor's behaviour.

However, besides such experimental paradigms as the trust game, the most common method for measuring trust is the use of GT questions in surveys. Although the dichotomous version of the most-people question was the standard for many years, the ESS provides a question on GT whose answers are scaled from 0 ('not at all') to 10 ('complete trust'), rather than just a binary choice. It is also useful noting that, when an individual interacts with strangers, they can be of two types, trustworthy and untrustworthy; each individual has priors concerning the partner's type. The idea that 'most people can be trusted' can constitute this type of priors about a stranger's type. Furthermore, the trust game tests a specific strategic situation and trustor behaviour might not be a reliable indicator of the generalized form of trust caught by the ESS question or related ones. However, some studies provide validation that the mean response to the standard survey question is positively and highly correlated with trust experimentally measured (Cox *et al.*, 2009; Johnson and Mislin, 2012). Bellemare and Kröger (2007), for example, find that survey questions about trust are predictors of trusting behaviour. For all these reasons, we are confident that the measure used fits with the objective of our analysis.

Because the aim of the paper is to examine how institutional quality influences individual trust across regions in Europe, as a proxy for the quality of institutions, we use the EQI, calculated at the regional level over 27 EU countries. The EQI derives from a dataset developed by Charron *et al.* (2014) that contains information from a survey carried out in 172 sub-national regions aimed at capturing average perceptions and experiences of corruption and the extent to which people consider the public services provided by their region impartial and of good quality. The focus is on education, health care and law enforcement. The answers lead to the construction, based on factor analysis, of the three indicators reflecting perceptions of the quality, impartiality and level of corruption of the regional government. The average of these three pillars forms the final figure for each region (for more information, see Charron *et al.*, 2014).

To assess the objective of the paper, the ESS database has been merged with the EQI database by means of the territorial identification for the respondent in ESS. Table A1 in the online Appendix reports the countries for which the merging has been possible, the distribution of individuals by country of the ESS dataset and the sample used in this paper.

4. Econometric strategy

To analyse, in a multi-country context, the effect on trust of the QoG at the regional level, microdata are used and the individual represents the unit of analysis. Because each individual lives in a region and each region is located in a country, the data have a clustered structure. The individuals who live within a region are probably more similar to each other than a randomly selected group of individuals would be, because they share the same external environment. Thus, error terms among the individuals within a region can be correlated, and the assumption of independence of ordinary least squares (OLS) estimation may be violated, resulting in downwardly biased standard error estimates and large test statistics. Multilevel modelling relaxes this assumption and, consequently, provides more statistically reliable estimates than those ignoring the hierarchical nature of the data.⁵

⁵One possibility for relaxing the assumption of independence is using OLS with the cluster option. Compared with OLS without clustering, this option increases the error term to accommodate the lack of independence of individuals within regions. However, it leaves both the noise associated with differences between individuals and the noise associated

This technique explicitly models the within-group homogeneity of errors by allowing the estimation of error terms for both the individual and the group. Moreover, multilevel models have the ability to examine the effects of variables at both individual and group levels simultaneously, as well as possible cross-level interaction effects. Indeed, in the multilevel analysis, variables at different levels are not simply added to the same single-level equation, but are linked together in ways that make the simultaneous existence of distinct level-one and level-two equations explicit. In this way, level-two factors are used not just as independent variables to explain variability in a level-one dependent variable, but also to explain variability in random intercept and random slopes (Bickel, 2007).⁶ Considering as a group, the region in which the individual lives, an econometric specification of the multilevel model may be expressed as follows:

$$trust_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + e_{ij} \quad (1)$$

where the $trust_{ij}$ is the level of trust of individual i ($i = 1 \dots N_j$) living in region j ($j = 1 \dots r$); X represents a variable measured at the individual level; β_{0j} is the intercept; β_{1j} is the slope coefficient and e_{ij} is the random error term with zero mean and variance σ_e^2 . In equation (1), the regression parameter β_{0j} varies across level-two units. The specification used here is a random intercept model, that is:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}R_j + u_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} \quad (3)$$

In doing so, β_{0j} differs across regions and depends on R_j , a variable defined at the regional level, whereas u_{0j} is the random error term defined at the group level with zero mean and assumed to be independent of e_{ij} . Moreover, X_{ij} and R_j are assumed not to be correlated with the error terms, e_{ij} and u_{0j} . The random component u_{0j} captures variability in the intercept across clusters, whereas the fixed component γ_{00} is a weighted average of the intercept across all clusters; γ denotes the fixed level-two parameters.

The combination of micro (equation (1)) and macro models (equations (2) and (3)) produces a two-level mixed equation:

$$trust_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}R_j + (u_{0j} + e_{ij}) \quad (4)$$

The deterministic part of the model, $\gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}R_j$, contains all of the fixed coefficients, whereas the stochastic component is in brackets. The error term captures the residual variance, in the same way as OLS regression does, and the group-to-group variability of the random intercepts. It is clear that the error term displayed in equation (4) is not independently distributed. Indeed, as data are nested at different levels of analysis, individuals belonging to the same group tend to have correlated residuals, thus violating the assumption of independence.⁷

with differences between regions in the error term, whereas the multilevel model allows to separate these two errors (see equation (4)).

⁶The possibility of employing contextual factors to explain variability in random components is the main difference between a multilevel model and random coefficient regression.

⁷A way to interpret the relative magnitude of the variance components is to compute the variance partition coefficients (VPCs), which are the proportion of the variance that lies at each level of the model hierarchy. The VPC at the regional level is calculated as the ratio of the regional variance to the total variance, that is:

$$VPC_{u_0} = \frac{\sigma_{u_0}^2}{\sigma_{u_0}^2 + \sigma_e^2}.$$

The specification adopted in this paper is a random intercept model. In particular, the final model is:

$$\text{trust}_{ij} = \beta_0 + \sum_{v=1}^k \beta_v X_{vij} + \psi \text{QoG} + \sum_{q=1}^n \omega_q R_{qj} + \sum_{c=1}^{14} \eta_c C_{ci} + u_{0j} + e_{ij} \quad (5)$$

where X is a vector of individual-level variables, QoG is our variable of interest (the indicator of the QoG or its components) and R represents a number of control variables at the regional level that may affect the individual level of trust.

Given the hierarchical structure of the data, a three-level mixed model with random intercepts at both the region and country levels could be used. However, in the sample used, the data from only 15 countries were available. Because accurately measuring the between-group variance requires a ‘sufficient’ number of clusters – at least twenty (Rabe-Hesketh and Skrondal, 2008) – as in Aslam and Corrado (2012), countries (C) are treated as fixed effects.⁸ Controlling for country fixed effects allows us to remove the effect of the common national institutions. Moreover, as a robustness check, we also present the estimate of a three-level mixed model (see section 5).

The empirical model expressed by equation (5) relates the individual level of trust to certain individual characteristics and regional variables. Trust outcome is treated as a continuous variable ranging from 0 to 10. A multilevel cumulative logit model is, however, also implemented as a robustness check (see section 5).

The choice of individual characteristics has been made in accordance with the previous literature, and the signs of the expected correlations are briefly outlined in Table 1, which synthesizes the list of variables with their description and summary statistics.⁹

As far as the specific scope of this paper, the idea is that, within the same country, people can have different access to collective provisions depending on the region where they live. Therefore, the individuals’ trust in the same country may differ by region, depending also on the quality of public administration at the regional level. To measure the quality of public administration at the regional level, the EQI and its sub-categories are used. Higher values of the EQI and of the quality and impartiality scores correspond to better institutions. In case of corruption, the value is computed so that it takes on higher values for lower levels of corruption. To minimize the possibility of endogeneity, 2010 values for EQI, sub-indicators and contextual variables are used.

As control, contextual variables such as per capita GDP and the population size of the regions are considered. Indeed, previous studies pointed out that per capita GDP matters for trust at the country level (e.g. Freitag and Bühlmann, 2009; Zak and Knack, 2001), furthermore, larger countries might be less trusting compared to small countries motivating us to investigate these relationships across European regions. Concerning per capita GDP, the main argument is that wealthier societies provide people with conditions favouring the acceptance of risk and make them more willing to take a chance in trusting strangers. Regarding population size, in larger countries, the cultural and ethnic diversity is often more pronounced, which would also suggest that they are less trusting compared to small countries (Bjørnskov, 2007). Most research, in fact, documents a negative relationship between ethnic diversity and GT (e.g. Alesina and La Ferrara, 2002).

⁸In a fixed-effects approach, the number of groups is not important, but the dimension becomes crucial as the estimated group-effect is unreliable for small-sized groups. In random-effects models, the clusters must be sized with at least two observations.

⁹More explanatory variables should have been included, such as indicators for legal marital status and the presence of children living at home. However, we omitted legal marital status because non-responses on this variable led to a marked drop in sample size (50%). We excluded from the model the presence of children living at home because the coefficient of this variable was not significant, as in Robbins (2011).

Table 1. Summary statistics of individual level variables and expected effect

	Description	Obs.	Mean	SD	Min	Max	Expected effect
<i>Dependent variable</i>							
Trust	Question 'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?' Answers are recorded from 'not at all' (coded as 0) to 'complete trust' (coded as 10).	22,891	4.9	2.4	0	10	
<i>Independent variables</i>							
Life satisfaction	How satisfied with life as a whole: 0 means extremely dissatisfied and 10 means extremely satisfied	22,891	6.8	2.4	0	10	Positive
Social engagement	How often socially meet with: dummy equal 1 if at least one a week or more	22,891	0.6	0.5	0	1	Positive
Health	Subjective general health: 1 very good, 2 good, 3 fair, 4 bad, or 5 very bad	22,891	2.3	0.9	1	5	Positive
Religiosity	How often do you attend religious services: dummy equal 1 if at least one a week or more	22,891	0.1	0.3	0	1	Positive
Citizen of the country	Are you a citizen of – Dummy	22,891	1	0.2	0	1	??
Victim of crime	Have you or a member of your household been a victim of the burglary or assault in the last 5 years – Dummy	22,891	0.2	0.4	0	1	Negative
Male	Dummy for gender	22,891	0.5	0.5	0	1	Positive
Age	Age of respondents	22,891	50.1	17.9	15	103	Positive
Education: tertiary	Dummy for tertiary education	22,891	0.2	0.4	0	1	Positive
Education: secondary	Dummy for secondary education	22,891	0.5	0.5	0	1	Positive
Unemployed	During last 7 days: unemployed actively looking for a job – Dummy	22,891	0.1	0.2	0	1	Negative
Household income	Dummy equal 1 if household's total net income is higher than the median of the actual distribution in the country of reference	22,891	0.5	0.5	0	1	Positive

Source: European Social Survey (ESS6-2012) Multilevel Data.

5. Results

Main results

Table 2 reports the results.¹⁰ Column 1 refers to the empty model – that is, the model without covariates. The empty model is tested against the standard OLS regression using the likelihood-ratio test, in which the null hypothesis is $\sigma_{u0}^2 = 0$. If the null hypothesis is true, OLS can be used instead of a variance-components model. The test is highly significant and indicates that the intercept should be considered as a group-by-group variant coefficient. The evidence in favour of the multilevel approach holds for each model considered in Table 2. Column 1 of Table 2 shows that region-specific factors capture 13% of the total variance. However, when the dummies for countries are introduced (column 2) the variance explained by regional factors falls to 2%. The country-dummies are highly significant, except for Slovakia, which is similar to the controlling group (Portugal).

A useful aspect of the multilevel approach is the possibility of using the variance at the different levels of analysis to calculate the reduction in the estimated residual variance due to the inserted variables. This is done by comparing the ‘empty model’ with the extended specification of the model (Rabe-Hesketh and Skrondal, 2008). In the case of the contribution of country-effects in explaining regional variance, this amounts to 85%, which is calculated by comparing the total variance (0.73) explained at the regional level in the empty model (column 1, Table 2) and the variance (0.12) obtained when the country-dummies are considered (column 2, Table 2).¹¹ Therefore, country of residence has a non-negligible effect on individual trust as in Wang and Gordon (2011).

All individual characteristics considered are positively associated with individual trust, except for subjective general health and being a victim of crime (or having a family member who has been a victim of crime), which show negative and significant coefficients. For health, because answers are graded 1–5 (1 = very good, 5 = very bad),¹² the negative coefficient means that bad health is associated with a lower predisposition to trust people. Citizenship in the country of residence and being unemployed do not seem to influence the individual trust. This finding is consistent with Rothstein and Stolle (2003).

Focusing on the variable of interest, the quality of public administration at the regional level, the correlation with individual trust appears positive and significant: individuals who live in regions with a high-quality regional government show a higher level of trust.¹³ The result holds even if we control for the regional population size and per capita GDP. Population size does not seem to affect trust, as in Delhey and Newton (2005) at the country level. The positive relationship between per capita GDP and trust found at the country level (Delhey and Newton, 2005; Zak and Knack, 2001) is confirmed at the regional level: the wealthier the region, the higher the level of trust among its citizens. About 20% of the respondents refused to report their income. Because of this large proportion of missing data, in model 6 of Table 2 the non-response rate of this variable in each region is included. The inclusion of this variable allows us to test if there is a systematic bias in the occurrence of non-response data (Aslam and Corrado, 2012). The coefficient of the fraction of missing values by region on household income is negative and significantly different from zero. However, the inclusion of this control does not change our results.

Our findings are in line with previous research analysing how a country’s institutional quality influences individual trust (Delhey and Newton, 2005; Freitag and Bühlmann, 2009) and confirm that the positive relationship also holds for within-country QoG (Camussi and Mancini, 2019). Considering the scores of the EQI components (Table 3), the results show that the quality of services and

¹⁰Multilevel analysis is implemented with the ‘xtmixed’ routine in STATA. All models are estimated using restricted maximum likelihood over maximum likelihood, because the latter is more sensitive to loss of degrees of freedom when dealing with a small number of groups (Bickel, 2007).

¹¹The formula is: $[(0.73 - 0.12)/0.73]$.

¹²The question is: ‘How is your health in general? Would you say it is ... 1 very good, 2 good, 3 fair, 4 bad, or 5 very bad?’

¹³In Table 2 ordinal variables such as *life satisfaction* and *health* are treated as continuous. However, model 5 has also been estimated considering these two variables as categorical. The coefficient of EQI is positive, but significant at 10% instead of 5% (results are available upon a request).

Table 2. Individual trust and the quality of the regional government

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Fixed effects</i>						
Level 1: individuals						
Life satisfaction				0.169***	0.169***	0.169***
				(23.62)	(23.58)	(23.58)
Frequent social engagement				0.164***	0.164***	0.164***
				(5.42)	(5.43)	(5.44)
Health				-0.188***	-0.187***	-0.187***
				(-10.52)	(-10.48)	(-10.48)
Actively religious people				0.0807*	0.0810*	0.0805*
				(1.81)	(1.82)	(1.81)
Citizen of the country				-0.105	-0.0995	-0.0994
				(-1.24)	(-1.17)	(-1.17)
Victim of crime				-0.186***	-0.189***	-0.189***
				(-4.94)	(-5.00)	(-5.02)
Gender: male				0.0834***	0.0842***	0.0847***
				(2.95)	(2.98)	(3.00)
Age				0.00456***	0.00457***	0.00457***
				(5.09)	(5.09)	(5.09)
Education: tertiary				0.807***	0.803***	0.803***
				(18.43)	(18.34)	(18.34)
Education: secondary				0.298***	0.297***	0.297***
				(8.39)	(8.37)	(8.37)
Unemployed				-0.00321	-0.00238	-0.00325
				(-0.05)	(-0.04)	(-0.05)
High household income				0.195***	0.191***	0.191***
				(6.12)	(5.99)	(5.98)
Constant	4.795***	3.539***	3.533***	2.658***	0.0424	0.134
	(63.51)	(19.34)	(19.35)	(13.20)	(0.04)	(0.12)
Level 2: regions						
EQI			0.185*	0.182*	0.199**	0.203**
			(1.77)	(1.91)	(2.09)	(2.16)
GDP – Euro per inhabitant 2010 (ln)					0.162*	0.172*
					(1.74)	(1.86)
Population size 2010 (ln)					0.0718	0.0857
					(1.32)	(1.59)
Share of missing values (income)						-0.749*
						(-1.75)

(Continued)

Table 2. (Continued.)

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Country fixed effects</i>						
Belgium		1.493***	1.466***	0.825***	0.665**	0.339
		(5.36)	(5.27)	(3.27)	(2.56)	(1.07)
Bulgaria		-0.193	0.136	0.126	0.429	0.164
		(-0.82)	(0.45)	(0.46)	(1.41)	(0.49)
Czech Republic		0.843***	0.938***	0.474**	0.540**	0.376*
		(3.70)	(4.02)	(2.22)	(2.53)	(1.65)
Denmark		3.454***	3.182***	2.215***	2.096***	1.810***
		(14.01)	(10.97)	(8.37)	(7.58)	(5.71)
Germany		1.389***	1.216***	0.595***	0.435**	0.125
		(6.63)	(5.27)	(2.82)	(1.97)	(0.45)
France		0.902***	0.816***	0.431**	0.321	-0.00981
		(4.38)	(3.86)	(2.23)	(1.62)	(-0.04)
Hungary		1.301***	1.420***	1.246***	1.311***	1.150***
		(4.71)	(5.01)	(4.85)	(5.01)	(4.24)
Italy		1.471***	1.679***	1.256***	1.183***	1.042***
		(6.56)	(6.64)	(5.43)	(5.09)	(4.32)
Spain		1.584***	1.562***	1.158***	1.088***	0.816***
		(7.42)	(7.32)	(5.96)	(5.57)	(3.32)
Great Britain		1.898***	1.735***	1.136***	0.984***	0.732***
		(8.83)	(7.43)	(5.33)	(4.43)	(2.81)
Netherland		2.414***	2.181***	1.473***	1.273***	0.984***
		(9.34)	(7.53)	(5.60)	(4.65)	(3.12)
Poland		0.638***	0.813***	0.361*	0.473**	0.250
		(3.02)	(3.49)	(1.70)	(2.15)	(1.00)
Sweden		2.539***	2.290***	1.495***	1.307***	0.971***
		(9.21)	(7.42)	(5.34)	(4.52)	(2.83)
Slovakia		0.350	0.493*	-0.0239	0.0647	-0.0624
		(1.35)	(1.82)	(-0.10)	(0.26)	(-0.25)
<i>Random-effects</i>						
Variance						
Regions	0.726	0.118	0.117	0.093	0.090	0.086
Individuals	4.804	4.807	4.807	4.451	4.451	4.452
Total	5.530	4.925	4.924	4.544	4.541	4.538
VPC	13%	2%	2%	2%	2%	2%
LR test	3,747.8	254.9	246.6	181.8	167.5	145.0
Number of groups	142	142	142	142	142	142
Observations	22,891	22,891	22,891	22,891	22,891	22,891

In parentheses, t-values. Level of significance: *** 1%, ** 5% and * 10%.

corruption are positively correlated with individual trust.¹⁴ To live in environments with a low level of corruption and good-quality local services seems to be associated with a higher propensity to trust other people. The results on corruption are consistent with what has been found by Delhey and Newton (2005) and Bjørnskov (2004). The evidence is inconclusive for the impartiality score and this is not in line with the findings of Rothstein and Stolle (2003). According to Suzuki and Demircioglu (2021), vulnerable citizens may not benefit equally from public services, and more personalized treatment may be needed for them. The contrast between the needs of vulnerable

Table 3. Individual trust and the quality, impartiality and corruption indicators

	(1)	(2)	(3)	(4)
<i>Fixed effects</i>				
Level 1: individuals				
Individual characteristics	No	Yes	Yes	Yes
Country fixed effects	No	Yes	Yes	Yes
Constant	4.795***	0.388	0.453	0.173
	(63.51)	(0.35)	(0.41)	(0.15)
Level 2: regions				
Corruption		0.235**		
		(2.29)		
Quality			0.160**	
			(2.08)	
Impartiality				0.0899
				(0.99)
GDP – Euro per inhabitant 2010 (ln)		0.174*	0.160*	0.180*
		(1.88)	(1.72)	(1.92)
Population size 2010 (ln)		0.0763	0.0797	0.0808
		(1.43)	(1.49)	(1.47)
Share of missing values (income)		–0.730*	–0.788*	–0.705
		(–1.71)	(–1.84)	(–1.63)
<i>Random-effects</i>				
Variance				
Regions	0.726	0.085	0.086	0.089
Individuals	4.804	4.451	4.452	4.452
Total	5.530	4.536	4.538	4.541
VPC	13%	2%	2%	2%
LR test	3,747.8	154.2	149.7	151.1
Number of groups	142	142	142	142
Observations	22,891	22,891	22,891	22,891

In parentheses, t-values. Level of significance: *** 1%, ** 5% and * 10%.

¹⁴The sign and significance of the coefficients for individual characteristics are confirmed, but are not reported to save space.

citizens¹⁵ and impartiality might be a possible explanation for the inconclusive evidence we found for this pillar of QoG.

Results by group

Young people have a different propensity to trust compared to elders, so the effect of EQI on individual trust changes according to age. Previous studies have shown that trust is not constant over individual's life cycle. Some authors find that the relationship between age and trust describes an inverted U-shaped curve reaching its maximum in the late 30s (Bellemare and Kröger, 2007); others find that trust increases with age, although at a declining rate (e.g. Alesina and La Ferrara, 2002), or that the reverse is true (Rothstein and Stolle, 2003). We have tested the hypothesis of a U-shaped relationship between age and trust, but the coefficients are not significant and, thus, decided to model age as a linear effect (results available upon a request).

To test whether the effect of the quality of regional government on individual trust changes according to age we estimate three age groups separately: young (under 36 years old), mature (from 36 to 65 years old) and old (over 65 years of age). It is likely that individuals at different stages in their life cycle care about different aspects of the surrounding environment, including the quality of public services. For our sample, the EQI coefficient is statistically significant only for young people – that is, the QoG seems to affect trust positively only in the case of young people (see Table A2 in the online Appendix). A possible explanation might be linked to the higher level of education among younger generations. Higher levels of education facilitate an understanding of other people's motivation for action and make it easier to infer the trustworthiness of others. However, it is not clear if age captures life cycle patterns such as child rearing, work and retirement or if it captures differences between younger and older cohorts.

Our sample includes countries from both Western and Eastern Europe.¹⁶ The first group of countries is all original EU member states, whereas the second is new accession countries. We test if the effect of EQI differs between these two groups of countries by augmenting the model with a dummy for Eastern countries and an interaction term between this dummy and EQI. The coefficients of these variables are not significant, while the coefficient of EQI is still significant (results available on request).

Robustness checks

Our results are robust to a series of sensitivity checks reported in Table A3 in the online appendix. The structure of data could have suggested the use of a three-level mixed model with random intercepts at the both region and country level but the availability of data from only fifteen countries prevented us from using such a model. As robustness check, however, we present the results of a three-level model. The relative sizes of the random effects variances show that country random effects explain 16% of the trust variability, whereas regional random effects account for only 2% of variance, in line with the results of the two-level model with dummy for countries (Table 2). In column 2 of Table A3, Individual and regional variables are introduced and the EQI coefficient is confirmed to be positive and significant at 1% (column 2 of Table A3). The ordinal nature of the dependent variable could suggest the use of an ordered logit or probit model. A multilevel cumulative logit model is therefore also implemented to verify the robustness of the results. Table A3 reports the estimates from a random-effects ordered logit model and shows that the results are qualitatively the same as those discussed throughout the paper.¹⁷

Other regional variables are also used in the literature. First, alternative measures of contextual economic conditions and regional size are considered: unemployment rate and population density, respectively. These two variables are substituted for regional GDP and population size (Table A3, column 5): population density shows a positive coefficient, significant at the 10% level, whereas the

¹⁵We find that bad health is associated with a lower predisposition to trust people. Such a type of vulnerability could induce individuals to expect a different treatment by institutions.

¹⁶In Western Europe are Denmark, Sweden, the UK, Belgium, Germany, France, Spain, Italy, Portugal and the Netherlands, whereas Eastern Europe includes Bulgaria, Hungary, Poland, the Czech Republic and Slovakia.

¹⁷The STATA 'meologit' routine that fits mixed-effects logistic models for ordered responses has been used.

unemployment rate does not appear to be correlated with individual trust. Second, we also control for whether or not a region is a capital region or an autonomous region.¹⁸ The first, to account for differences deriving from living in a larger town compared to a small one (Camussi and Mancini, 2019), and the second, to consider differences based on whether countries are federal or semi-federal (Charron and Rothstein, 2014). Some studies have argued that federalism creates greater problems of collective action and more cumbersome decision-making rules (see Gerring and Thacker, 2004), whereas others have argued that greater vertical power sharing in the form of federalism would lead to better QoG outcomes (Charron *et al.*, 2014). The coefficients of these dummies are not significant. Finally, following Wang and Gordon (2011), we consider the percentage of the population in each region who belong to four religions: Catholic, Protestant, Orthodox and Muslim. These shares, defined by computing the regional averages from individual data using ESS design weights, are considered as proxies for regional informal institutions. The coefficients of these variables are significant for the Muslim and Orthodox group (Table A3, column 7). The positive association between EQI and trust survives the inclusions of all of these contextual variables at the regional level. The omission of crucial variables at the regional level is thus of minor concern.

Endogeneity issues

In this section, we shall attempt to tackle potential endogeneity issues. First, we consider the possibility that the random effects could be correlated with level-one covariates. In this case, the models may be affected by so-called level-two endogeneity. The correlation between the lower-level predictor variables and the higher-level error terms can be removed by including the group-level means of the lower-level variables, a procedure known as the Mundlak (1978) correction. The cluster mean of individual covariates picks up any correlation between these variables and the level two error. The Mundlak correction is illustrated in column 1 of Table 4, where the regional averages from the individual variables have been calculated by applying the ESS design weights (ESS, 2014). Moreover, a test for level-two endogeneity can be carried out as a Wald test of the joint hypothesis that all coefficients for the cluster means are zero (Grilli and Rampichini, 2006). The Wald test is equal to 12.41 with $df=12$, so the null hypothesis that the coefficients of the group means are all zero is accepted. The results are almost equivalent to model 6 of Table 2, the main difference being that the coefficient of per capita GDP is no longer significant.

The possibility of simultaneity and reverse causality is a shortcoming that may affect our analysis. Possible channels of reverse causality may exist where QoG is high for a higher presence of people who trust others in the region – that is, more trusting people may choose to live in regions with higher institutional quality and regions where more trusting people live might aim to ensure higher quality public services. This may be a problem when the analysis is focused on the aggregate level. In this case, previous studies at the country level have found that institutional quality produces GT (Bidner and Francois, 2011; Bjørnskov, 2004; Delhey and Newton, 2005), GT produces institutional quality (Bjørnskov, 2010; Tabellini, 2007) and even that the two social processes are statistically unrelated (Bjørnskov, 2007) or that there is a reciprocal relationship (Robbins, 2012).

However, our dependent variable is individual trust, whereas the indicator of the QoG is measured at the regional level; this should mitigate the problem of endogeneity. It is quite improbable, in fact, that the GT of an individual influences QoG at the regional level.¹⁹ Camussi and Mancini (2019), for example, do not expect endogeneity to be a major issue in their analysis because their dependent variable is individual trust, whereas their variable of interest, the quality of local institutions, is an aggregate measure (NUTS 3 level). Indeed, the results of the difference in Sargan statistics obtained with an instrumental variable (IV) approach using a two-step Gaussian mixture model estimator lead them to affirm that their local quality indicator can be treated as exogenous.

¹⁸Source: EQI database.

¹⁹That does not mean we neglect the possibility that the GT calculated at the regional level as aggregation of individual trust may influence the regional QoG.

To attenuate the potential endogeneity, we used the previous period values for EQI (2010) compared with trust (2012).

Moreover, as in the previous literature, we adopted the IV technique to take into account any potential problems of endogeneity. We therefore had to find exogenous variables correlated with EQI but uncorrelated with the error term. First, we focus on historical variables in line with Acemoglu *et al.* (2001) and Di Liberto and Sideri (2015): the idea is that distant history emerges as an important determinant of the quality of current institutions and, therefore, current institutions are partially the result of past institutions, formal and informal norms.²⁰ We identified two regional historical variables following Ketterer and Rodríguez-Pose (2018). The historical variables are two dummies that take the value one if the region was part of the Roman Empire under Caesar in 49 BC or part of Charlemagne's empire and/or represented a tributary territory at the time of the Emperor's death in AD 814.²¹ The Roman Empire with a complex system of government with provinces ruled by governors, appointed by the Senate, in charge of the local army and the collection of taxes, and the Carolingian Empire characterized by an administrative system with central and local components controlled by the king through his emissaries (Kishlansky *et al.*, 2003), both may be considered precursors of 'modern' systems of government. Therefore, in the case of Europe, they may have had a certain influence on the formation and development of its institutional framework. Although it has been shown that trust also has deep historical roots (Alesina and Giuliano, 2015; Putnam, 1993; Tabellini, 2010),²² it is reasonable to assume that, even if past historical experiences, such as being part of the Roman and Carolingian empire may have had an influence on the development of institutional structure of European regions, they are unlikely to influence individual GT today.

Moreover, following Camussi and Mancini (2019), we use two proxies of the historical level of provision of and demand for public services, as instruments of EQI. Therefore, the other IVs are the population density and the percentage of public workers on total employment in 1999.²³ The first serves as a proxy of the demand for services and the second as a proxy of the historical level of resources dedicated by the region to public services; more resources may translate into higher quality or result in a greater carve up in their provision, which may encourage bribery and inefficiency (Tsanana *et al.*, 2016). It is reasonable to assume that past values of production of and demand for public services are linked to the indicators of regional QoG and exclude any direct effect of the instruments on individual trust in 2012. We employed a two-stage least-squares random-effects estimator (Table 4).²⁴ The *F*-test on the excluded instruments shows that they are not weak²⁵ and the over-identifying restrictions test (Sargan test) that they are good instruments.²⁶

²⁰Acemoglu *et al.* (2001) argued that the different policies adopted by Europeans in different colonies between the 17th and 19th centuries were associated with different institutions and these institutions persisted to the present. Di Liberto and Sideri (2015) suggest that history can be used to find suitable instruments for current institutions.

²¹To determine these two dummies, the historical maps available in Kishlansky *et al.* (2003) and in the online source <http://www.euratlas.com> have been used.

²²Tabellini (2010) uses within country variation to explore the link between historical institutions and culture (measured as trust and respect for others) and the influence of culture on regional economic development.

²³In a few cases, these variables are not available for 1999; in such cases, the first available year is considered.

²⁴STATA *xtivreg* command has been used.

²⁵In the first-stage regression, all the IV show significant coefficients: positive for the dummy for Charlemagne's empire and negative for the other three instruments.

²⁶As a further check, following Tabellini (2010), we added the IV to the second-stage regressions one at a time, treating the included variable as exogenous. If the instruments are valid, the estimated coefficients on these additional regressors ought to be close to zero, and the estimated coefficient of EQI ought to remain statistically significant and stable under these alternative specifications, that is what we obtained. The result is the same when all the four IV are inserted in the model (results are available upon a request).

Table 4. Individual trust and the quality of the regional government: endogeneity issues

	Mundlak correction	IV random effect model		
		First stage	Main equation	IV multilevel model ^a
<i>Fixed effects</i>				
Constant	4.813**	1.787***	0.133	0.255
	(2.224)	(0.074)	(1.197)	(1.034)
Level 1: individual characteristics	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Level 2: regions				
EQI	0.234**		0.145	0.129
	(0.099)		(0.221)	(0.190)
GDP – Euro per inhabitant 2010 (ln)	0.096	0.064***	0.078	0.165
	(0.059)	(0.006)	(0.061)	(0.088)
Population size 2010 (ln)	0.093	–0.113***	0.179*	0.084
	(0.111)	(0.003)	(0.097)	(0.051)
Share of missing values (income)	–0.908**	0.184***	–0.687	–0.794
	(0.454)	(0.026)	(0.464)	(0.397)
<i>Random-effects</i>				
Variance				
Regions	0.091		0.114	0.064
Individuals	4.451		4.452	4.45
<i>Instrumental variables</i>				
Roman empire	No	–0.216***	Yes	Yes
Charlemagne's empire	No	0.375***	Yes	Yes
% of public workers on total of employment (1999)	No	–2.413***	Yes	Yes
Population density, 1999	No	–0.0001***	Yes	Yes
Weak instruments test			1,090.9	
			(0.00)	
Overidentification test			3.224	
<i>p</i> -value			(0.343)	
Endogeneity test			0.03	
<i>p</i> -value			(0.856)	
Number of groups	142		142	142
Number of observations	22,891	22,891	22,891	22,891

^aEstimates obtained using *mlwin* macro (IV) implemented by Spencer and Fielding (2000). In parentheses, standard errors. Level of significance: *** 1%, ** 5% and * 10%.

The results indicate that the QoG has no effect on individual trust. The same is obtained when the Spencer and Fielding (2000) procedure that extend the IV technique to multilevel random effects models for obtaining consistent parameter estimates is used (column 3).²⁷

Nevertheless, the exogeneity test²⁸ suggests that the quality of regional institutions can be treated as exogenous. Our findings are, thus, in line with the results of Camussi and Mancini (2019) for Italy. However, the fact that coefficient of EQI is still positive but not significant, lead us to conclude that the present results do not give any final answer to the direction of causality. The results, thus, emphasize the need for a better account of endogeneity. However, samples across several waves of data both for the individual trust and regional QoG indicator are needed. In the foreseeable future, the availability of both variables for different years and regions of different countries, will allow the use of alternative methodologies with panel data to test causality between the quality of regional institutions and individual trust more accurately.

However, our finding unambiguously leads to the conclusion that the positive association between the QoG and individual trust found at the country level in the empirical literature (Freitag and Bühlmann, 2009; Wang and Gordon, 2011) is confirmed at the regional level. Therefore, within country institutional differences do matter and have to be considered in the debate on institutions and trust.

6. Concluding remarks

This paper examined the effect of the quality of institutions on GT. This has its basis in individual behaviour, attitudes and predispositions. Micro-founded analysis is preferable since it controls for any potential aggregation bias. It, however, must be supplemented by a macro-level analysis since attitudes and predispositions are also affected by macro-level factors.

To achieve its objective, the paper has gone beyond existing studies on the topic in several important aspects, focusing on the regional level in a multi-country context. Microdata were used, so the individual represents the unit of analysis, whereas our variable of interest, the QoG, is measured at the regional level. This is a distinctive element of the paper because, although the prevailing approach analyses the effectiveness of the QoG on GT at the country level, a more comprehensive picture emerges when country and individual levels are supplemented with the regional level because most public services are organized and provided at a subnational level.

Individuals living in the same region are probably more similar to each other than a randomly selected group of individuals would be, because they share the same external environment. The multi-level approach allows us to consider this aspect and to estimate simultaneously and in a statistically accurate way both the influence of contextual- and individual-level factors.

The use of an overall index of QoG and of the three components of the index in the analysis is another innovative aspect of this paper; in the literature, in fact, most authors consider either an overall index or just one aspect of QoG such as corruption or impartiality.

The first important result of the paper is that country of residence has a non-negligible effect on individual trust. The estimates provide evidence, as expected, of the importance of individual factors. The results are in line with previous research analysing how the quality of institutions influences GT and confirm that the positive relationship also holds for within-country QoG. This positive association remains after the inclusion of several contextual variables at the regional level. We have shown that individuals are more trusting in the presence of

²⁷The MLwiN macro, available at <http://www.bristol.ac.uk/cmm/software/mlwin/download/macros.html>, has been used. In the first-stage of the procedure, the fixed effect parameters are estimated by instrumenting the endogenous variables. The standard errors are then estimated by imposing the restriction that the fixed parameters equal the estimates obtained in the first step. The model is estimated by using iterative generalized least square (IGLS) algorithms.

²⁸Following Wooldridge (2010), the test for exogeneity of EQI was performed by adding the first-stage residuals, v , in the model (equation (5)). The t statistic for v is the test of the null hypothesis that EQI is exogenous.

institutions they consider untainted by corruption and when local authorities organize and provide good quality services. The evidence is inconclusive with regards to the relationship between GT and impartiality.

We tested and excluded potential endogeneity issues. Although our findings do not give a definitive answer to the direction of causality and more research is needed, they unambiguously lead to the conclusion that the positive association between the QoG and individual trust found at the country level in the empirical literature is confirmed at the regional level.

They support the institutions-centred strand of the literature: well-functioning institutions influence GT. Although we have not considered the society-centred approach in our analysis, we think that government cannot hold citizens responsible for any lack of GT on the grounds of their reluctance to become involved in voluntary associations and activities. One policy implication of our study is that the lack of GT is fuelled, among other things, by dysfunctional government institutions.

Our findings assume a certain relevance in light of the long-term countries' need to improve government efficacy and the overall quality of institutions, not only at the national level. QoG is an important factor on which regions should invest (Rodríguez-Pose, 2020) not only to promote growth (Ketterer and Rodríguez-Pose, 2018), innovation capacity (Rodríguez-Pose and Di Cataldo, 2015), firm productivity (Ganau and Rodríguez-Pose, 2019; Ricotta, 2019), employment growth and social inclusion (Di Cataldo and Rodríguez-Pose, 2017), but also to promote GT.

In fact, local government, especially if untainted by corruption and providing good quality services, sets a framework in which individuals are able to act in a trustworthy manner and can expect others to behave likewise. To this end, our findings suggest that it is important both to understand how to design educational structures, health care and law enforcement systems in order to increase their effectiveness and transparency, and to improve bureaucratic capacity and discourage corruption.

To strengthen GT, local policy makers, in particular, should focus on anticorruption strategies. If people, in their dealings with local public officials find that they are solicited for bribes, they may infer that corruption is the norm and most other people comply with such requests and hence cannot be trusted. Corruption engenders lack of trust, leading in turn to more widespread corruption, thereby perpetuating a vicious circle of institutional dysfunction. If reducing corruption can enact better public interventions, characterized by a more efficient use of public expenditure and by the provision of better quality services, this might be a first step to make individual more trusting.

Furthermore, although our research question concerns the relation between individual trust and QoG, it is worth noting that differences in institutional quality across subnational territories have implications for the effectiveness of a number of policies. They, for example, might influence the choice of public goods as the types of transport infrastructure investments in different regions within a country and might affect the attractiveness of a region for potential investments. If a region attracts investments, its inhabitants may be more trusting, and willing to cooperate with others in general, compared to inhabitants of other regions.

Finally, if the way in which institutions affect economic performance is still something of dark in the field of economic development (Storper, 2010), clarification of their impact on GT could enable a better understanding of the transmission mechanisms through which they affect economic outcomes.

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