RESEARCH ARTICLE

Trust as a catalyst for regional growth in a decentralized Europe: The interplay between informal and formal institutions in driving economic growth

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Abstract

Empirical studies examining the interplay between informal and formal institutions on economic growth are scarce. As a result, we do not know how differences in trust affect the economic returns of the quality of regional governments and their autonomy. A panel regression analysis of 208 regions in 21 EU countries shows that informal and formal institutions matter for economic growth, individually and in combination. More specifically, trust substitutes the quality of regional government but does not affect the economic impact of its degree of decentralization. Therefore, policymakers need to think creatively about harnessing institutions to promote economic growth.

KEYWORDS
decentralization, economic growth, institutions, quality of regional government, regions, trust

1 | INTRODUCTION

Understanding and explaining regional economic growth "requires taking into account the role of both formal society-wide institutions and local and sometimes informal institutions" (Farole et al., 2011, p. 58). Currently, there are two but disparate strands of literature on informal and formal institutions and regional economic growth (Rodríguez-Pose, 2020). The first strand of literature addresses the role of informal institutions, such as trust

(Beugelsdijk & Van Schaik, 2005; Tabellini, 2010). Broadly, trust is the expectation that the other person or impersonal entities or systems will act as expected (Hardin, 2002). There are different types of trust, with two main types: one kind of trust we give to impersonal entities such as political trust given to the political system, including government. The other one is given to people with two subtypes, particularized trust for familiar people and generalized or social trust for unfamiliar people or strangers (Fukuyama, 1995a, 1995b; Newton et al., 2018; Uslaner, 2018). This paper focuses on the trust we give to people unfamiliar to us, also known as generalized or social trust. Since this paper only looks at this type of trust, it will simply refer to it as trust. Arguably, the trust we give to unfamiliar people matters for economic organization and economic growth (Fukuyama, 1995a; Putnam et al., 1993; Tabellini, 2010). It works through mechanisms that include facilitating human interaction and information sharing as well as reducing the cost of enforcing contracts and monitoring others (Beugelsdijk & Van Schaik, 2005; Bjørnskov, 2010, 2012; Farole et al., 2011; Rodríguez-Pose & Storper, 2006; G. Schneider et al., 2000; Whiteley, 2000).

The second strand of literature (e.g., Crescenzi et al., 2016; Muringani et al., 2019; Rodríguez-Pose & Garcilazo, 2015; Rodríguez-Pose & Ketterer, 2020) examines the effect of formal institutions such as the degree of decentralization or regional autonomy and the quality of regional government on economic growth. Decentralization reconfigures relationships between different government levels depending on what is decentralized and how it is decentralized (Hooghe et al., 2016, 2010; OECD, 2019; Renko et al., 2021). It includes transferring some political, fiscal, administrative responsibilities and power from the central government to the subnational region level and below (Renko et al., 2021; Rodden, 2004; A. Schneider, 2003). Accordingly, fiscal decentralization involves transferring expenditure and revenue responsibilities. Administrative decentralization is the extent of decision-making power at the subnational levels. Lastly, political decentralization refers to the significance of political processes, including elections and deliberation at the same subnational levels.

Some scholars (e.g., Blöchliger & Égert, 2013; Kuhlmann & Wayenberg, 2016; A. Schneider, 2003) focus on either one or all the three forms of decentralization. A. Schneider (2003) argues that these three forms complement each other. Thus, fiscal decentralization does not evaluate the degree of autonomy. Administrative decentralization fills this role but neglects the political processes of representation. Therefore, political decentralization becomes equally necessary. However, other scholars (Hooghe et al., 2010, 2016; Schakel, 2008) argue merely combining these three forms of decentralization does not sufficiently give a complete picture of a region's actual autonomy. Accordingly, they responded to this shortcoming by creating a composite measure, regional authority index (RAI), that combines all the three forms of decentralization and further specifies which regional tiers do what.

The RAI has two main dimensions specifying the extent to which the regional governments have the power or authority to form and implement their policies (self-rule) and influence national policy (shared rule). Specifically, this paper focuses on the degree of self-rule as a measure of decentralization. It shows the extent of power or authority a region has to make decisions and influence its economic development. Regardless of their amount of power or authority, regional governments differ in their quality and, therefore, their capacity to deliver public goods impartially, efficiently and in a noncorrupt manner (Charron et al., 2010, 2014; Putnam et al., 1993; Treisman, 2002). Empirical studies (e.g., Crescenzi et al., 2016; Muringani et al., 2019; Rodríguez-Pose & Di Cataldo, 2015; Rodríguez-Pose & Garcilazo, 2015) show that these differences in the quality of government (QoG) also explain economic differences across regions.

Nevertheless, a combination of these two strands of literature on informal and formal institutions remains scarce (Alesina & Giuliano, 2015; Farole et al., 2011; Rodríguez-Pose, 2020; Rodríguez-Pose & Storper, 2006). Thus, in theory, while informal institutions such as trust and formal institutions such as the quality of regional government and its degree of decentralization or autonomy coexist and jointly affect regional economic growth, empirically, their interaction remains unexplored. As such, empirical studies on the economic impact of trust in regions are not in short supply (e.g., Akçomak & Ter Weel, 2009; Beugelsdijk & Van Schaik, 2005; Kaasa, 2016; Neira et al., 2009; G. Schneider et al., 2000; Tabellini, 2010).

However, these studies have not examined whether differences in trust affect the returns of other factors such as the quality of regional government and its degree of decentralization or autonomy on economic growth. As a result, whether trust is a complement or substitute for the other factors remains unknown. Therefore, this paper examines the interactions between trust and the QoG on economic growth and trust and decentralization on economic growth.

The paper addresses the above question by conducting a panel regression analysis using eight waves of data from 2002 to 2016 of 208 intermediate subnational regions in 21 European Union (EU) countries. An intermediate subnational region refers to an administrative or political jurisdiction below the nation–state and above the municipal or lowest level with an elected regional assembly (Hooghe et al., 2010, 2016). Overall, the findings show that formal and informal institutions matter for economic growth, individually and as a combination. Specifically, we find that trust substitutes the quality of the regional government but does not affect the economic impact of the degree of decentralization. This finding suggests that improving the quality of regional governments and/or promoting trust leads to economic growth. Together, these findings point to the need to (re)consider the policy debate on whether it is formal or informal institutions that singularly matter for economic growth and pay equal attention to both of them, including their interaction. Specifically, the findings suggest that policymakers have the flexibility to use interventions that improve the quality of regional governments or promote trust as potential policy tools to stimulate economic development but should also pay attention to place-sensitive policies.

The rest of the paper follows this structure: Section 2 examines the literature and develops the hypotheses. Section 3 describes the data and the model. The results and discussion follow in Section 5, and Section 7 concludes the paper.

2 | TRUST, DECENTRALIZATION, QoG, AND REGIONAL ECONOMIC GROWTH

This paper adopts the conceptual framework of Rodríguez-Pose and Storper (2006) to consider regional institutions as community and society, referring to informal and formal institutions, respectively. Informal institutions refer to habits and customs and are not enforceable through official channels, whereas formal institutions are written rules, primarily codified and enforceable through official channels (North, 1990; Rodríguez-Pose, 2013). There are numerous informal institutions, and we focus on trust (e.g., Charron & Rothstein, 2018; Tabellini, 2010). It is the most frequently studied informal institution and is widely believed to be important for regional economic growth. Again, numerous formal institutions could matter, but we focus on the quality of regional government and its degree of decentralization or regional autonomy as they are among the most widely studied formal institutions (e.g., Charron et al., 2010; Muringani et al., 2019).

The interest in this paper is to understand and explain how these regional institutions affect economic growth. The central argument is that both informal institutions and formal institutions individually and jointly matter for regional economic growth, such that one complements or substitutes the effect of the other's performance (Farole et al., 2011; Keating & Loughlin, 1997; Rodríguez-Pose & Storper, 2006).

2.1 | Trust and economic growth

Trust as an informal institution or a feature of the social structure can constrain and facilitate human interaction and exchange (Charron & Rothstein, 2018; Nelson & Nelson, 2002; North, 1990; Putnam et al., 1993). By its nature, trust allows communities or societies to achieve collective action by encouraging active participation and increasing the interaction among otherwise dissimilar people (Farole et al., 2011; Fukuyama, 1995a; Putnam et al., 1993; Uslaner, 2008). It mitigates information asymmetry between parties because people still trust in the absence of

information and repeated interaction with others (Luhmann, 2018). It also reduces transaction costs by reducing opportunism and enforcement costs among actors (Whiteley, 2000). Even in the presence of well-functioning third-party enforcement, trust is still necessary for complex transactions (Beugelsdijk & Van Schaik, 2005). According to Fukuyama (1995a), trust facilitates the formation of economic organizations. It also encourages trade, innovation, and entrepreneurship by enabling information sharing, ease of interaction and cooperation (Beugelsdijk & Van Schaik, 2005; Feldman, 2014; Reiersen, 2019; Shearmur, 2011). Trust creates tolerance that attracts creative talent to regions (Florida, 2002; Florida et al., 2008; Westlund & Calidoni, 2010). Overall, trust creates a conducive environment that promotes economic growth (Rodríguez-Pose & Storper, 2006).

Both trust and economic activities are spatially embedded, and in the case of the latter, this makes the region a fundamental organizing unit of production in the globalizing economy (Amin, 1999; Keating & Loughlin, 1997; Pike et al., 2017; Storper, 1997). Storper (1997, p. 65) argues, "[...] The region [...] (is) a place where technological variety is created and then limited, where the pathway is traced out." Arguably, trust facilitates this variety by promoting diversity of ideas and interaction of dissimilar people. It is also a relational region-specific asset that defines the character of a place and differs from one region to another (Bathelt & Glückler, 2011; Feldman, 2014; Storper, 1997).

Empirical studies by Tabellini (2010) on the original EU-15 show that low trust regions have less income per capita and economic growth compared to high trust regions. At the same time, trust is relatively stable but can change, albeit slowly (Fukuyama, 1995a; Rodríguez-Pose, 2020; Uslaner, 2008). Therefore, its consequences are likely to persist over time. The overall process through which this happens is complex and path-dependent with increasing returns or cumulative causation such that regions that are doing well will often continue to do so in the future, creating a virtuous cycle of development or, conversely, a vicious cycle of underdevelopment (Boschma & Frenken, 2018; Pike et al., 2017; Storper, 1997, 2013).

However, empirical studies on trust and regional economic growth remain inconclusive, showing positive and significant effects (Tabellini, 2010), negative and significant effects (G. Schneider et al., 2000) or no effect (Akçomak & Ter Weel, 2009; Beugelsdijk & Van Schaik, 2005; Kaasa, 2016; Neira et al., 2009). There are several explanations for these inconclusive results at the regional level and their contradiction at the national level (Peiró-Palomino, 2016). Some of them include the availability of data, relatively small samples (cf. Beugelsdijk & Van Schaik, 2005), and different data sources and concepts of trust that might drive different results. The recent improvements in data availability and its quality make it possible to reconsider these findings. Accordingly, we hypothesize the following:

H1: *Trust has a positive effect on economic growth.*

2.2 | Trust, decentralization, and economic growth

Earlier in the paper, a broad definition of the degree of decentralization was presented and scoped down to the extent to which a region has the authority to do two things: first, to influence national policy (shared rule) and second, to define and implement its policies (self-rule) (Hooghe et al., 2010, 2016; Schakel, 2008, 2009, 2015). Arguably, self-rule is the most critical aspect of decentralization in that it empowers regions to define and implement their policies (Hooghe et al., 2016). In theory, it produces economic dividends at least through two mechanisms, first, bringing the government to the people enables preference matching resulting in responsive policies that stimulate economic growth (Muringani et al., 2019; Rodriguez-Pose & Ezcurra, 2010; Rodriguez-Pose & Gill, 2003; Treisman, 2002, 2007). Second, it expands the capacity or capabilities of regions to form and implement their economic policies (Rodríguez-Pose, 1998; Rodríguez-Pose & Tselios, 2019; Trigilia, 2001; Trigilia & Burroni, 2009).

However, the returns of decentralization remain debatable (e.g., Rodríguez-Pose & Gill, 2005; Schakel, 2009; Treisman, 2002, 2007) and the empirical evidence is inconclusive. Some scholars (e.g., Blöchliger & Égert, 2013;

Rodríguez-Pose & Ezcurra, 2011) find a direct association between decentralization and economic growth, while others find that it depends on the type of measure or index used (Rodríguez-Pose & Tselios, 2019) or do not find any relationship (e.g., Muringani et al., 2019). The reasons for these mixed results could be different forms of decentralization or their aspects and levels of analysis at either the country or regional level (Baskaran et al., 2016; Martínez-Vázquez et al., 2017). Some studies are cross-country and others single country, with either cross-sectional or panel data analyses. These studies also deal with endogeneity issues differently.

The most studied form of decentralization is fiscal decentralization (Canare, 2021; Ezcurra & Rodríguez-Pose, 2013; Goel et al., 2017). Its different types, revenue and expenditure decentralization, have been found to show opposite, positive and negative outcomes, respectively (Gemmell et al., 2013; Iqbal et al., 2012). In contrast, Canavire-Bacarreza et al. (2020) find positive outcomes on both types of fiscal decentralization. Other studies (e.g., Blöchliger & Égert, 2013; Carniti et al., 2019; Mauro et al., 2018; Thiessen, 2003) further examine and find fiscal decentralization and its types to have nonlinear effects on economic growth. For instance, Thiessen (2003) finds a positive relationship with economic growth when expenditure decentralization is increasing from a low level but peaks and turns negative. Similarly, Blöchliger and Égert (2013) and Carniti et al. (2019) find the same relationship with tax revenue decentralization. These findings contradict Gemmell et al. (2013) and Iqbal et al. (2012) who find that the two types of fiscal decentralization have opposite linear effects on economic growth.

However, most of these studies on fiscal decentralization are at the country level of analysis do not explicitly look at the regional level. Also, whether their findings apply to administrative and political decentralization and dimensions of RAI, such as self-rule, is unknown. More recent studies focus on the RAI (e.g., Ezcurra & Rodríguez-Pose, 2013; Filippetti & Sacchi, 2016; Rodríguez-Pose & Tselios, 2019) and its dimensions of self-rule (e.g., Muringani et al., 2019). In separate studies, Ezcurra and Rodríguez-Pose (2013) and Rodríguez-Pose and Tselios (2019) find no direct association between measures of political decentralization and RAI and economic growth. In the same vein, Muringani et al. (2019) further examines both the composite RAI and its dimension of self-rule and find no direct association with economic growth. Like the studies on fiscal decentralization discussed earlier, these findings remain inconclusive.

Given the debate and inconclusive empirical evidence on the economic dividends of decentralization, Kuhlmann and Wayenberg (2016) suggest the need to move the research agenda forward and consider the conditions under which it takes place or thrives. In the same vein, Rodríguez-Pose and Gill (2005), Calamai (2009), and Mauro and Pigliaru (2013) argue that the features of localities such as social capital or trust maintain and foster the (dis)advantages of decentralization. Although Putnam et al. (1993) and subsequent studies by Helliwell and Putnam (1995) and Knack (2000) suggest that trust plays a role in mediating the returns of decentralization, this is rather implicit or somewhat anecdotal. Keating (2007) argues that trust determines the success or failure of decentralization reforms. While Mauro et al. (2018) investigate the interaction between trust and decentralization on economic growth and find the nonlinear effects of tax decentralization and the interaction between expenditure decentralization and social capital, their study is a country-level analysis, and so is the measurement of trust. Still, the interaction between trust and decentralization and its association with economic growth at the regional level is assumed and neglected at best.

Arguably, the broader understanding of formal and informal institutions (e.g., Farole et al., 2011; North, 1990; Rodríguez-Pose & Storper, 2006) allows us to examine the relationship between trust and the economic returns of decentralization. First, North (1990) argues that formal institutions are embedded within the broader informal institutions, such as trust. The informal institutions are features of locality in that they arise out of local interactions, persist overtime, and, therefore, condition political processes or the functioning of formal institutions (Mauro & Pigliaru, 2013; Rodríguez-Pose, 2013; Rodríguez-Pose & Storper, 2006; Storper, 1997, 2013). As such, the formal institutions perform very differently at the local level irrespective of whether they are partially decentralized or fully devolved. Second, Rodríguez-Pose and Storper (2006) and Farole et al. (2011) argue that formal and informal institutions coexist and interact in a dynamic adjustment process in which one increases or decreases the performance of the other. These processes explain the success of the German Länder and the Third Italy and the problems of the Mezzogiorno and other peripheral regions of Europe (Rodríguez-Pose, 1998; Streeck, 1991; Trigilia, 2001).

As alluded to earlier, existing empirical studies have not examined the interaction between decentralization and trust. Although Torrisi et al. (2015) build on the conceptual model by Calamai (2009) to consider that social conditions (which includes trust) interact with decentralization or mediates its returns, they do not examine this relationship specifically. Yet, the features of a locality (Calamai, 2009; Mauro & Pigliaru, 2013; Rodríguez-Pose & Gill, 2005), such as trust (Keating, 2007), maintain and foster the potential returns of decentralization. In the same vein, Kuhlmann and Wayenberg (2016) argue that the question is not whether decentralization matters for economic growth but under what local conditions does it matter. Therefore, we argue that formal and informal institutions (e.g., Farole et al., 2011; North, 1990; Rodríguez-Pose & Storper, 2006), specifically decentralization and trust, interact with each other and hypothesize the following:

H2: *Trust mediates the impact of decentralization on economic growth.*

2.3 | Trust, the quality of regional government, and economic growth

The quality of regional government refers to the extent to which it delivers public goods in an impartial, efficient, and noncorrupt manner (Charron et al., 2010, 2014; Rothstein et al., 2013). Although empirical studies agree that the QoG varies across regions with corresponding economic consequences, these studies have two groups. The first group include single country studies such as a seminal study by Putnam et al. (1993) and follow up studies (Helliwell & Putnam, 1995; Knack, 1999) which explicitly attribute the differences in the quality of regional governments and their economic performance to social capital dimensions, such as trust. According to them, subnational governments work, or their quality and economic performance are better when trust is high than low. However, despite this explicit link between trust and quality of regional government, these studies did not examine their interaction and its association with economic growth.

The second group is the subsequent empirical cross-country studies (e.g., Crescenzi et al., 2016; Muringani et al., 2019; Rodríguez-Pose & Di Cataldo, 2015; Rodríguez-Pose & Garcilazo, 2015) that examine the quality of regional governments and economic growth. These studies find an association between the quality of regional government and economic growth. They argue that the quality of regional government affects economic growth through mechanisms that include reducing opportunism and rent-seeking behavior while promoting cooperation and efficient allocation of resources. However, these studies do not examine the role of trust. Equally, the empirical studies on trust and economic growth (e.g., Tabellini, 2010) do not include the quality of regional governments.

However, at the national level, Ahlerup et al. (2009) and James (2015) examined the interaction between trust and the QoG and found a substitution effect between them. Thus, when one is low, and the other is high, there is a significant marginal effect on economic growth and no effect when both are high. Therefore, an improvement in one of them when both are low leads to economic growth. Arguably, the regional context is important because "these institutional arrangements work better at both the local and the regional scales, as the national scale can be too distant, remote and detached" (Rodríguez-Pose, 2013, p. 1037). Accordingly, we hypothesize the following:

H3: *Trust substitutes for the impact of government quality on economic growth.*

3 | EMPIRICAL MODEL

A fixed-effects panel regression model is employed to test the hypotheses. The paper argues that differences in economic growth are due to some persistent and region-specific institutional factors, such as trust and the QoG, and other unobserved factors. Although these institutional factors are persistent over time, they can also change, albeit slowly (Andersson, 2015; Glückler & Lenz, 2016; Rodríguez-Pose, 2020; Scott, 2013), as seen by the QoG in

some regions in Central and Eastern Europe (Charron et al., 2019). Therefore, the fixed-effects panel regression model exploits the heterogeneity across regions and changes over time. Equation (1) tests for H1 and the model takes the following form:

$$LnGDPpc_{r,t} = \alpha + \beta_1 Trust_{r,t} + \beta_2 Quality\ of\ government_{r,t} + \beta_3 Decentralization_{r,t} + \bar{\chi}_{r,t} + \mu_t + \varepsilon_{r,t}. \tag{1}$$

$LnGDPpc_{r,t}$ is the log of annual gross domestic product (GDP) per capita in region r at time t. $\bar{\chi}_{r,t}$ denotes a vector of control variables. μ_t captures time-specific fixed-effects; and $\varepsilon_{r,t}$ denotes the error term. In Equation (2), the main model presented above is modified by adding an interaction term between trust and the degree of decentralization to test for H2:

$$LnGDPpc_{r,t} = \alpha + \beta_1 Trust_{r,t} + \beta_2 Quality\ of\ government_{r,t} + \beta_3 Decentralization_{r,t} + \beta_4 Trust_{r,t}$$
$$*Decentralization_{r,t} + \bar{\chi}_{r,t} + \mu_t + \varepsilon_{r,t}. \tag{2}$$

To test for H3, the model in Equation (1) is modified in Equation (3) to add an interaction term between trust and QoG:

$$LnGDPpc_{r,t} = \alpha + \beta_1 Trust_{r,t} + \beta_2 Quality\ of\ government_{r,t} + \beta_3 Decentralization_{r,t} + \beta_4 Trust_{r,t}$$
$$*Quality\ of\ government_{r,t} + \bar{\chi}_{r,t} + \mu_t + \varepsilon_{r,t}. \tag{3}$$

4 | VARIABLES AND DATA

4.1 | Overview of the variables and data

In this paper, we focus on subnational regions in the EU which are at the intermediate level of government meaning a tier below the central government but above the lowest local or municipal level (Hooghe et al., 2010, 2016). The intermediate level of government can be found either at NUTS 1 in countries such as Belgium, Germany, and three regions in the United Kingdom (UK) and NUTS level 2 in most other countries. The paper uses a panel data set for eight waves from 2002 to 2016 on the 208 NUTS 1 and 2 regions in 21 EU countries.

The dependent variable is economic growth using the level of GDP per capita from the European statistical (Eurostat) databases as a proxy. It is log-transformed to avoid skewness. The explanatory variables are trust, decentralization, and QoG. The trust variables are from the European social survey (ESS), a biennial survey conducted since 2002. Trust is an aggregate dimension of individual responses to three trust-related questions on a scale of 1–10: First, "would you say that most people can be trusted or that you can't be too careful in dealing with people?" (trust in people). Second, "do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?" (fairness in people). Third, "would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?" (helpfulness in people). The factor analysis in Supporting Information Appendix 1 shows that a single factor explains the trust variable. In essence, factor analysis is a data reduction technique. Specifically, it allows us to understand whether one or more underlying constructs or latent variables explain observable measures or are the reason for their high correlations (Mehmetoglu & Jakobsen, 2017).

As shown in Supporting Information Appendix 1, Table 1C, a Cronbach α test gives a coefficient of 0.77 and 0.78 for 2006 and 2012 survey data, respectively. Since a coefficient of 0.7 or greater is considered satisfactory, the results ascertain the internal consistency of the trust variables, which indicates how well the scale items correlate or measure the same thing as a scale (McNeish, 2018; Vaske et al., 2017). Also, the Kaiser–Meyer–Olkin

(KMO) tests give an overall score of 0.70 for each of the two surveys. However, there are criticisms that a Cronbach α is not very robust unless the data meets certain assumptions and conditions. McNeish (2018) observes these criticisms and lists some of these assumptions as adherence to τ equivalence. Scale items are on a continuous scale and normally distributed. Other items' errors must not vary. Also, Vaske et al. (2017) argue that the Cronbach α test does not indicate stability or consistency over time, suggesting the need to test it at least two time periods. The ESS questions on trust use a continuous Likert scale of 1–10. The data meet the normality assumption, and the Cronbach α test shows stability over two survey periods.

We combine the three questions into one composite factor at the individual and regional levels based on the factor analysis and the Cronbach α test. We first normalize the scales for each variable at the individual level using standardization to have a mean of 0 and a standard deviation of 1. It is the most appropriate approach for comparability since the individual indicators are at different scales. Second, we create a composite indicator for individual levels of trust using weighted averages. Third, we calculate the mean level of trust across all individual respondents in each region to create regional level measures.

The QoG measures come from the European QoG Index (EQI; Charron et al., 2010, 2014; Charron & Rothstein, 2018). It is a composite index that measures citizens' perception of how well their regional government performs its function, along four dimensions: (i) control of corruption, (ii) the rule of law, (iii) government effectiveness, and (iv) voice and accountability (Charron et al., 2010, 2014). Accordingly, we used the metadata (Charron et al., 2010, 2015, 2019) from three consecutive surveys conducted in 2010, 2013, and 2017.

Instead of using the statistical regions, we estimate the QoG of administrative regions following the definition of regions outlined above. We compile the data set following the same process as mentioned earlier on trust variables. The result is a data set with three waves for 2010, 2013, and 2017. Overall, we follow the same approach used by Rothstein et al. (2013), Rodríguez-Pose and Di Cataldo (2015), and Muringani et al. (2019) to create the QoG Index. Accordingly, we extend this data set into eight waves from 2002 to 2016 using the Worldwide Governance Indicator (WGI).[1]

The degree of decentralization or regional autonomy is from the RAI (Hooghe et al., 2010, 2016; Schakel, 2008). We focus on the degree of self-rule, which refers to the authority exercised by the subnational government in its territory or the measure of its autonomy. See Hooghe et al. (2016, pp. 3–30). The RAI data ended in 2010, but there have been no significant changes in regional authority in Europe until 2016, so we follow the same approach in Muringani et al. (2019) to extend this data to create a complete panel with eight waves from 2002 to 2016. Also, using the same approach, in countries with several regional levels of government, we use the level with the highest RAI score to measure the regional authority, explicitly focusing on self-rule.

The control variables are from the Eurostat database. They include research and development expenditure (R&D) as a percentage of GDP, human capital measured as a percentage of 25–64-year olds with tertiary education and employment in manufacturing as a percentage of total employment. Specifically, employment in manufacturing as a percentage of total employment controls for sectors so that we are sure that our explanatory variables explain economic growth. Other control variables are population density and road accessibility per 1000 inhabitants, which are log-transformed to avoid skewness. Table 1 shows the descriptive statistics.

The correlations shown in Table 2 between most of the variables are low. However, population density and road accessibility have a coefficient of 0.731. We check for multicollinearity using the variance inflation factor as shown in Appendix 2, Table 2D. The scores are within the ranges from 1.23 to 2.85. These ranges are acceptable as

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[1]The WGI survey started in 1996 and was conducted every 2 years until 2002 and every year thereafter. Rothstein et al. (2013), Rodríguez-Pose and Di Cataldo (2015), and Muringani et al (2019) used a 2-year lag from the WGI to create a corresponding panel for extrapolating the EQI survey indicators. The calculation for the QoG takes this approach: $QoG_{r,c} = WGI_c + (Rqog_{r,c} - \overline{Rqog}_c)$. $QoG_{r,c}$ is the final QoG Index for region r in country c. It is obtained as the distance from the regional QoG country mean ($\overline{Rqog}_c$) of the regional score ($Rqog_{r,c}$), added to WGI score for country c (WGI_c).

TABLE 1 Descriptive statistics

Variables	N	Mean	Standard deviation	Minimum	Maximum
Trust	1664	−0.0682	0.402	−2.530	1.840
Decentralization	1664	10.42	3.461	1	15
Quality of government	1664	0.441	1.595	−5.160	11.81
Research and development (R&D)	1664	1.433	1.192	−5.384	17.47
Human capital	1664	24.91	8.989	6.800	57.10
Employment in manufacturing	1664	16.43	6.681	2.900	39.40
Population density	1664	4.993	1.160	1.194	8.910
Road accessibility	1664	14.54	0.820	11.62	16.00
ln_GDP	1664	10.02	0.391	8.497	11.06

Abbreviation: GDP, gross domestic product.

they are "lower than the lowest commonly suggested limit: 5 (although limits such as 8 or 10 are also often used)" (Kaasa, 2016, p. 18).

4.2 | Geography of trust and QoG

The maps in Figures 1 and 2 show the distribution of trust and QoG, respectively, in 208 EU regions for the year 2016.

The maps show a traditional trend where trust and the quality of regional governments are high in the Nordic countries. A phenomenon termed, Nordic exceptionalism (Andreasson, 2017; Delhey & Newton, 2004). However, the maps also show that Western Europe is not far behind. At the same time, consistent with Charron et al. (2019), the maps show improvements across European regions. Particularly in some Central and Eastern European countries, also called transition countries, the traditional dichotomies of the North–South divide and West–East are getting blurred.

5 | RESULTS AND DISCUSSION

We estimate our empirical model and test for H1 using stepwise multiple regression, as shown in Table 3. In Model 1, we introduce controls, and the results give us the expected signs. The exception is population density which gives a negative and significant result. This result is contrary to previous studies (e.g., Beugelsdijk & Van Schaik, 2005) but seems to corroborate results from other studies that use related controls, such as regional population (e.g., Crescenzi et al., 2016). But still, these studies report but do not explain these results. Ideally, we expect population density to be positive and significant as it results in agglomeration effects that encourage economic activities, and consequently, growth. However, Fritsch and Schroeter (2011) argue that agglomeration has advantages and disadvantages that can enhance or discourage economic activities based on their work on the economic effects of new business formation. Although we cannot ascertain the reason for this result, we suggest that future studies investigate this further. Our interest is to explain how trust, decentralization, and the QoG affect economic growth.

We introduce trust in Model 2, and it has a positive and significant association with economic growth. In Model 3, we introduce decentralization which does not show an association with economic growth. In Model 4, we introduce the QoG and find it to have a positive and significant association with economic growth. In Model 5, we introduce all factors.

TABLE 2 Pairwise correlation

| Variables	Trust	Decentralization	Quality of government	R&D	Human capital	Employment in manufacturing	Population density	Road accessibility
Trust	1.000							
Decentralization	0.230***	1.000						
Quality of government	0.468***	0.093***	1.000					
Research and development	0.414***	0.195***	0.289***	1.000				
Human capital	0.443***	0.036	0.263***	0.452***	1.000			
Employment in manufacturing	−0.139***	−0.063***	−0.167***	−0.136***	−0.455***	1.000		
Population density	0.118***	0.163***	0.034	0.222***	0.313***	−0.201***	1.000	
Road accessibility	0.245***	0.327***	0.106***	0.293***	0.259***	0.045*	0.731***	1.000

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.
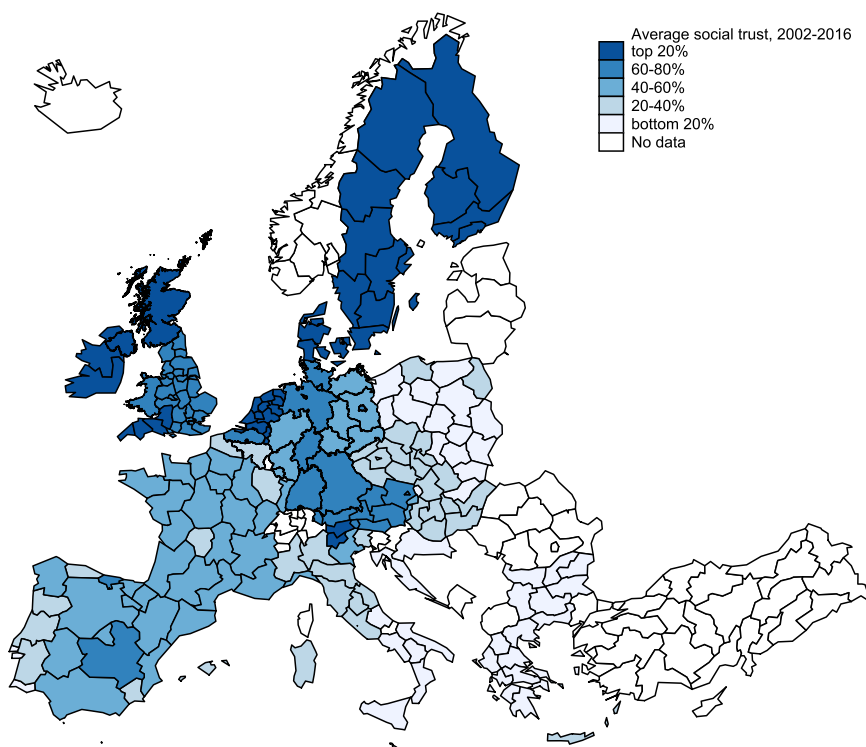
FIGURE 1 Trust for years 2002–2016, ESS data (author's elaboration). ESS, European social survey [Color figure can be viewed at wileyonlinelibrary.com]

We find that trust has a positive and significant effect on regional economic growth. The results are consistent with Tabellini (2010) and confirm theoretical propositions that trust has positive consequences for regional economic growth. We also find consistent with previous research (e.g., Crescenzi et al., 2016; Muringani et al., 2019; Rodríguez-Pose & Di Cataldo, 2015; Rodríguez-Pose & Garcilazo, 2015) that the QoG is positively and significantly associated with economic growth. Further, consistent with Muringani et al. (2019) and Uttermark (2020), we find decentralization to have no association with regional economic growth, suggesting that it may act through trust, which is what we proceed to establish empirically in the subsequent section.

The above findings withstanding, our interest is to examine and understand the interaction between formal and informal institutions. We proceed to explore this relationship and show the interaction effects in Table 4. Specifically, we look at the effect of the interaction between trust and decentralization on regional economic growth and trust and the QoG on economic growth.

In Model 1, we examine the effect of the interaction between trust and decentralization on economic growth. The results show the interaction effect is negative and significant. These results suggest that trust mediates the economic returns of decentralization. However, we cannot conclude based on these results and the significance test. There is a need to plot the marginal effects (Brambor et al., 2006; Kingsley et al., 2017; Preacher et al., 2006).

Figure 3 shows the results of the plot of the marginal effects of decentralization on economic growth at different levels (from the 10th to the 90th percentile) of trust. The plot of the marginal effects in Figure 3 shows what the results in Table 1 for Model 1 mean for the effect of the interaction between trust and decentralization. Although the slope is negative, the findings show that decentralization has a nonsignificant impact on growth regardless of the level of trust in the region. Hence, there is no substitution, and we find no support for H2.
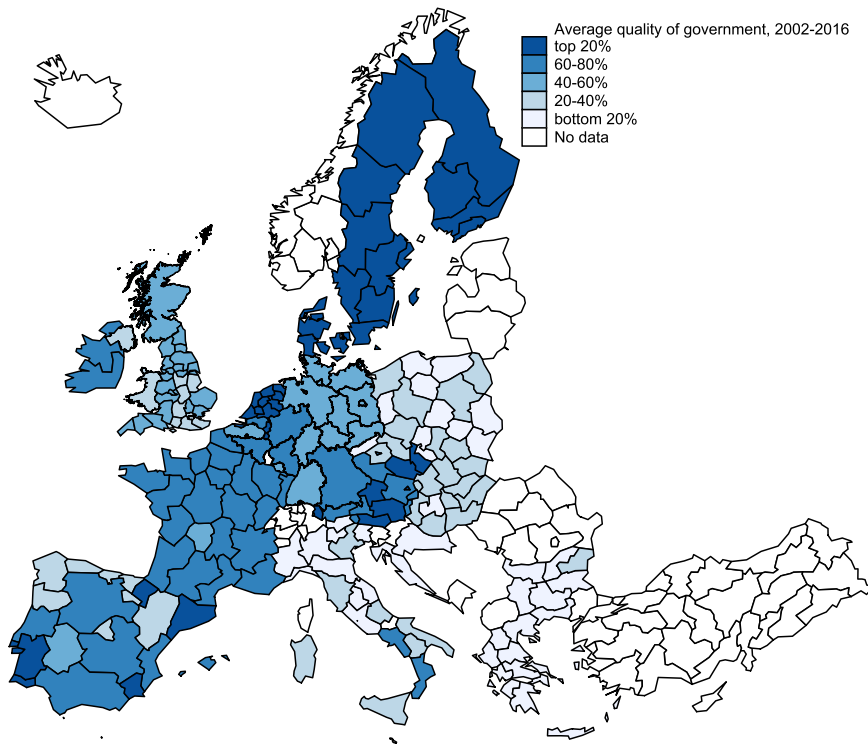
FIGURE 2 Quality of government for years 2002–2016, ESS data (author's elaboration). ESS, European social survey [Color figure can be viewed at wileyonlinelibrary.com]

However, there is a need for caution on these findings as they do not suggest that decentralization does not matter as its interaction with other factors can be complex. Calamai (2009) and Torrisi et al. (2015) suggest that decentralization works through other factors such as social capital to affect the quality of institutions, consequently affecting regional development. In separate studies, Muringani et al. (2019) and Rodríguez-Pose and Ketterer (2020) confirm that the QoG mediates the returns of decentralization.

In Model 2, we examine the effect of the interaction between trust and the QoG on economic growth. We find a negative and significant result on the interaction terms, and the simple effects or conditioning effects are positive and significant. Similarly, we proceed to plot the marginal effects in Figure 4.

Figure 4 shows the marginal effects of the QoG by different levels (from the 10th to the 90th percentile) of trust. There is a negative slope, indicating a substitution effect. The marginal effects of QoG become insignificant at very high levels of trust (above 0.2). Thus, when trust is low, an increase in the QoG increases economic growth, but the same is not true when the trust is at a medium or high level. We substantively establish and conclude that there is a substitution effect between trust and the QoG. We find support for H3. These findings at the regional level are the same as previous findings (e.g., Ahlerup et al., 2009; James, 2015) at the national level.

6 | ROBUSTNESS TEST

We address the problem of endogeneity to be sure it is not the previous economic growth but trust and the QoG that leads to economic growth. We control for endogeneity using the same approach as other scholars (e.g., Beugelsdijk & Van Schaik, 2005; Crescenzi & Gagliardi, 2015). In Table 5, we compare the results in Models 1 and 2,

TABLE 3 Main effects

Variables	1	2	3	4	5
Trust		0.039***			0.041***
		(0.012)			(0.012)
Decentralization			0.002		0.002
			(0.004)		(0.004)
Quality of government				0.005***	0.006***
				(0.002)	(0.002)
Research and development (R&D)	0.007*	0.007**	0.007*	0.006*	0.007*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Human capital	0.004***	0.003***	0.004***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Population density (natural log)	−0.246***	−0.243***	−0.245***	−0.233***	−0.228***
	(0.046)	(0.046)	(0.046)	(0.046)	(0.046)
Road accessibility (natural log)	0.181***	0.183***	0.181***	0.184***	0.185***
	(0.042)	(0.042)	(0.042)	(0.042)	(0.042)
Observations	1664	1664	1664	1664	1664
R^2	0.627	0.630	0.627	0.629	0.632
Number of regions	208	208	208	208	208
Time FE	YES	YES	YES	YES	YES
Adjusted R^2	0.570	0.573	0.570	0.572	0.575
F test	202	188.8	186.4	188.1	165.1

Note: Robust standard errors in parentheses.

Abbreviation: FE, fixed-effect.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

where Model 2 uses a lag of GDP per capita in 2000 as a control variable. We find no significant differences between the results of the two models. Therefore, our results are robust, controlling for the previous GDP, and we show that it does not influence the explanatory variables.

Also, we consider that the effects of the degree of decentralization are often not immediate. Therefore, in Model 3, we lag the explanatory variables to explain the level of GDP per capita in the next period (2 years later). Although Model 3 uses fewer observations which reduces its explanatory power, similar to Models 1 and 2, the results show no significant differences as it retains the same positive signs and level of significance on the explanatory variables. The same applies to the control variables, which also have the respective signs and levels of significance as the other models. Therefore, our results are robust, controlling for both the previous GDP and lagged explanatory variables to explain the effects of the degree of decentralization in the next period.

TABLE 4 Interactions

| Variables	1	2
Trust	0.109***	0.025**
	(0.032)	(0.012)
decentralization	0.005	0.004
	(0.004)	(0.004)
Trust * Decentralization	−0.007**	
	(0.003)	
Quality of government	0.005***	0.008***
	(0.002)	(0.002)
Trust * Quality of government		−0.026***
		(0.004)
Research and development	0.007**	0.007**
	(0.003)	(0.003)
Human capital	0.003***	0.003***
	(0.001)	(0.001)
Employment in manufacturing	0.010***	0.010***
	(0.001)	(0.001)
Population density (natural log)	−0.232***	−0.276***
	(0.046)	(0.046)
Road accessibility (natural log)	0.189***	0.165***
	(0.042)	(0.041)
Observations	1664	1664
R^2	0.633	0.645
Number of regions	208	208
Time FE	YES	YES
Adjusted R^2	0.577	0.590
F test	155.5	163.7

*Note*: Robust standard errors in parentheses.

Abbreviation: FE, fixed-effect.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

7 | CONCLUSION

This paper argued that explaining regional economic growth requires understanding the role played by both formal and informal institutions (Farole et al., 2011; Rodríguez-Pose, 2020; Storper, 2005). However, existing empirical studies on these two aspects remain isolated, and as a result, the interaction between them remains unexplored. Thus, while existing empirical studies show the importance of trust for regional economic growth (e.g., Tabellini, 2010), they have not examined how it mediates the economic returns of other factors such as the quality of
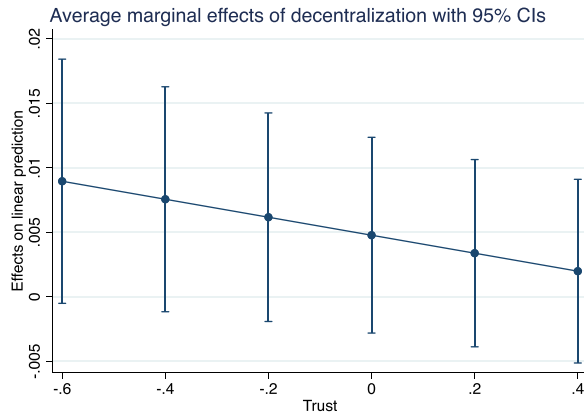
FIGURE 3 Marginal effects of decentralization by the level of trust. CI, confidence interval [Color figure can be viewed at wileyonlinelibrary.com]
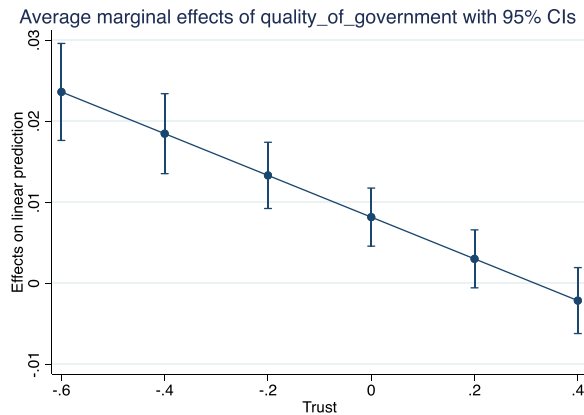
FIGURE 4 Marginal effects of trust by the level of quality of government. CI, confidence interval [Color figure can be viewed at wileyonlinelibrary.com]

regional government and its degree of decentralization or autonomy. Our contribution is to bring these isolated studies together to address this gap in the literature.

Accordingly, our findings confirm that trust (Tabellini, 2010) and the QoG (e.g., Crescenzi et al., 2016; Muringani et al., 2019; Rodríguez-Pose & Di Cataldo, 2015; Rodríguez-Pose & Garcilazo, 2015) matter for regional economic growth. Broadly, these findings suggest that it is not whether formal or informal institutions matter but how they matter individually and as a combination (Alesina & Giuliano, 2015; Farole et al., 2011; Rodríguez-Pose, 2013; Storper, 2005). Specifically, the contribution we make is to show that the interaction between trust and the QoG has a substitution effect. These findings at the regional level are consistent with Ahlerup et al. (2009) and James (2015), who show the same at the national level. However, decentralization has no association with economic growth regardless of the level of trust. It is important to caution that this finding does not explicitly suggest that trust at the regional level does not influence decentralization or its economic dividends. Instead, it implicitly suggests and corroborates other findings (e.g., Mauro et al., 2018; Muringani et al., 2019) that there could be another mechanism or pathway through which it acts.

The policy implications of these findings are threefold; first, there is a need to reconsider the policy debate on the primacy of formal vis-à-vis informal institutions for economic growth to consider giving them equal attention, including

TABLE 5 Robustness check

Variables	1	2	3
Lag of GDP 2000		0.004	
		(0.003)	
Trust	0.041***	0.041***	0.046***
	(0.012)	(0.012)	(0.013)
Decentralization	0.002	0.002	0.000
	(0.004)	(0.004)	(0.004)
Quality of government	0.006***	0.006***	0.004**
	(0.002)	(0.002)	(0.002)
Research and development	0.007*	0.007*	0.007**
	(0.003)	(0.003)	(0.003)
Human capital	0.003***	0.003***	0.005***
	(0.001)	(0.001)	(0.001)
Employment in manufacturing	0.010***	0.010***	0.009***
	(0.001)	(0.001)	(0.001)
Population density (natural log)	−0.228***	−0.225***	−0.250***
	(0.046)	(0.046)	(0.045)
Road access (natural log)	0.185***	0.181***	0.014
	(0.042)	(0.042)	(0.047)
Observations	1664	1663	1456
R^2	0.632	0.632	0.538
Number of regions	208	208	208
Time FE	YES	YES	YES
Adjusted R^2	0.575	0.575	0.456
F test	165.1	154.5	102.8

Note: Robust standard errors in parentheses.

Abbreviations: FE, fixed-effect; GDP, gross domestic product.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

their interaction (Rodríguez-Pose, 2010). Second, these findings are relevant in the context of regional development (e.g., Pike et al., 2017) and debates on devolution (e.g., Schakel, 2015; Treisman, 2007). Specifically, they suggest that policymakers have the flexibility to devise and implement interventions that either generate trust or improve the quality of regional government to realize regional development. While neither is easy, this is possible to achieve through bottom-up processes involving civil society and top-down responsive policies, respectively. Third, the explanatory power of trust and QoG given their social and spatial embeddedness cautions against the tradition of best practices but demands place-based policies (e.g., Barca, 2009; Barca et al., 2012) tailored to the unique needs of specific regions.

However, this study is not without limitations. First, we caution that our findings only give a descriptive analysis and do not make causal claims. There are two reasons for this: the primary interest is not whether trust, the QoG and decentralization explain economic differences across regions but how their interaction matters.

The other reason is that this paper does not use instrumental variables. Second, although we do not find an interaction effect between trust and the degree of decentralization, related empirical studies (e.g., Mauro et al., 2018; Muringani et al., 2019) show that the latter works indirectly through the QoG. Third, the paper focused on self-rule, but different forms and decentralization measures might have different results. For example, some empirical studies (e.g., Blöchliger & Égert, 2013; Carniti et al., 2019; Mauro et al., 2018; Thiessen, 2003) on fiscal decentralization have nonlinear effects on economic growth at the country level but not at the regional level. While similar approaches could investigate if the same applies to the RAI dimension of self-rule at the regional level, also fiscal decentralization can be examined using the same empirical method in this paper to see if we get the same results. Fourth, the scope of the paper is limited to the context of the EU, an examination of specific informal and formal institutions, and economic growth as a measure of development. Therefore, future studies should consider regions in other parts of the world, different formal and informal institutions, and other alternative measures of development such as well-being and human development.

CONFLICT OF INTEREST

The author declares no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in the public domain based on three sources: (1) The European Social Survey, from 2002 to 2016, https://www.europeansocialsurvey.org, (2) The European Quality of Government Index, https://www.gu.se/en/quality-government/qog-data/data-downloads/european-quality-of-government-index, and (3) The Regional Authority Index. The actual compiled data from these three sources are available upon request from the author.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.