Do informal institutions matter for the economic resilience of European regions? A study of the post-2008 shock

Abstract

This paper investigates the relationship between informal institutions and resilience across EU regions in the years following the 2008 Great Recession. By using voluntary work as a proxy for informal institutions, we analyse its association with regional resilience over two different periods: the resistance phase (2008–2010) and the recovery phase (2010–2013). Overall, we find robust evidence that voluntary work is positively associated with greater regional resilience. Our results also show that there is a relation between voluntary work and formal institutions, represented by welfare state models. Overall, the effect of voluntary work is always positive for strong welfare states, but its effect is mitigated by the presence of public provisions. Additionally, in regions with a relatively weaker institutional context, informal institutions retain their positive effect. However, in this context, informal institutions appear to take more time to deploy their effects, but their positive impact on regional labour market recovery is even stronger than in other welfare regimes, probably due to the poor public support that characterises this welfare system.

Keywords: regional resilience, informal institutions, voluntary work, European regions, welfare
JEL classification: R1, R11, O38, L3

1. Introduction

The 2008 Great Recession marked a turning point in the field of economic studies. As the most severe recession since the 1929 Great Depression (Eigner and Umlauft, 2015), it attracted considerable attention from researchers attempting to investigate the causes that fuelled its outbreak, its immediate effects across countries and regions, and its legacy on production systems. In this context, a spectrum of studies in the field of regional economics and economic geography have approached the analysis of the 2008 shock through the conceptual lens of resilience (Martin 2012; Breathnach et al. 2015; Crescenzi et al. 2016; Pontarollo and Serpieri 2020). The concept has been borrowed from socioecological studies and used to explain the pervasiveness and the geographically heterogeneous impact of the 2008 crisis. Within this framework, resilience defines "*the capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, to maintain or restore its previous developmental path, or transit to a new sustainable path characterised by a fuller and more productive use of its physical, human and environmental resources"* (Martin and Sunley 2015, p. 13).

The growing attention to the concept of regional resilience has pushed researchers to collect evidence on precrisis elements shaping regional responses to unexpected shocks. To date, the literature has highlighted that, along with national macroeconomic conditions, context-specific regional factors (such as socioeconomic conditions, the specialisation of the economy, innovation capacity, human capital, and the quality of the institutional environment) are key to sheltering regional economies in the aftermath of the crisis, contributing to overall regional resilience (Crescenzi et al. 2016). However, while the influence of formal institutions has received attention (Oorschot, Arts and Halman, 2005; Ezcurra and Rios 2019), studies on regional resilience have neglected the potential role of informal institutions. This gap in the literature is surprising, since a well-established strand of research on the economic performance of regions has found evidence that informal institutions contribute to a large extent to shaping productive and market relations and to the development of economic activities (Dei Ottati 1994; Rodriguez-Pose and Storper 2006; Rodriguez-Pose 2013). In particular, strong ethical norms, trust-based tight-knitted social networks, cultures of engagement and participation facilitate information and knowledge circulation across the economy

of a territory (Yao et al. 2020; Zhao and Hao 2021). According to this view, such resources accruing from civil society might also play a relevant role in times of economic hardship (Popenoe 1988).

Therefore, studies have pointed out that the nexus between institutions and economic resilience should not only focus on formal institutions.

The present paper aims to fill this gap by investigating whether and to what extent informal institutions, expressed in terms of citizens' involvement in unpaid voluntary work and activities, contributed to mitigating the impact of the post-2008 crisis across the European region. Furthermore, we are also interested in exploring the interaction between informal institutions and formal institutions, identified by the welfare state model in place in the relevant region, to assess the possible influence of such an interaction on regional resilience.

To this aim, we follow the empirical approach by Filippetti et al. (2020) that, in line with previous literature, observes regional resilience across two different subperiods: i) the resistance phase, when the labour market is hit the hardest by the shock and employment losses occur; and ii) the response phase, when the labour market recovers. This approach allows us to detect eventual changes in the influence of informal institutions over the two time frames studied and to draw relevant policy implications.

Overall, our study contributes to prior research in three ways. First, we introduce the role of informal institutions in the literature on regional resilience, which has thus far been overlooked. Second, we account for the interaction between informal institutions and the welfare state model in place in the relevant region and analyse their joint impact on regional resilience. Third, we observe the influence of informal institutions, as well as their interaction with different welfare models, over two different time frames, i.e., the resistance and the rebound phases, to capture potential changes in the impact of one stage on the other and draw relevant policy implications.

The remainder of the paper is structured as follows: Section 2 reviews the literature on regional resilience and connects it with studies on informal institutions. Section 3 presents the methodology, while Section 4 shows the empirical results. Section 5 discusses the results and draws the main conclusions of the paper.

2. Literature Review

2.1 Postshock resilience: types and determinants

The term *resilience* is multifaceted because it has been used in several disciplines.

In the domains of mathematics, physics and engineering, it is used synonymously with elasticity because it measures the "*speed at which the system returns to the stable point or trajectory following a perturbation*" (Gallopin 2006, p. 299). However, the equilibrium-restoring implications yielded by such a mechanical conception of systems are disputed by socioecological studies (Hollings 1973), where resilience accounts for system renewal and reorganisational processes (Berkes 2007), defining the ability of systems to absorb change and adapt to the effects of external disturbances. Such an evolutionary-based understanding of resilience has exerted great influence over other branches of the social sciences that have applied the concept using different units of analysis and at different spatial scales (Brown and Westaway, 2011; Cardinale 2019).

All the disciplines that contributed to building the scholarship around the concept of resilience share a common element of understanding, that is, the idea that resilience does not exist in isolation but represents an idiosyncratic property of a system intimately related to how its structure and features respond to the waves of disturbances experienced (Adger 2000).

In the aftermath of the 2008 downturn, this idea has attracted considerable attention from economic research as well. Indeed, although the outbreak of the 2008 global recession caused a sharp decline in economic activity worldwide, a spectrum of studies in regional economics and economic

geography observed uneven and heterogeneous patterns of economic recovery among countries and regions (Crescenzi et al., 2016). The concept of resilience has, thus, entered this field too, where it has been applied to explain why territories behave heterogeneously in the face of disruptive recessionary shocks (Martin 2012; Capello et al. 2015; Breathnach et al. 2015; Faggian et al. 2018; Di Tommaso 2020). In this context, *resilience* has been framed as a complex and multifaced process of systemic adaptation and transformations through disruption involving several stages. Martins (2012) identified four progressive and interrelated phases: (i) *resistance*, i.e., the sensitivity of regional output and employment to exogenous shocks; (ii) *recovery*, measuring how fast the region bounces back from a negative shock; (iii) *reorientation,* which concerns the extent to which a region changes after a shock by modifying, for example, its economic sectoral composition; and (iv) *renewal*, that is, the ability of a regional economy to renew its growth path.

The collected evidence on the spatially heterogeneous impact of the crisis mainly draws from analyses focusing on a single country, such as the UK (Rocchetta and Mina, 2017), Italy (Mazzola et al., 2018), Ireland (Breathnach et al., 2015) and the U.S. (Han and Goetz, 2015). Other studies adopt, instead, a cross-regional comparative perspective at the EU level (see Crescenzi et al., 2016; Rizzi et al., 2018; Ezcurra and Rios, 2019).

All these works assess economic resilience mainly by looking at the changes in the labour market before and after the crisis, thus primarily focusing on the regional *resistance* and the *recovery* phases. Indeed, labour market dynamics, in general, are more effective in capturing the depth of the structural change occurring within a local economy (Cardinale and Scazzieri 2018; Faggian 2018).

Hence, regional resilience has been assessed foremost in terms of postcrisis variation in regional/county employment levels (Martin 2012; Fingleton et al. Martin 2012; Davies 2011; Brown and Greenbaum 2017; Ezcurra and Rios 2019; Crescenzi et al. 2016) or by the ratio of the employment drop to the rebound (Han and Goetz 2015). Recently, other studies have used the change in the number of hours worked before and after a shock (Filippetti et al., 2020) as another way to look at employment dynamics and compare cross-regional reactions to the crisis in Europe.

Studies converge around the fact that, along with national macroeconomic conditions, context-specific features play a crucial role in helping territories respond to unforeseen shocks. In particular, major sources of regional economic resilience encompass those inherent structural endowments (both physical and intangible), namely, (i) the sectoral composition of economic activities and their diversity (Groot et al. 2011), (ii) the intensity of innovation activities and technological specialisation (Filippetti et al. 2020), (iii) the presence of a well-educated workforce (Crescenzi et al. 2016), and (iv) labour market characteristics (Luci, 2009; Bardhan, 1983).

Additionally, Ezcurra and Rios (2019) have recently found that the way in which governments administer public services also contributes to the adaptability and responsiveness of regional economies in times of crisis. These authors have drawn from a well-established stream of literature in the field of new institutional economics, contending that government institutions matter to the growth and development of economic activities (Rodrigues Pose, 2013; Agostino et al., 2020) since "*they promote stability and regulation by providing norm and authoritative behavioural guidelines"* (Holmes et al., 2013, p.533). In particular, the literature acknowledges that the welfare state takes on the role of a protective buffer in times of economic hardships for individuals and regions to alleviate the negative consequences of shocks (Stuckler et al. 2009; Visser et al. 2014).

Institutional economics studies have highlighted that research on institutional environments refers not only to formal institutions but also to immaterial and informal types of institutions. According to the literature, the latter "*include a series of features of group life such as norms, traditions and social conventions, interpersonal contacts, relationships, and informal networks"* (Rodriguez-Pose 2013 p.1038) that arise spontaneously through repeated community interactions.

However, even if in the literature there is a strong belief, supported by empirical evidence, that informal institutions contribute to the economic growth and adaptiveness of regions (Hudson 1994; Rodriguez-Pose 2013), their potential cushioning role for the economies of regions in times of economic hardships has been mostly overlooked (Reeskens and Vandecasteele 2017).

We believe that such a relationship is an interesting and pivotal one to be investigated for two major reasons.

First, the evolutionary concept of regional resilience used in economic geography draws from ecological studies, stressing evolutionary adaptation over equilibrium. Through this lens, informal institutions represent an intrinsic part of the way in which a socioeconomic system copes with and adapts to changing external circumstances. In particular, when informal institutions — namely, those identified in terms of interpersonal social trust (Knack and Keefer, 1997; Zak and Knack, 2001; Beugelsdijk et al., 2004) and cultural norms of engagement in civic life (Lim and Laurence 2015; Uhyel 2018) — nourish trust-based community bonds, they contribute to shaping and enhancing the idiosyncratic capacity of regions to adopt and recombine new knowledge, as well as to engage in innovative and creative activities (North, 1990) to seek joint solutions to problems (Morgan, 2007).
Second, it is widely acknowledged that the nexus between government institutions and economic phenomena should not be, whenever possible, studied separately from informal institutions (North 1990; Serageldin and Grootaert, 1999). Indeed, *"at the local level, formal government and other institutions interact with a dense set of informal networks, associative frameworks and voluntary associations"* (Serageldin and Grootaert, 1999, p. 51). Therefore, informal networks, norms and cultures of civic engagement should be considered as well because their interaction with formal institutions has important consequences for economic activities (Putnam 1993; Serageldin and Grootaert, 1999; Helmke and Levitsky, 2006; North, 1990; Pejovich, 1999; Alfano 2022).

Thus, investigating the informal institutions-regional resilience nexus allows us to fill the current gaps in the literature as well as to build upon previous studies in the field of resilience that limited their analysis to formal institutions. This study aims to take a closer look at the role of informal institutions, expressed in terms of citizens' involvement in unpaid voluntary work and activities, on regional economic resilience, without losing sight of the fact that such informal institutions may partially interact with efforts made by formal institutions, as the literature suggests.

2.2 Informal institutions: a catalyst for regional resilience?

Informal institutions relate to unwritten norms, cultural and moral values, traditions and religious beliefs regulating the relations and interactions among actors (Lewin et al., 2011; North, 1990). They can be defined as "*the informal ways by which human beings have structured human interaction*" (North, 1990, p. 36). They encompass societal norms, unwritten behavioural rules or ideologies that everyone has an interest in preserving because they represent the set of "*shared mental models*" that have been inherited from the past and "*have passed the test of time*" (Pejovich 1999, p. 166), even if they "*have never been consciously designed*" (Sugden, 1986, p. 54; Tonoyan et al., 2010). Because of this, informal institutions are considered "*more primary and deep-seated than formal institutions in orienting individual and organisations' behaviours*" (Crossland and Hambrick, 2011, p. 800), since they represent historically rooted conventions and social traits that arise spontaneously through repeatedly community interaction (Fukuyama 2000) and are gradually internalised by economic actors and passed from generation to generation (Lewin et al., 2011; Pejovich 1999; Rodriguez-Pose and Storper 2006; Pahl-Wostl 2009).

Among informal institutions, the literature has devoted considerable attention to interpersonal social trust (Knack and Keefer, 1997; Zak and Knack, 2001; Beugelsdijk et al., 2004) and cultural norms of engagement in civic life (Lim and Laurence 2015; Uhyel 2018) that are mutually reinforcing and embody the spirit of a community (Putnam, 1993, 2000; Beugelsdijk and Van Schaik, 2005). Such informal institutions contribute to shaping the attitude of society towards civic engagement and the involvement and participation of individuals in voluntary activities, which often develop in organisations such as voluntary associations and clubs. (Turner, 1999)

The attitude of individuals towards volunteering, both in formal organisations and in informal helping activities, captures the altruistic values, moral beliefs about voluntary work as a duty, and

cultural propensity towards participation in civic life (Lim and Laurence 2015; Bekkers 2011; Musick and Wilson 2008; Putnam 2000; Bale 1996), *"because values are an important attribute of culture, it seems reasonable to assume that collective values are important for volunteering as well. Volunteering will be more common in societies with a spirit of solidarity*" (Dekker and Halman, 2003, p.7). In the same vein, Lim and Laurence (2015, p.338) assert that "*volunteering tends to be more common and stable in communities where a strong cultural norm of trust and civic engagement makes it a natural part of community life*". For these reasons, the involvement of citizens in unpaid voluntary organisations and activities is rooted in the altruistic and prosocial values of a community and therefore captures the informal institutional endowment of the community itself. Therefore, unpaid voluntary work might be used as a proxy for the informal institution endowment characterising a given territory.

While it is widely acknowledged that institutions affect the economic performance of regions (North 1990; Dei Ottati 1994; Vasquez-Barquero 2002, Acemoglu and Johnson 2005), most studies have concentrated on formal institutions while overshadowing the role of informal institutions, which is still poorly understood (Gertler 2010). However, several studies have observed that informal institutions contribute to a large extent to shaping productive and market relations and, thus, play a relevant role in the potential of regions to develop economic activities (Beugelsdijk and Van Schaik 2003; Williamson 2009; Rodriguez-Pose 2013).

A well-known example of the nexus between informal institutions and economic prosperity relates to the formation of successful industrial districts in central and northern Italy. In particular, in regions such as Emilia-Romagna, Tuscany or Veneto, dense communitarian bonds underpinned by trust and shared political, social and cultural identity have strongly contributed to the development of economic activities in the form of agglomerations of small and medium-sized businesses characterised by a mix of cooperative and competitive behaviours (Brusco and Sabel, 1981; Dei Ottati, 1994; Becattini et al., 2009; Becattini, 2015). Informal institutions have also played a crucial role in the transitions of Eastern European countries, such as the Czech Republic, Hungary, Poland and Slovenia (Raiser 2001). Another case in point beyond the European boundaries is the well-established social network typical of China called *guanxi*, which can be defined as personal relationships based on trust and reciprocity through which individuals exchange favours (Wang, 2000) and make economic activities thrive.

On a more general level, informal institutions contribute to achieving economic prosperity by promoting social cooperation (Putnam, 1993), enhancing the financial system (Guiso et al., 2004; Duarte et al., 2012), and promoting stable networks of interfirm relations (Dei Ottati 1994) and international trade (Guiso et al., 2004). Furthermore, the evidence collected supports that strong ethical norms, trust-based tight-knitted social networks, cultures of engagement and participation facilitate information and knowledge circulation across the economy of a territory (Yao et al. 2020; Zhao and Hao 2021). Conversely, in areas characterised by a weak informal institutional environment, the potential for knowledge circulation and coordination of expectations through frequent interpersonal and production relations is hampered, as is the generation of creative responses, especially in times of economic hardships (Dobler 2011).

Finally, in regional studies, it is also important to consider both formal and informal institutions. Indeed, the latter can partly alleviate and compensate for the shortcomings of the former, given the potential underlying commonalities in their functions, although they cannot fully replace each other (Kafouros et al. 2021; Ugyel 2018). Specifically, while resources accruing from civil society can play a relevant role in buffering regional economies from the negative impact of a shock (Popenoe 1988), they should be considered in relation to their relevant institutional context (Grabner 2021 in Rudiger Wink ed.; Pascario e Pintilescu 2021), particularly with welfare state models. Indeed, to fully understand the role of informal institutions in withstanding a job crisis and supporting economic recovery, it should be acknowledged that they might interact with the support provided by the welfare state (Reeskens and Vandecasteele 2017). This view has been partially confirmed by studies highlighting that voluntary work might fill the gap in institutional intervention in some specific

socioeconomic fields and support the formulation of policy responses to new, emerging threats to human well-being for which there are no established (or poor) governance institutions (Anderson and Chang 2020).

In summary, the literature has highlighted various reasons supporting the idea that informal institutions might have an inherent capacity to influence regional resilience, although research in this field has neglected this dimension.

In particular, we contend that informal institutions are a crucial asset that sustain regional employment levels in ordinary times as well as in periods of economic hardship (such as the crisis Europe experienced in 2008–2013), thus contributing to regional resilience.

In the sections that follow, we explore the hypothesis that a positive correlation exists between informal institutions and the resilience of a region, while also considering the interaction between informal institutions and the efforts made by welfare state models.

3. Methodology

3.1 Data description

This study primarily investigates the nexus between informal institutions and the economic resilience of European regions during and in the aftermath of the 2008 Great Recession. Particular attention is also devoted to the potential interaction between informal institutions and welfare state models.

The dataset used is a cross-section of 192 NUTS2 regions and covers all EU27 members, with the exception of Croatia, Ireland, Poland, Cyprus, Malta, Denmark, Slovenia, and Sweden, for which data on the variables of interest over the period considered are missing.

Dependent variables

In line with previous studies (Breathnach et al. 2015; Rizzi et al. 2018; Filippetti et al. 2020), we break down regional resilience into two periods: resistance and recovery. In particular, the resistance period refers to the years 2008–2010, during which regions tried to withstand the economic shock, whereas the recovery period refers to the years 2010–2013, during which regions started to bounce back from the shock (Filippetti et al. 2020; Martin 2012).

We follow the literature and proxy resilience in terms of employment performance. Thus, the better a region performs in terms of employment reduction containment in the 2008–2010 period, the greater its resistance to the exogenous shock; in parallel, a fast increase in employment levels over 2010–2013 indicates a robust economic recovery. Specifically, to measure cross-regional employment performance over both the resistance and the recovery phases, we follow Filippetti et al. (2020) and use the number of hours worked; hence, a region is considered resistant if its relative drop of worked hours with respect to the average European drop in 2008–2010 was substantially low, while it is considered rapidly recovering if it was able to return to its relative precrisis amount (or more) of worked hours over the 2010–2013 recovery period.

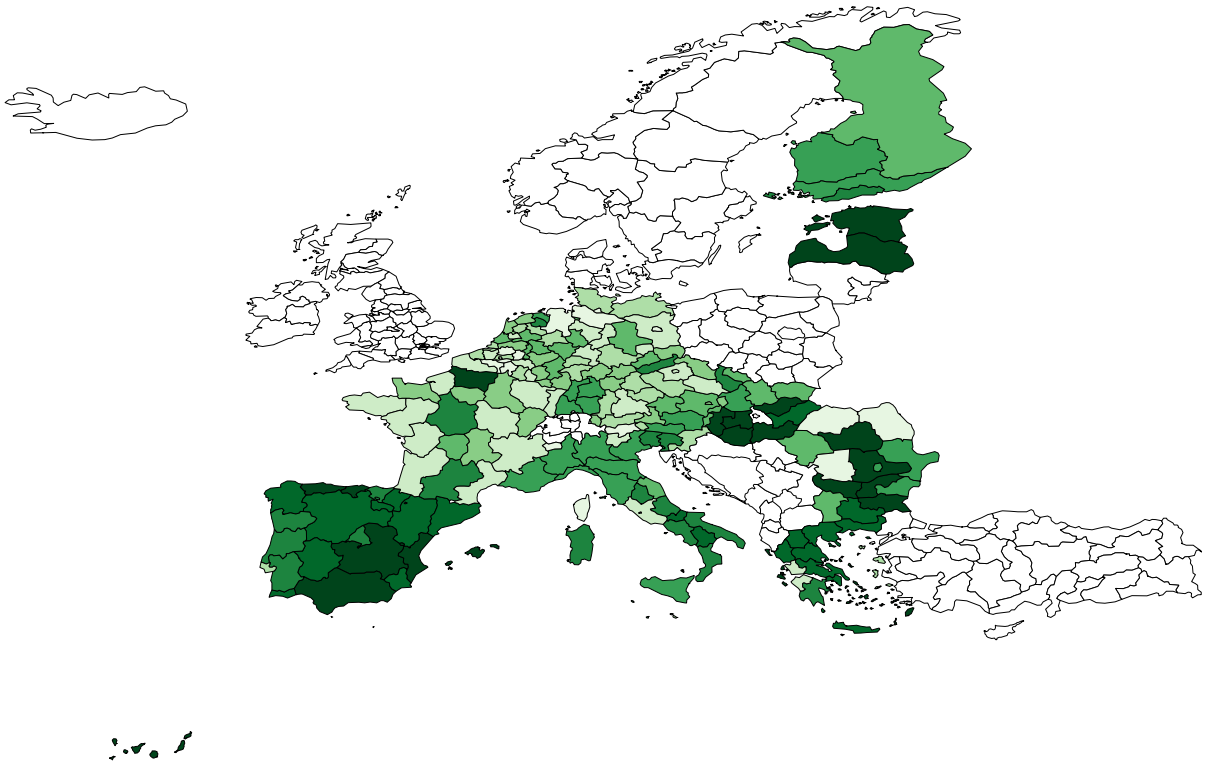
Drawing from Faggian et al. (2018) and Filippetti et al. (2020), we create two indices to estimate the resistance and recovery capacity of regions: the sensitivity index (SI) and the response index (RI), respectively. These indices are computed as follows:

$$\mathrm{SI} = \frac{\frac{Er,2010}{Er,2008}}{\frac{En,2010}{En,2008}} \quad (1)$$

$$RI = \frac{\frac{Er,2013}{Er,2010}}{\frac{En,2013}{En,2010}} \quad (2)$$

In the above equations, *Er* indicates the number of hours worked in region *r* in the year of reference (2008, 2010, or 2013). *En* refers to the average number of hours worked in European Union (EU) countries, which allows us to understand the relative performance of each European region within the EU context. Higher values of SI indicate a higher resistance during the crisis period; at the same time, higher RI values show a higher capacity of recovery for region *r*.
Figures 1 and 2 illustrate the SI and RI indices for the European regions observed, respectively.

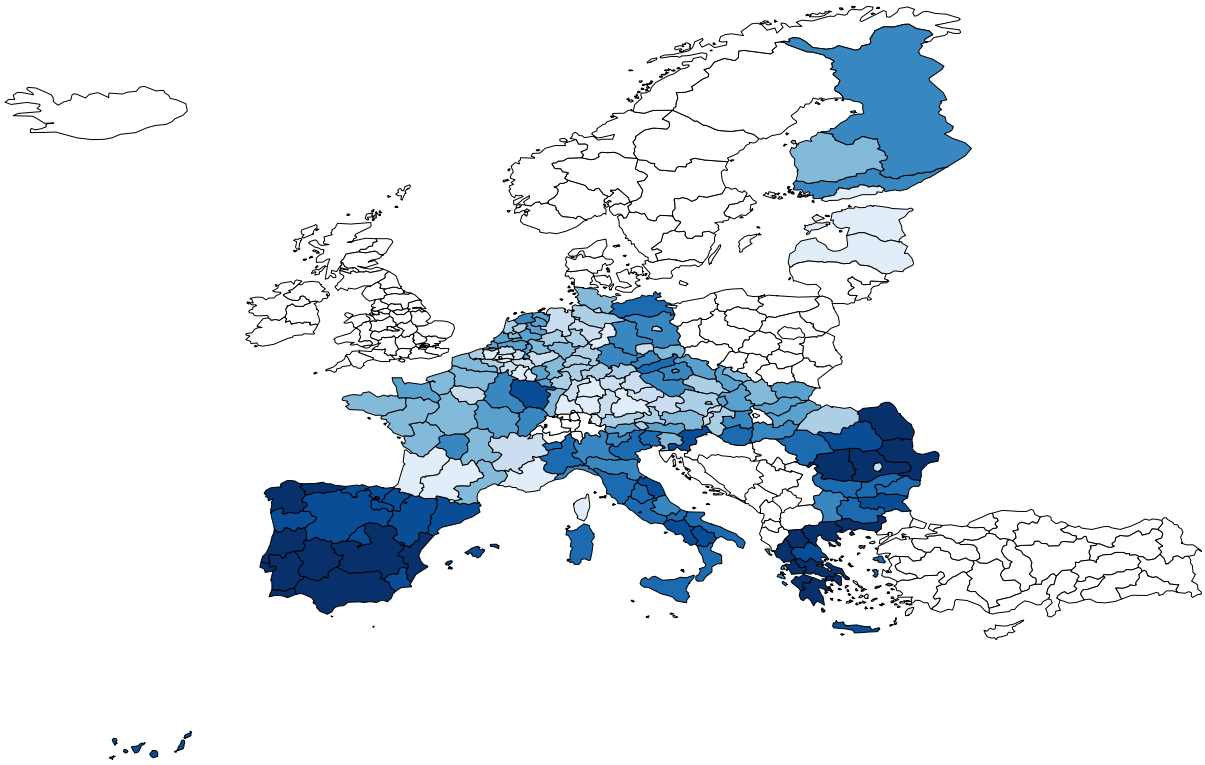
Figure 1 – Sensitivity index (SI) across observed European regions



Source: Authors' elaborations

The regions that best withstood the crisis were concentrated in continental Europe, the Nordic countries and a few Romanian regions (Figure 1). The regions that performed better in terms of recovery belong to continental Europe and to the Baltic area (Figure 2). Conversely, regions located in southern Europe performed relatively worse in both periods (Figures 1 and 2).

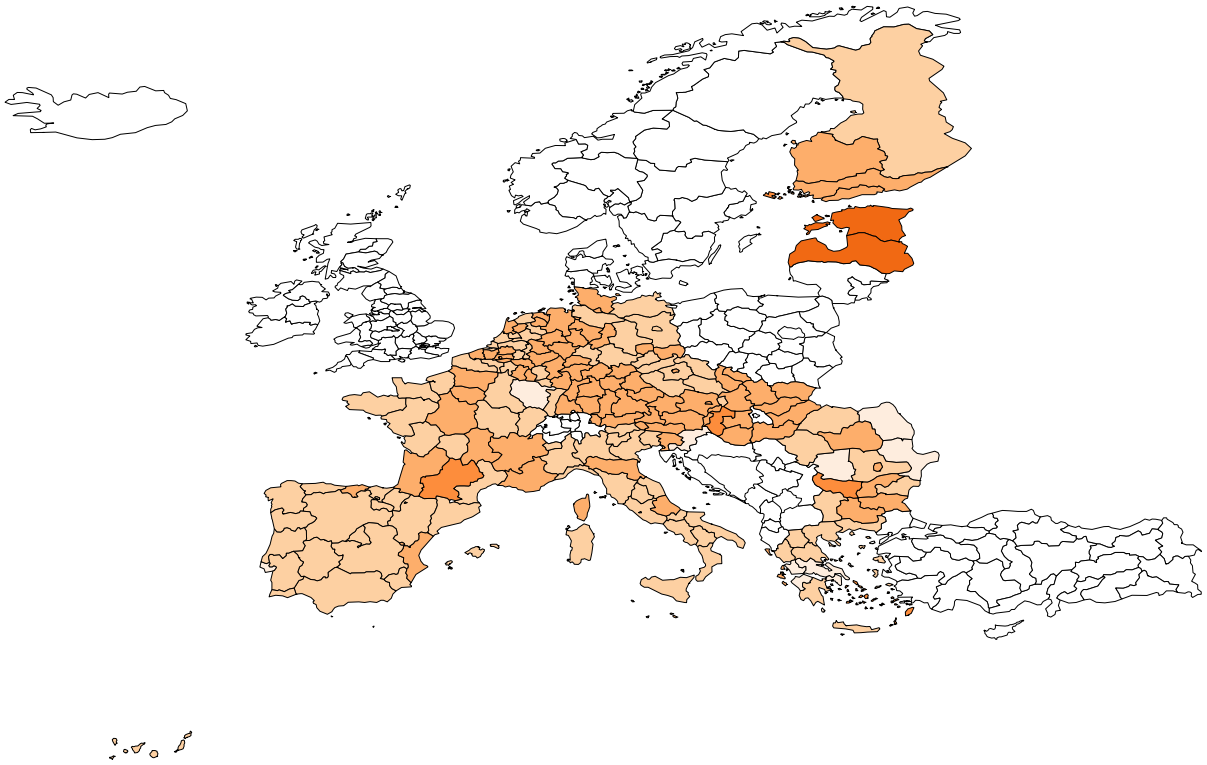
Figure 2 – Response index (RI) across observed European regions



Source: Authors' elaborations

Figure 3 shows the extent to which each region managed to improve labour market performance in the recovery phase compared to the resistance phase. Overall, regions located in continental Europe and in the Nordic area, along with several areas of Eastern Europe, managed to raise employment levels in the recovery phase more than in the resistance phase. Conversely, in the recovery phase, regions located in southern Europe display a labour market performance that is weaker compared to the early stage of the crisis, with very few exceptions, i.e., Emilia-Romagna in Italy and the Comunidad Valenciana in Spain, which stand out as important manufacturing centres.

Figure 3 – Difference between RI and SI index



Source: Authors' elaborations

Main explanatory variables

In line with previous studies, we have used data from the European Values Study (EVS, 2008) to measure informal institutions (Kaase et al. 2014; Fazio e Lavecchia 2013; Oorschot, Arts and Halman, 2005). The EVS is a large-scale, cross-national survey of attitudes, opinions and values using adult population samples that are representative both at the national and regional levels ([1]). Specifically, we created an indicator that accounts for citizens' involvement in unpaid voluntary work and activities and for the existence of a culture of civic engagement (Lim and Laurence 2015) within a given region. This indicator (*Volunteering*) measures the share of the population voluntarily engaged in unpaid work activities ([2]). In particular, the indicator is calculated as the proportion of the population of a region engaged in at least one voluntary activity ([3]). The indicator ranges between zero (no people doing unpaid voluntary work) and one (the entire population in the representative sample is engaged in at least one unpaid voluntary activity): the closer this indicator is to one, the greater the involvement of the regional population in voluntary activities. For example, a value of 0.6

[1] Only Denmark is not representative at the regional level, but the country is not included in this study.

[2] In line with the definition of volunteer work by Tilly and Tilly (1994): "*unpaid work provided to parties to whom the worker owes no contractual, familial, or friendship obligations*" (p. 291).

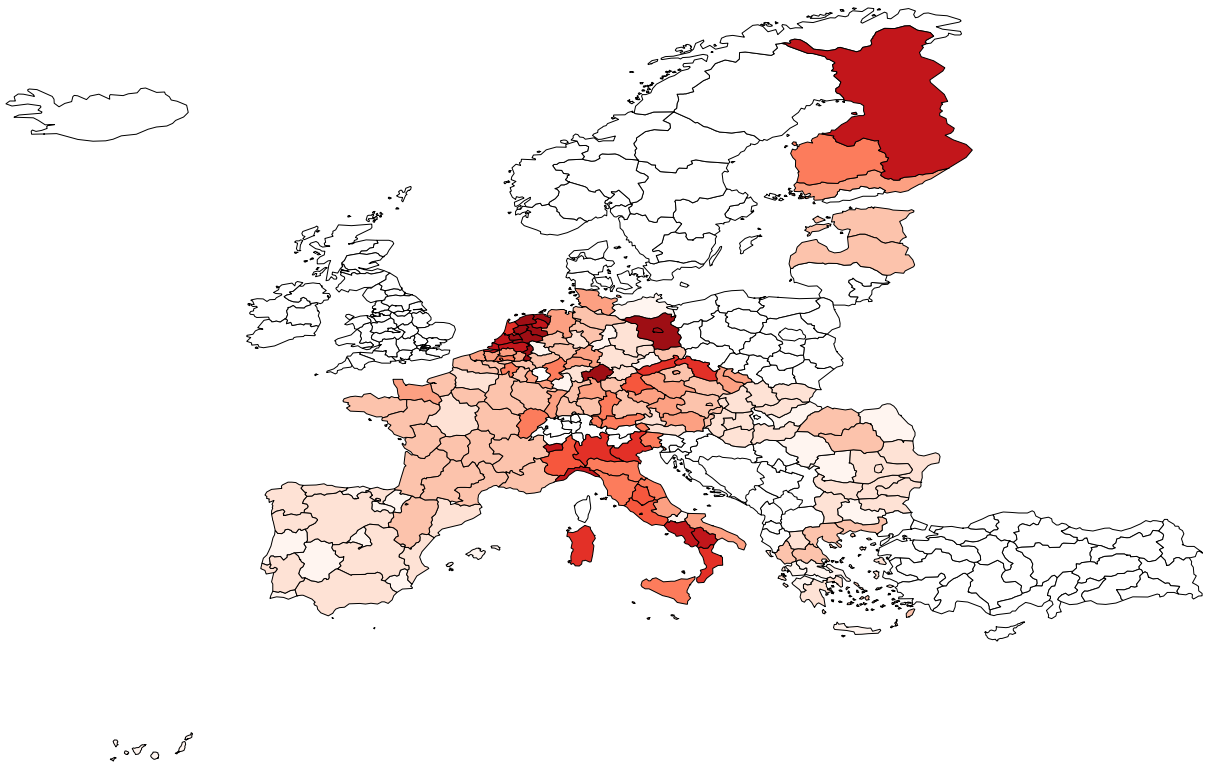
[3] The survey asked the respondents "*which, if any, of the following list of voluntary organizations and activities are you currently doing unpaid voluntary work for?*". Such a question primarily addresses in general terms the involvement of individuals in unpaid voluntary works across different activities and organizations. The list of voluntary activities and organizations included: a) Social welfare services for elderly, handicapped or deprived people; b) Religious or church organizations; c) Education, arts, music or cultural activities; d) Trade unions; e) Political parties or groups; f) Local community action on issues like poverty, employment, housing, racial equality; g) Third world development or human rights; h) Conservation, the environment, ecology, animal rights; i) Professional associations; j) Youth work (e.g., scouts, guides, youth clubs etc.); k) Sports or recreation; l) Women's groups; m) Peace movements; n) Voluntary organizations concerned with health; o) Other groups; and p) None.

indicates that 60% of the regional population participates in at least one of the listed unpaid voluntary activities.

We acknowledge that unpaid voluntary work might have a certain degree of formality, often being carried out as an organised service with rules given to participants by voluntary associations. However, the degree of internal organisation that a voluntary service/association adopts does not directly imply that it should be considered a formal institution, as the literature suggests. Indeed, "*the abilities and effectiveness of the institutions at the macro- and microlevels (and in the formal and informal spheres) influence outcomes. Institutions need values, but they also need organisational and management capacity and communication and technical skills in order to act effectively upon these values*" (Serageldin and Grootaert 1999, p.51). This means that both formal and informal institutions require a certain degree of organisation to effectively deploy their effects. Hence, even when voluntary work is organised, the involvement of individuals in unpaid voluntary work remains spontaneous and, thus, reflects the extent to which a culture of participation in civic life is present in a community. In other words, although we cannot exclude the fact that our indicator captures a small degree of formality, it is an appropriate approximation of informal institutions. Indeed, the data on which the indicator is based do not refer to voluntary associations but to the individual propensity to participate in voluntary organisations and activities. In particular, they refer to a question in the ESV survey (see footnote 3) addressing the actual involvement of the surveyed population in voluntary work, not their memberships in voluntary organisations, which does not necessarily entail actual participation in voluntary activities.

Figure 4 shows the distribution of citizens involved in voluntary activities across the European regions observed. Unpaid voluntary work seems to be clustered within countries and localised in some specific regions, primarily belonging to Belgium, the Netherlands, Finland, Italy, Germany, Austria and the Czech Republic.

Figure 4 – Unpaid voluntary work across the European regions observed (year=2008)



Source: Authors' elaborations

Regarding formal institutions, we identify them using welfare state models.

Over the past decades, social studies and welfare scholars (Esping-Andersen, 1990 and 1999; Leibfried, 1993; Ferrera, 1996; Aidukaite, 2006) have converged around the idea that there are different models of the welfare state in Europe. These models have been identified mainly according to, on the one hand, the degree to which basic resources and services needed to sustain people's lives are detached from the market mechanism (decommodification) and, on the other hand, to the degree to which social security is assigned to the family system rather than to the public sector (familiarisation). Moreover, welfare states across Europe have also been grouped according to common historical-institutional and geographical features. The result is a five-category taxonomy, which has been used as a reference framework in this work.

The first is the Continental model, which is rooted in the corporatist and conservative arrangements deriving from the so-called "Bismarckian legacy", i.e., a welfare mix shaped by the influence of the Catholic Church and by a corporatist approach to State regulation (Leichsenring, 2001). Such a model is based on medium levels of decommodification and low levels of familiarisation. Germany best represents this group, which also encompasses France, Belgium Luxembourg, Austria and Hungary. The latter is included due to the historical ties still existing with the Bismarckian insurance scheme adopted under the Austro-Hungarian Empire and to some other common traits shared with the Continental model (Orosz, 2018; Hajighasemi, 2019; Cavallo and Silvestri, 2022).

The second is the Mediterranean model, typical of southern European countries, encompassing Spain, Portugal, Italy and Greece (Leibfried, 1993; Rhodes 1996). The Mediterranean model is historically rooted in the dictatorships that started over the XX century and shaped welfare provisions across these countries. This model is characterised by a highly fragmented and corporatist income maintenance system, the formation—in some cases—of elaborated forms of clientelism for the selective distribution of cash subsidies (Ferrera 1996), and the strong reliance on the Church, local charity organisations, voluntary activities and family ties as social safety nets (Hajighasemi, 2019; Bambra and Eikemo, 2009).

The third is the Social-democratic model. It is characterised by full decommodification and defamiliarisation, which results in a comparatively generous social expenditure by the government and a commitment towards full employment and income protection. This model encompasses Sweden, Finland, Norway, Iceland, Denmark and, to some extent, the Netherlands (Bekker and Mailand, 2019). The latter case is usually represented as a hybrid welfare system between the Continental and the Social-democratic groups. However, "*scholars are of the opinion that, institutionally, the Dutch welfare system comes closer to the social-democratic type because its social security system contains not only Bismarckian-type social insurance for workers but also universal people's insurances that cover all citizens, and because its insurance and assistance benefits are comprehensive and relatively generous*" (Oorschot 2006, p. 58; see also Goodin and Smitsman 2000; Visser and Hamerijck 1997).

The fourth is the Anglo-Saxon model (not relevant for the present study). This model is characterised by a liberal approach to the welfare state that minimises the decommodification and defamiliarisation levels. Typical of this approach are the United Kingdom, Ireland and Malta (Esping-Andersen 1990; Bambra and Eikemo, 2009).

The fifth is the Transition countries model, encompassing most post-socialist EU countries. This group came about after the break-up of the Soviet Union. The transition period was characterised by substantial privatisation and liberalisation of the economic system, which challenged the design of the socialist welfare and insurance system. Currently, welfare states in these countries, i.e., the three Baltic Republics, Poland, the Czech Republic and Slovakia, Slovenia and Croatia, Romania and Bulgaria, are experiencing a demise of the universalism of the communist welfare state and a shift towards policies associated more with the Anglo-Saxon regime, notably the marketisation of public provisions and decentralisation (Bambra and Eikemo; 2009). However, until the transition process is

not concluded and the landing is defined, it is advisable to group these countries together within the cluster of Transition welfare states (Adukaite, J. 2009; Hajgasemi, 2019).

The following table summarises the five proposed models with respect to EU countries inside and outside the coverage of our study.

Table 1 – Classification of EU Countries by Welfare model

Welfare Model	EU countries considered in the study	EU countries not considered in the study
Continental	Austria, Belgium, Germany, France, Luxembourg, Hungary	-
Transition countries	Bulgaria, Czech Republic, Estonia, Lithuania, Latvia, Romania, Slovakia	Croatia, Poland, Slovenia
Mediterranean	Greece, Italy, Portugal, Spain	-
Social-democratic	Finland, The Netherlands	Denmark, Sweden
Anglo-Saxon	-	Ireland, Malta

Source: Authors' elaboration

Clearly, all of the NUTS 2 regions belonging to a given country are assumed to display the same welfare model. We thus include in the econometric specification a categorical variable ranging from 1 to 4, where the value 1 is associated with regions belonging to countries displaying a Continental welfare model; 2 to the welfare state in transition countries (and therefore in the relevant regions); 3 to the Mediterranean welfare model and thus is associated with Italian, Spanish, Portuguese and Greek regions; and 4 to the regions belonging to the countries adopting a Social-democratic model. Table 2 summarises this information by welfare state models, showing that, on average, regions with the Continental and Social-democratic welfare models are those whose labour markets performed better in the recovery phase than in the resistance phase. The opposite holds for regions in transition and southern countries. However, it is worth noting that the labour market performance of regions in transition countries is slightly below zero. This means that their performance is more similar to that of Social-democratic and Continental welfare states than to the southern welfare model, which appears to lag behind the other three groups.

Table 2 – Difference between RI index and SI index – Average values by welfare models

Welfare model	RI - SI	N° obs
Continental	0.0076	89
Transition countries	-0.0022	30
Mediterranean	-0.0453	56
Social-democratic	0.0014	17

Source: Authors' elaborations

Control variables

Other variables are included as controls (*X)* at the regional level, accounting for the main socioeconomic features of regions, as well as for their tangible and intangible endowments (Table 3). In particular, population density controls for the demographic composition of the regions, whereas regional gross domestic product is a proxy for the size of the regional economy. The share of the population working in the industry sector controls for the regional weight of the secondary sector, while the share of the population with tertiary education accounts for the quality of human capital endowment. Furthermore, the number of patent applications per million inhabitants accounts for regional attitudes towards research and its innovation capacity, which, along with human capital, represent crucial assets for its economic prosperity.

Table 3 – Explanatory and control variables

Main explanatory variables	*Description*	*Year*	*Source*
Volunteering	Share of population involved in at least one unpaid voluntary activity	2008	European Value Survey
Welfare model	Categorical variables ranging from 1 to 4, where 1 represents the Continental model, 2 the welfare model in transition countries, 3 the Mediterranean model and 4 the Social-democratic welfare model.	/	Literature (various sources)
Other control variables	*Description*	*Year*	*Source*
Population density	Logarithm of regional population density	2008 and 2010	Eurostat
Size of the economy	Logarithm of the regional gross domestic product (Million purchasing power standards)	2008 and 2010	Eurostat
Human capital	Share of population 25–64 years with tertiary education (level5 5-8)	2008 and 2010	Eurostat
Innovation capacity	Patent applications to the EPO (per capita)	2008 and 2010	Eurostat
Share of workers in manufacturing	Share of people employed in manufacturing sector	2008 and 2010	Eurostat

Source: Authors' elaboration

* Data available at: https://www.gu.se/en/quality-government/qog-data/data-downloads/european-quality-of-government-index

3.2 Model estimation and econometric strategy

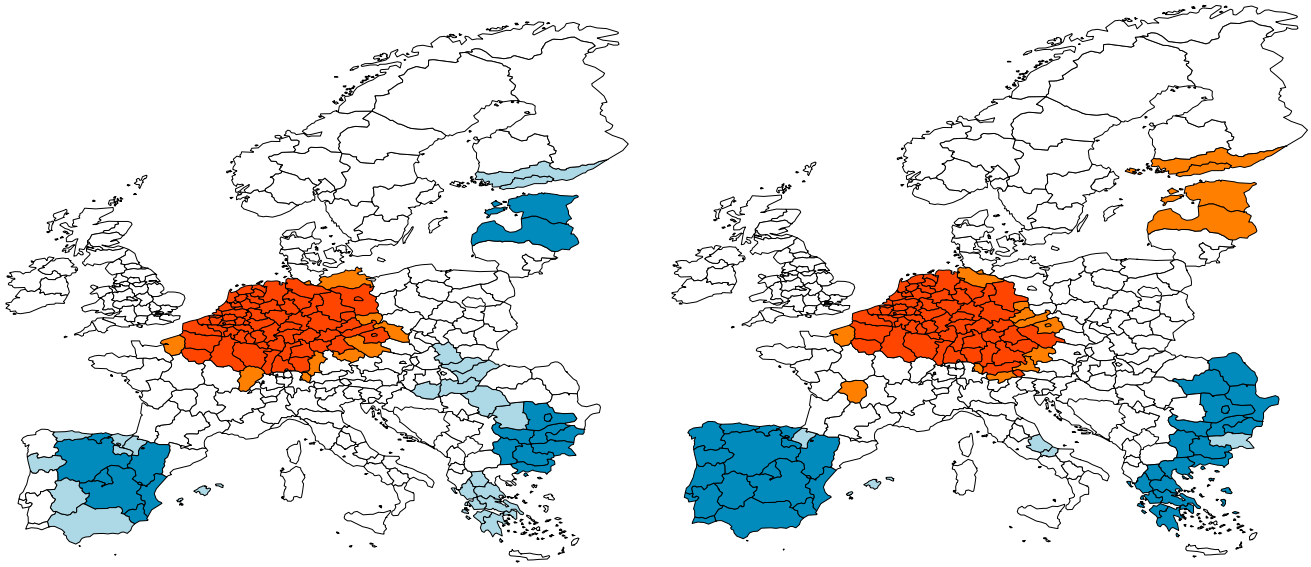
When considering which econometric specification allows us to appropriately investigate the relationship between resilience and informal institutions, it is important to note that the ability of a region to both resist the negative consequences of a crisis and to recover from it might not be randomly distributed. Indeed, Figures 1, 2 and 3 suggest the presence of spatial clusters of regions with similar levels of resilience during the crisis, whereas only in a few cases do regions stand out among neighbouring areas, showing a markedly different performance. Furthermore, the literature has shown the existence of a strong link between a given region's resilience and the average resilience of neighbouring regions (Ezcurra and Rios 2018; Filippetti et al. 2020; Pontarollo and Serpieri 2020).

To confirm such a spatial pattern, both in the aftermath of the shock and in the recovery phase, we perform a Moran's *I* test of spatial dependence. Moran's *I* statistics test for the existence of global spatial autocorrelation in the distribution of regional resilience (Moran, 1950). The results for both SI and RI (*I* statistic is 0.30 with p-value =0.00 and 0.47 with p-value=0.00, respectively, see Tables 7 and 8 in Appendix A) lead to the rejection of the null hypothesis of spatial randomisation in the distribution of regional resilience, pointing to the presence of a general tendency to cluster within the study area.

We also perform a Hot Spot Analysis for detecting local spatial autocorrelation. Specifically, the Hot Spot Analysis tool calculates the Getis-Ord Gi* statistic for each feature in a dataset (Getis and Ord, 1992; Ord and Getis, 1995).

The Gi* statistic return for each feature in the dataset is a z scorez-score and the relevant p-value. For statistically significant positive z-scores, the larger the z-score is, the more intense the local clustering of high values (hot spot). For statistically significant negative z-scores, the smaller the z-score is, the more intense the local clustering of low values (cold spot). In other words, the resulting z-scores and p-values identify statistically significant spatial clusters of high values (hot spots) and low values (cold spots) (see Tables 9 and 10 in Appendix A). When calculating the Gi* statistic, we have followed the literature according to which knowledge spillovers, due to their tacit nature, operate in a range of approximately 300 km (Bottazzi and Peri 2003; Filippetti et al. 2020).

Figure 5 – The Hot Spot Map based on the Getis-Ord GI* statistics by SI (left map) and RI (right map)



Source: Authors' elaborations.
Regions are grouped into local clusters. Cold spots (blue and light blue regions) identify statistically significant spatial clusters of low values for SI and RI, whereas hot spots (orange and red regions) identify statistically significant spatial clusters of high values for SI and RI. For white regions, z-scores are not statistically significant.

Figure 5 shows that in the aftermath of the crisis (SI), some statistically significant "cold" spatial clusters were concentrated in Spain, Greece, the Baltic regions, Bulgaria, Romania and Hungary, whereas a wider hot cluster was located in continental Europe. For the RI, we observe hot local clusters in continental Europe, Finland and the Baltic regions, whereas statistically significant cold clusters are located in Spain, Eastern Europe and, to a lesser extent, Italy. This suggests that the resilience performance of a region is affected by that of neighbouring regions.

Given the global and local spatial correlation of both SI and RI, we resort to a spatial autoregressive model (SAR). The SAR model is a fairly general spatial specification accounting for the spatial lag of the dependent variable. Indeed, the results of the global and local spatial autocorrelation tests have shown that the possible presence of spatial spillovers between neighbouring regions related to their resilience capacity is a spatial process. Thus, this suggests considering an SAR model where the outcomes of a region are affected by the outcomes of the nearby regions.

Equations 3 and 4 show the model specification.

$$SI_i = \alpha + \rho Wy + \beta * volunteering_i + \gamma * WelfareModel_i + \delta * Volunteering_i * WelfareModel_i + \Delta * X_i + u_i \quad (3)$$

and

$$RI_i = \alpha + \rho Wy + \beta * volunteering_i + \gamma * WelfareModel_i + \delta * Volunteering_i * WelfareModel_i + \Delta * X_i + u_i \quad (4)$$

where

ρWy *= the spatial lags of the dependent variable*

Resilience is our dependent variable. As stated above, we decompose resilience in SI and RI; thus, both indices are considered dependent variables in two different cross-section SAR spatial models. *Volunteering*, which already proxies the presence and intensity of informal institutions across regions, is our main explanatory variable, along with the categorical variable *WelfareModel* and the interaction term $Volunteering_i * WelfareModel_i$. The latter allows the effects of unpaid voluntary work on regional resilience to differ by the relevant welfare model. X is the vector of exogenous variables included as controls. ρ is the coefficient of the spatially lagged dependent variable, while W is an $n \times n$ contiguity spatial weights matrix specified as a row normalised binary contiguity matrix, with elements wij=1 if two spatial neighbourhoods share a common border and 0 otherwise.

Following Filippetti et al. (2020), in the SI specification, the explanatory variables refer to 2008 (the initial year of the resistance period on which the SI index is calculated), whereas in the RI specification, the explanatory variables refer to 2010 (the initial year of the recovery period on which the RI index is calculated). Therefore, regressors in Equation (3) use 2008 data, while those in Equation (4) use 2010 data. The only exception concerns *Volunteering*, which is measured in 2008 for both estimations since the data collected by the EVS survey are available only for a limited number of years. However, given that the time distance between SI and RI only covers two years, it seems reasonable to assume that in such a short period of time, the informal institutional endowments of regions, including our main explanatory variable, are stable, and potential changes would only be marginal even when facing an unforeseen shock, as the literature suggests (Cortinovis et al. 2017; Sarracino and Mikucka, 2015; Lim and Laurence 2015). Finally, descriptive statistics are reported in Table 4, while the correlation between regressors is shown in Table A5 in Appendix A.

Table 4 – Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Population density 2008	190	4.98	1.08	1.85	8.80
Population density 2010	190	4.98	1.08	1.85	8.85
Size of the economy 2008	192	10.34	1.02	6.99	13.30
Size of the economy 2010	192	10.31	1.03	7.05	13.32
Human capital 2008	188	3.04	0.37	1.91	3.85
Human capital 2010	188	3.10	0.36	2.19	3.90
Innovation capacity 2008	186	110.04	132.58	0	626.10
Innovation capacity 2010	185	110.29	136.63	0	721.29
Share of workers in manufacturing 2008	192	25.60	7.58	8.26	46.4
Share of workers in manufacturing 2010	192	23.91	7.25	7.83	43.38
Volunteering	182	0.31	0.24	0	0.96

Source: Authors' elaboration

4. Empirical results

Table 5 presents the main results of our empirical analysis, estimated through a generalised spatial two-stage least square (GS2SLS) estimator. For each of the two indices SI and RI, we run three specifications: Columns (1) and (4) focus on the association between the dependent variables and *Volunteering*, while Columns (2) and (5) include both *Volunteering* and the categorical variable controlling for welfare models. Columns (3) and (6) include the interaction term between the two.

Table 5 – Main empirical findings

	SI	**SI**	**SI**	**RI**	**RI**	**RI**
	(1)	(2)	(3)	(4)	(5)	(6)
Volunteering	0.020**	0.0360***	0.0131	0.0362***	0.0698***	0.1219***
	(0.0085)	(0.0125)	(0.0186)	(0.0105)	(0.0167)	(0.0199)
Population density	0.0064**	0.0048	0.0063	0.0088**	0.0037	0.0026
	(0.0027)	(0.0036)	(0.0039)	(0.0036)	(0.0029)	(0.0030)
Size of the economy	0.0017	0.0038	0.0039	-0.0063	0.0004**	-0.0021
	(0.0035)	(0.0037)	(0.0038)	(0.0040)	(0.0029)	(0.0029)
Human capital	-0.0208**	-0.0209*	-0.0284**	0.0412***	0.0350***	0.0482***
	(0.0098)	(0.0117)	(0.0130)	(0.0142)	(0.0132)	(0.0138)
Innovation capacity	0.0001***	0.0001*	0.0001	0.0002***	0.0001***	0.0001***
	(0.00002)	(0.00002)	(0.00001)	(0.00001)	(0.00003)	(0.00003)
Share of workers in Manufacturing	-0.0016***	-0.0016***	-0.0018***	0.0014**	0.0010**	0.0010**
	(0.000)	(0.0005)	(0.0005)	(0.0006)	(0.0004)	(0.0004)
Continental welfare		0.0327***	0.0147		0.0861***	0.1185***
		(0.0060)	(0.0108)		(0.0064)	(0.0113)
Transition countries welfare		0.0195	0.0091		0.0596***	0.0723***
		(0.0156)	(0.0177)		(0.0126)	(0.0161)
Social-democratic welfare		0.0071	0.0598 ***		0.0293**	0.0630***
		(0.0120)	(0.0181)		(0.0121)	(0.0160)
Mediterranean welfare		omitted	omitted		omitted	omitted
Continental welfare x volunteering			0.0645**			-0.1225***
			(0.0304)			(0.0331)
Transition countries welfare x volunteering			0.0380			-0.0403
			(0.0415)			(0.0399)
Social-democratic welfare x volunteering			-0.0498**			-0.0820***
			(0.0228)			(0.0192)
Mediterranean welfare x volunteering			omitted			omitted
Spatial lag-dependent variables	0.0382**	0.0231*	0.0292**	0.0027	-0.0469**	-0.0507**
	(0.0124)	(0.0130)	(0.0135)	(0.0204)	(0.0196)	(0.0196)
Constant	1.0030***	0.9857 ***	1.0065 ***	0.8179***	0.7978 ***	0.7784 ***
	(0.0472)	(0.0479)	(0.0483)	(0.0671)	(0.0521)	(0.0516)
N	178	178	178	177	177	177
R-squared	0.291	0.380	0.401	0.378	0.682	0.709

*p < 0.10, **p < 0.05, ***p < 0.01; standard errors in parentheses.
Source: Authors' elaboration

The estimated coefficients of the spatial lag of the dependent variables SI and RI are statistically significant, indicating the existence of a spatial dependence in regional resilience. In other words, the capacity for a given region to withstand the crisis and recover from it is affected by the capacity of its neighbouring regions. This result confirms the need to account for spatial models when studying regional resilience across EU regions.

Turning to the main focus of the paper, Columns (1) and (4) show that the coefficient of *Volunteering* is positive and statistically significant for both SI and RI.

This means that the existence of informal institutions in a region is associated, on average and *ceteris paribus,* with greater regional resilience, both in the resistance (SI) and in the recovery phase (RI). This is consistent with most of the arguments in the literature review in Section 2, specifically the fact that immaterial resources accruing from civil society might play a relevant role in times of economic hardships to cushion regional economies from the negative impact of a shock (Popenoe 1988).

Moreover, the coefficients of *Volunteering* suggest that the endowment of informal institutions represents a pivotal asset supporting regions withstanding the crisis, but it is even more crucial for the labour market recovery in the aftermath of economic downturns.

In Columns (2) and (5), we control for the typology of the welfare state model. Additionally, in these cases, *Volunteering* is positive and statistically significant. Additionally, we observe that when we control for the welfare state institutions in place in a given region, the estimate of *Volunteering* is positive and its effect increases both for SI and RI, confirming the important role played by informal institutions, on average and *ceteris paribus*, for the resilience of regions. In particular, as a baseline category, we have used the Mediterranean welfare state, where a crucial role for social security is attributed to family and informal social ties, which act as a last-resort protection network. Our results show that, especially in the recovery phase (RI), the regions located in a country displaying either a Continental, a Transition or a Social-democratic type of welfare experience a labour market recovery that is higher than that experienced by regions characterised by Mediterranean welfare regimes. Moreover, we find that the Continental welfare state is the one that supports the most regional resilience, both in the SI and RI phases.

These results are in line with recent studies that have shown that the effects of the 2008 crisis have been cushioned differently across European states, depending on the welfare regime in place (Ólafsson and Kolbeinn 2019; Ronchi 2018; Dumitrache and Tache 2013; Hemerijck 2012). In particular, the consequences of the crisis have been especially hard for Mediterranean countries, whereas overall Continental countries managed quite well to counteract the negative welfare consequences during the Great Recession (Ólafsson and Kolbeinn 2019; Ronchi 2018; Moreno-Fuentes and Marí-Klose 2016).

Finally, in Columns (3) and (6), we add the interaction term between *Volunteering* and welfare state regimes. We are interested in observing how the impact of unpaid voluntary work on regional resilience might differ depending on the conditioning of the welfare state models in place in the regions. Overall, our results show that the effect of an increase in unpaid voluntary work differs across regions depending upon the welfare model in place in that region.

In particular, for SI, we observe that *Volunteering* is no longer statistically significant ([4]). This could be due to the fact that informal institutions in regions with a Mediterranean welfare state are not strong enough to mitigate the negative consequences of the crisis on the labour market in the immediate aftermath of the crisis (SI).

[4] It is important to note that the coefficient of *Volunteering* in Columns 3 and 6 is not, as in the other columns, the average effect of voluntary work on resilience, but it instead refers to the effect of unpaid voluntary work conditioning on the Mediterranean welfare model.

Looking at the other interaction estimates in SI, we see that the values in regions characterised by Continental and Social-democratic welfare states are statistically significant and overall positive. In particular, the estimate value for *Volunteering* in the Continental welfare state is 0.0645, whereas the actual estimate for *Volunteering* in the Social-democratic welfare state is 0,01([5]). Indeed, the negative sign of the variable *SocialDemocraticWelfarexVolunteering* should not be interpreted as a negative effect of social democratic welfare on resilience compared to the baseline category, i.e., the Mediterranean model. Rather, it points to a "crowding-out effect" (Reeskens and Vandecasteele 2017) that social democratic welfare exerts on the impact of voluntary work. In other words, "*generous welfare provisions erode the supportive role of immaterial resources"* (Reeskens and Vandecasteele 2017, p. 46. See also Fukuyama 2001; Reeskens and Oorschot 2014). This might explain why in SI, the overall effect of unpaid voluntary work in a social democratic region is small (given that it is eroded by a strong welfare state) but still positive and nonnegligible compared to the effect of unpaid voluntary work in the Mediterranean welfare state, which is not significant.

No effect is registered for voluntary work in regions belonging to the Transition welfare model. This result might be the consequence of what has been stated in the literature review, that transition countries do not yet have a common and clear welfare state model but are instead in a transformative phase, which seems to be converging towards the Anglo-Saxon model, in which the role of public provisions and support is minimal.

In the recovery phase, we observe that *Volunteering* is positive and statistically significant at the 1% level and that the effect is the highest across all six specifications. This suggests that while informal institutions in Mediterranean welfare regimes do not support regions withstanding a crisis, they seem to play a meaningful role in the recovery stage, suggesting a strong impact of informal institutions on regional resilience and no crowding-out effect exerted by a relatively weaker welfare regime.

Looking at the other interaction terms in RI, we see that the estimates in regions characterised by Continental and Social-democratic welfare states are statistically significant at the 1% level and overall positive. In particular, the overall estimated value for voluntary work in Continental welfare states is 0,1179 ([6]), whereas for Social-democratic welfare state, it is 0,1029 ([7]). It is interesting to note that in RI, the interaction terms related to Continental and Social-democratic welfare have a negative sign. Again, this suggests that informal institutions might partially compete with the support provided by generous welfare state regimes, as in the case of Continental and Social-democratic regimes. In other words, also in the recovery stage, the effect of *Volunteering* on resilience is partially mitigated by the provisions of strong welfare states. Again, no specific effect is registered for *Volunteering* in regions of transition countries.

Our results are robust to the use of an alternative estimation strategy and spatial model (see Appendix B).

With respect to the control variables included in our model, a few comments are worth noting. Table 5 shows that the employment share in manufacturing is negatively associated with the resistance of a region, while it is significant for its recovery. This points to the fact that a region characterised by a larger manufacturing sector suffers more from labour market contractions in terms of lost hours worked in the early phase of an economic downturn but not in its aftermath, where manufacturing becomes a crucial asset for labour market recovery and job creation. This finding is in line with prior

[5] The coefficient value for the variable *SocialDemocraticWelfarexVolunteering* is calculated by adding up 0.0598 (the coefficient of the variable *Social Democratic Welfare*) and -0.0498 (the coefficient of the variable *SocialDemocraticWelfarexVolunteering*). Hence, 0.0598 + (-0.0498) = 0,01.

[6] The coefficient value for the variable *ContinentalxVolunteering* is calculated by adding up 0.1219 (the coefficient of the variable *Volunt*eering), 0.1185 (the coefficient of the variable *ContinentalWelfare*) and -0.1225 (the coefficient of the variable *ContinentalWelfarexVolunteering*).

[7] The coefficient value for the variable *SocialDemocraticWelfarexVolunteering* is calculated by adding up 0.1219 (the coefficient of the variable *Volunt*eering), 0.0630 (the coefficient of the variable *SocialDemocraticWelfare*) and -0.0820 (the coefficient of the variable *SocialDemocraticWelfarexVolunteering*).

studies, which suggest that firms in the manufacturing sector made up of traditional and lower-value added activities have less capacity to resist the crisis and make relatively lower contributions to the resilience of the region (Filippetti et al. 2020; Sarra et al. 2019). In fact, a large number of these firms do not survive the crisis in the medium-long run (and thus exit the market) or suffer from a high contraction of hours worked in the early phase.
Conversely, the innovation capacity of regions seems to be an important endowment that explains labour market resilience. This result confirms previous findings on the determinants of regional resilience (Filippetti et al. 2020; Crescenzi et al. 2016), according to which an innovative regional environment is conducive to a higher level of economic resilience.
Finally, concerning the effect of the educational attainment of human capital on resilience, we observe that across the SI regressions, all coefficients are negative and statistically significant at a minimum at the 5% level, while in the RI regressions, they are all positive and significant at the 1% level. This might be because a better qualification of workers usually corresponds to higher wages and, therefore, to higher labour costs. Given that the first reaction of firms after the crisis was to reduce labour costs by adjusting quantities (Fabiani et al. 2015), it is reasonable to assume that such a reaction is more intense in regions characterised by a more educated and therefore, more expensive, workforce. However, the abundance of a qualified workforce in the region facilitates organisational innovation and the identification of creative solutions to the external shock, thus increasing regional recovery capacity (Crescenzi et al. 2016).

5. Discussion and Conclusions

The paper explores the relationship between informal institutions and resilience across EU regions following the 2008 Great Recession. Specifically, by building upon early research by Filippetti et al. (2020), we observe the impact that the quality of institutions and voluntary work exert on regional resilience over two different periods of the crisis: the resistance phase and the recovery phase.
Overall, our results show that informal institutions are a crucial asset for regional resilience, supporting regions in preserving employment both during and in the aftermath of economic downturns. Moreover, the effect of informal institutional action gains strength as recovery proceeds because it is higher for RI than for SI.
Nevertheless, we observe some differences in the effects of informal institutions on the resilience capacity of regions when we control for the welfare state model in place. While an increase in voluntary activities in regions characterised by the Continental and Social-democratic welfare models yields an increase both in the SI and RI index, an increase in voluntary activities in regions characterised by Mediterranean welfare displays its effect only in the recovery phase. The latter case is characterised by highly fragmented welfare provisions and limited coverage; therefore, to combat poverty and labour market exclusions, such a model relies the most on informal networks and solidarity rather than on universal safety nets provided by the institutions (Rhodes 1996). In this framework, in the early stages of the crisis, informal institutions act in emergency circumstances and have limited ability to self-organise and coordinate their actions to immediately withstand the crisis. However, as time passes, informal institutions might be better able to align their actions to emerging difficulties and to increase the strength of their effects, becoming significant and more effectively supporting the recovery.

Overall, the effect of voluntary work is always positive for strong welfare states, but its effect is mitigated by the presence of public provisions. Additionally, in regions with a relatively weaker institutional context (such as the Mediterranean model), informal institutions retain their positive effect. However, in this context, informal institutions appear to take more time to deploy their effects, but their positive impact on regional labour market recovery (RI) is even stronger than in other welfare regimes, probably due to the poor public support that characterises this welfare system model.

In terms of policy implications, our study shows that informal institutions and resources accrued from civil society are relevant for the resilience of regions, regardless of the typology of the welfare system in place. However, our analysis shows that formal and informal institutions should not be treated as separate worlds, given the positive interaction between them during economic hardship. This should be considered, and possibly exploited, to magnify the overall resilience effect on the social and economic welfare of regions. For instance, by improving the capacity of public authorities to steer the voluntary actions of communities towards the socioeconomic areas more affected by the crisis and the more vulnerable groups, it might be possible to activate a more rapid and coordinated response to the crisis and, possibly, even a more efficient use of public resources.

Moreover, we believe that if it is true that the variety of institutional endowments of EU regions is a signal of the existence of regional disparities, such a mix might be targeted to favour convergence. In particular, it might be strategic to continue favouring collaboration practices and secondments programmes involving governments located in both advanced and more laggard regions to enhance the spread of institutional best practices and to speed up the process of institutional upgrading across backwards regions. These initiatives would be in line with previous actions implemented by the EU (such as the Twinning program benefitting candidate countries) and might boost already existing European Territorial Cooperation programs, such as the Interreg Europe, specifically designed to support interregional collaboration. The same can also be done at the national level, especially in countries such as Italy or Spain that suffer from longstanding regional divides. Initiatives of a similar kind are already in place in Germany (Prodi et al. 2021).

Our study also suffers from some limitations. Concerning informal institutions, studies converge around the lack of univocal measures; hence, we have used voluntary work since, according to the literature, it seems to appropriately capture trust-based community bonds and the culture of civic engagement. A more informative picture might be drawn using multifaceted measures of informal institutions, conditioned upon the availability of structured and reliable data.

Further research could focus on investigating the nature of the interaction between voluntary work and formal institutions. Qualitative approaches seem particularly suitable to shed more light on such a mechanism and its determinants. Moreover, the same analysis could be performed with regard to the recent pandemic. Despite being of a different nature and having a distinct origin than the Great Recession, its economic, social and health consequences have, nevertheless, required a massive intervention from governments, as well as the activation of social and family networks to withstand the dramatic impact of the pandemic shock. Therefore, it would be interesting to explore the role played by both formal and informal institutions in such a specific context in a few years.

Author contribution statement

Elena Prodi: Conceptualization; Methodology; Formal Analysis and Investigation; Writing – Original Draft; Writing – Review & Editing; Supervision
Stefano Ghinoi: Conceptualization; Formal Analysis and Investigation; Writing – Original Draft
Lauretta Rubini: Conceptualization; Writing – Original Draft; Writing – Review & Editing;
Francesco Silvestri: Conceptualization; Writing - Original Draft

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APPENDIX A -

Table A1 - Moran's I statistic for the SI index

Number of Obs = 188

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
SI	0.30472	-0.00535	0.02919	10.62278	0.00000

Source: Authors' elaboration

Table A2 - Moran's I statistic for the RI index

Number of Obs = 188

Variable	Moran's I	E(I)	SE(I)	Z(I)	p-value
RI	0.47362	-0.00535	0.02945	16.26104	0.00000

Source: Authors' elaboration

Table A3 - The Gi* statistic for the SI index

Distance by a simplified version of Vincenty formula (unit: km)

	Obs.	Mean	S.D.	Min	Max
Distance	17578	1126.399	682.556	2.255	5082.482

*Getis-Ord G*i(d) Statistics*

Number of Obs = 188

Variable	z<=-2.58	-2.58<z<=-1.96	-1.96<z<1.96	1.96<=z<2.58	2.58<=z
SI	34	6	28	2	118

Source: Authors' elaboration

Table A4 - The Gi* statistic for the RI index

Distance by a simplified version of Vincenty formula (unit: km)

	Obs.	Mean	S.D.	Min	Max
Distance	17578	1126.399	682.556	2.255	5082.482

*Getis-Ord G*i(d) Statistics*

Number of Obs = 188

Variable	z<=-2.58	-2.58<z<=-1.96	-1.96<z<1.96	1.96<=z<2.58	2.58<=z
RI	42	2	19	6	119

Source: Authors' elaboration

Table A5 – Correlations among explanatory variables

	Population density 2008	Population density 2010	Size of economy 2008	Size of economy 2010	Human capital 2008	Human capital 2010	Innovation capacity 2008	Innovation capacity 2010	Share of workers in manufacturing 2008	Share of workers in manufacturing 2010	Volunteering
Population density 2008	1.00										
Population density 2010	0.99	1.00									
Size of economy 2008	0.54	0.54	1.00								
Size of economy 2010	0.55	0.55	0.99	1.00							
Human capital 2008	0.32	0.32	0.34	0.36	1.00						
Human capital 2010	0.34	0.34	0.35	0.36	0.98	1.00					
Innovation capacity 2008	0.33	0.33	0.44	0.45	0.36	0.35	1.00				
Innovation capacity 2010	0.29	0.29	0.41	0.42	0.34	0.33	0.98	1.00			
Share of workers in manufacturing 2008	-0.29	-0.30	-0.19	-0.20	-0.41	-0.40	-0.05	-0.02	1.00		
Share of workers in manufacturing 2010	-0.25	-0.25	-0.16	-0.16	-0.42	-0.41	0.01	0.03	0.98	1.00	
Volunteering	0.16	0.17	0.17	0.18	-0.002	0.006	0.20	0.18	-0.13	-0.07	1.00

Source: Authors' elaboration

APPENDIX B – Robustness check

To test the robustness of our results obtained through the SAR model, we use an alternative estimation strategy and spatial model. For this purpose, we estimate our main equations using a spatial Durbin error model (SDEM) in lieu of an SAR.
The spatial Durbin error model (SDEM) is a model allowing for fully flexible spillovers, since it includes endogenous interaction effects among the explanatory variables (WXθ) and interaction effects among error terms (λWu).

Equations 5 and 6 become as follows:

$$SI_i = \alpha + \beta * volunteering_i + \gamma * WelfareModel_i + \delta * Volunteering_i * WelfareModel_i + \Delta * X_i + WX_i\theta + u_i \quad (5)$$

and

$$RI_i = \alpha + \beta * volunteering_i + \gamma * WelfareModel_i + \delta * Volunteering_i * WelfareModel_i + \Delta * X_i + WX_i\theta + u_i \quad (6)$$

where

$$u_i = \lambda Wu + \varepsilon_i$$

Table B1 shows that the relationships under analysis remain mostly unaltered, regardless of the spatial model considered.

Table B1 – Robustness check: results estimated through an SDEM model

	SDEM	
	SI	**RI**
Volunteering	0.0033	0.0853***
	(0.0172)	(0.0226)
Population density	0.0018	0.0039
	(0.0026)	(0.0029)
Size of the economy	0.0029	-0.0062*
	(0.0031)	(0.0032)
Human capital	-0.0167*	0.0513 ***
	(0.0097)	(0.0157)
Innovation capacity	-0.0001	0.0001***
	(0.00001)	(0.00003)
Share of workers in manufacturing	-0.0018***	0.0012**
	(0.0005)	(0.0006)
Continental welfare	-0.0077	0.1385***
	(0.0164)	(0.0220)
Transition countries welfare	0.0598***	0.1167***
	(0.0186)	(0.0240)
Social-democratic welfare	0.0091***	0.1006***
	(0.0315)	(0.0337)

Mediterranean welfare	omitted	omitted
Continental welfare x volunteering	0.0661**	-0.0910***
	(0.0265)	(0.0328)
Transition countries welfare x volunteering	-0.0413	-0.0327
	(0.0408)	(0.0373)
Social-democratic welfare x volunteering	-0.0310**	-0.0744**
	(0.0318)	(0.0348)
Mediterranean welfare x volunteering	omitted	omitted
Spatial lag error term	0.3892***	0.3785***
	(0.1490)	(0.1345)
W x Volunteering	-0.0252	0.0692**
	(0.0269)	(0.0304)
W x Population density	0.0106	-0.0009
	(0.0066)	(0.0059)
W x Size of the economy	0.0071	0.00001
	(0.0051)	(0.0053)
W x Human capital	-0.0369*	-0.0119
	(0.0191)	(0.0175)
W x Innovation capacity	-0.0001	0.0001
	(0.0001)	(0.0001)
W x Share of workers in manufacturing	0.0004	-0.0010
	(0.0009)	(0.0009)
W x Continental welfare	-0.0024	-0.0092
	(0.0213)	(0.0252)
W x Transition countries' welfare	-0.0872***	-0.0525
	(0.0308)	(0.0332)
W x Social-democratic welfare	0.1382***	-0.0363
	(0.0456)	(0.0379)
W x Continental welfare x volunteering	0.1280**	-0.1012*
	(0.0497)	(0.0573)
W x Transition countries' welfare x volunteering	0.1853***	0.0102
	(0.0596)	(0.0559)
W x Social-democratic welfare x volunteering	-0.0835	-0.0419
	(0.0525)	(0.0442)
Constant	1.0158 ***	0.8116 ***
	(0.0415)	(0.0566)
N	178	177
R-squared	0.5828	0.7322

*p < 0.10, **p < 0.05, ***p < 0.01; standard errors in parentheses.
Source: authors' elaboration