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ORIGINAL ARTICLE

Varieties of capitalism and resilience clusters: An exploratory approach to European regions

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Abstract

Regions around the world suffered asymmetric effects with the global economic crisis of the last decade. European regions were not different, and a myriad of impacts with varied magnitudes was felt. This article, inspired by the literature of varieties of capitalism (VoC), presents statistical and econometric evidence about the differences of regional resilience, measured by the variation of economic product, unemployment and R&D across regions in European Union during the economic downturn. An exploratory approach analyses the socio-economic resilience between different member states, and VoC ideal-types (liberal market economies, the continental capitalism, the social-democrat economies, the Mediterranean capitalism, and the Eastern economies). The study presents a typology of resilience clusters in European regions. There were found six types of profiles concerning resilience: great performers, fast growth, intermediate position, R&D reduction, regions in divergence, and Mediterranean regions in big trouble. The study identifies key aspects for resilience, providing policy implications for regional economic policies. The comparison of the resilience clusters and the original VoC categorization has implications for this branch of literature as it does not completely address the variety of regional answers to the shocks.

KEYWORDS

Europe, innovation, R&D, regions, resilience, varieties of capitalism

1 | INTRODUCTION

Europe has faced a long-standing crisis over the last decade. Beginning in 2007, the financial crisis has been described as the worst economic crisis since the *Great Depression* of the 1930s. It prompted a credit crunch and sovereign debt crisis that greatly affected both private and public sectors, resulting in economic contraction, a rise in unemployment, budgetary cuts by governments, and a widespread decrease in income for families. Yet, for all the damage that the crisis has caused in Europe, its effects, have not been felt to the same degree in the entire continent, having uncovered major disparities in economic resilience both between countries and regions within countries (Cuadrado-Roura, Martin, & Rodríguez-Pose, 2016; Sensier, Bristow, & Healy, 2016). The asymmetric capacity of regions across the EU to adapt and respond to the crisis has given rise to a burgeoning literature exploring the reasons underpinning this (Fingleton, Garretsen, & Martin, 2015), and forms the centre of the discussion in this article.

Regional resilience is a topic of growing interest in regional science (Pinto, Vaz, & Noronha, 2018). A stabilized vision in the literature is presented by Simmie and Martin (2010), showing resilience with four forms: (i) resistance, referring to a system's capacity to keep its structure against external shocks and disturbances; (ii) recovery, which explains systemic responses after any downward trend; (iii) re-orientation, referring to an adaptation to changing conditions; and (iv) renewal, through the generation of new economic pathways. This vision is based on the concepts of resilience used in engineering, ecology, and evolutionary studies. The understanding is that resilience should be understood as the adaptive capacity of a socio-economic system to both internal and external change (Boschma, 2015), acknowledging not only that systems are subject to external shocks, but also that a shock may come from internal systemic failures.

Nevertheless, the linkages between the different regional capacities to answer a shock and the institutional architectures has not yet been completely clarified. In this article we consider how varieties of capitalism (VoC) may influence the economic resilience of regions in terms of their ability to withstand or respond to an economic shock. In doing so we seek to close one of the gaps in the literature regarding the linkages between regional resilience and macro-level institutions (Boschma, 2015). Whilst resilience is often conceived as emerging from regional assets, the VoC approach emphasizes the role of national institutional frameworks in conditioning economic performance. This facilitates a multi-level interdependence presenting VoCs as a broader context for regional dynamics. Of course, regions evolve depending upon sectoral specialization, productive structure, and the role different activities play in global value chains, but varieties of capitalism may play a crucial role in shaping institutional advantage and competitiveness. Certain types of capitalism may display differentiated levels of resilience. The article presents an exploratory approach starting from the following research questions. Are VoCs a satisfactory structure to interpret the different levels of resilience demonstrated by European regions? Are significant differences of resilience visible amongst different VoC regions? What are the key variables for stimulating regional resilience? Are there differences in the significance of these variables considering different resilience profiles?

Using official data from Eurostat to compare regional performance, we analyse the differences in the response to the *Great Recession* between different types of regions. It is relevant to underline that we are focusing on only two facets of regional resilience—the capacity of avoiding a crisis event (resistance) and the capacity of bouncing back (recovery)—and not its multi-layered character that includes path renewal and re-orientation. To this end, the article is organized as follows. Section 2 presents the literature of regional resilience and the varieties of capitalism. Section 3 presents some methodological considerations. Section 4 presents the empirical results. First it briefly presents the evolution of European regions. It will discuss the variation of gross domestic product (GDP) and unemployment at regional level, the most common indicators of socio-economic resilience (Psycharis, Kallioras, & Pantazis, 2014), and the variation of research and development (R&D), the most used indicator to assess innovation efforts. With these figures the analysis shows the different regional capacities to respond to the crisis, in other words, it illustrates diverse patterns of regional resilience. It then uses cluster analysis to explore the presence of different types of groups of regions regarding their capacity to cope with the crisis. Finally, econometric models are estimated to explain the different types of resilience, paying particular attention for the impacts of two theoretically-driven

variables: creative class employment and the strength of regional clusters. Finally, the article presents conclusions and implications for regional science, policy and practice.

2 | RESILIENCE AND VARIETIES OF CAPITALISM

2.1 | Economic resilience and regions

In the last decade since the global economic crisis, the concept of economic resilience has gained prominence in both scholarly and policy circles (Burnard & Bhamra, 2011). Driven by a desire to understand why "some regional economies manage to renew themselves, whereas others remain locked in decline" (Hassink, 2010, p. 45), explorations of economic resilience seek to analyse the experience of different regions in dealing with shocks (Simmie & Martin, 2010). Drawing upon a long tradition of resilience studies in both the engineering and the ecological fields, the concept of economic resilience suggests that to be resilient a regional economy should be able to either withstand an economic shock or to recover to its pre-shock state. In this respect the resilience of the regional economy is expressed in terms of its capacity to absorb, resist or respond to the shock (Carpenter, Walker, Anderies, & Abel, 2001).

However, this relatively narrow equilibrium-based view of resilience has been criticized for its limited appreciation of the ability of an economy to transform over time and to develop new development paths (Simmie & Martin, 2010; Xiao, Boschma, & Andersson, 2017). In line with current thinking in evolutionary economic geography, a resilient economy should not only be able to withstand or recover from an economic shock but should also be able to respond to a shock through a renewal of its economic structure in a manner which assists future economic growth and prosperity (Boschma, 2015; Martin & Sunley, 2015; Pike, Dawley, & Tomaney, 2010). In this guise, the economic resilience of regions is conceived as multidimensional, embracing not only recovery from the shock and the ability of regions to resist disruptive shocks in the first place, but also the extent to which the region adapts its economic structure, and is able to resume a previous, or new, growth path (Martin, 2012). Resilience is thus not a mere property or goal, but rather an on-going process (Simmie & Martin, 2010) which aims not only to strengthen the ability of an economy to respond to a shock but also to make it less vulnerable to the effects of potential shocks in the future.

One critique of the evolutionary approach is that it remains unclear as to what drives the underlying resilience of the regional economy. What is it that determines the alternative development paths through which resilience outcomes are observed? Factors which appear to have been useful in the past include those that shape a "learning region:" a skilled, innovative and entrepreneurial workforce, and a diversified and creative economic base the regional dynamics anchored in strong clusters and innovation systems, (Christopherson, Michie, & Tyler, 2010). The creative class is seen as one of the drivers for regional growth since the very influential and somewhat controversial contribution from Richard Florida (Florida, 2002). In general, it refers to a socio-professional classification of creative professionals (Florida, 2002). Boschma and Fritsch (2009) revealed evidence of a positive relationship among creative class occupation, employment growth, and entrepreneurship at the regional level in a number of European countries. Cruz (2014) also confirmed the significance of creative class as one of the engines of economic performance in the European Union twenty-seven member-states using a partial least squares approach. The presence of vibrant regional clusters, understood as geographic concentration of interconnected businesses, suppliers, and associated institutions in a particular field justified by agglomeration economies, is another commonly associated factor to stronger regional development patterns (Porter, 1998). Many authors have found a significant and positive association between the cluster strength and employment growth, productivity and economic growth (for a recent example, cf. Slaper, Harmon, & Rubin, 2018). A range of studies is now available that presents evidence of the importance of such features as the prevailing economic structure (Martin, Sunley, Gardiner, & Tyler, 2016), although the evidence is ambiguous as to whether specialization is an advantage (Brakman, Gerretsen, & van Marrewijk, 2014) or whether diversity provides stronger foundations for resilience (Brown & Greenbaum, 2017). Boschma (2015) overcomes this ambiguity by suggesting the important role that related and unrelated variety can play in promoting resilience,

particularly the transformation of the economy towards new development paths (see also Xiao et al., 2017). Other authors have emphasized the importance of innovation, and creativity more generally, in promoting the resilience of economies to economic shocks (Bristow & Healy, 2018; Cavaco & Machado, 2015; Crescenzi & Rodríguez-Pose, 2011; Pinto & Pereira, 2018), which speaks to the adaptive theme of resilience. In a similar vein, others identify the important role that skills and higher levels of human capital can play in promoting resilient economies (Polèse, 2014), as well as the positive role that foreign direct investment (FDI) is suggested to play (Bristow et al., 2014).

Of course, context also matters. In pointing to the contingency of place, Asheim and Gertler (2004) frame the findings of many authors. The initial starting conditions in any region at the onset of a shock, such as levels of unemployment, affect its ability to respond (Davies, 2011), similarly prevailing macro-economic policies have also been found to play an important role in shaping observed resilience (Caldera, Rsmussen, & Röhn, 2016). This illustrates the importance of not viewing regions in isolation, but as part of wider systems and entwined networks of activity and response. Indeed, Webber, Healy, and Bristow (2018) suggest that national economic performance is a substantive determinant for the resilience of sub-national geographies, thus highlighting the significance of the institutional dimension in framing resilience outcomes.

One of the notable features of the range of studies considering the economic resilience of regions is the tendency to treat the economic system in which these economies are situated as a relatively homogenous whole. Nonetheless shocks are asymmetric (Giannakis & Bruggeman, 2017). Despite the recognition of the contingency of place and the important role of institutions, there is less attention paid to how these might affect the resilience outcomes observed. The impacts of the different institutional architectures is often neglected in resilience studies (Boschma, 2015).

2.2 | Varieties of capitalism in Europe

The varieties of capitalism (VoC) literature revolves around the differences of the political and economic institutions across countries, territories or regions (Hall & Soskice, 2001). In this tradition, capitalism is not understood as a unitary model, but rather as a specific set of principles and rules that are applied in similar fashion but with differing results, owing to each country or region's particular development trajectory. In this way several forms of capitalism may exist without one of them being the correct one or the superior paradigm (Crouch, 2009).

This literature is primarily concerned with the macro-characteristics of national political economies, having resulted in significant contributions to provide the micro-foundations of cross-national capitalist organization (Hancké, Rhodes, & Thatcher, 2007). As an approach, it builds on neo-corporatism and the regulation school (Hall & Thelen, 2009), focusing on actors, as they occupy a central position in the process of economic adjustment (Schroder & Voelzkow, 2016). The pattern of analysis is based on the national level of capitalist varieties because of the greater impact of national institutional frameworks in firms, corporations and organizations strategic directions (Ebner, 2016; Hall & Soskice, 2001).

In their original proposal, Hall and Soskice (2001) distinguished between two types of economies: the liberal market economies (LME) and the co-ordinated market economies (CME). The first type followed the characteristics of classical liberalism, with competition playing a prominent role in market relations. Thus, actors adjust themselves to demand and supply in the market. Needless to say, that this type of capitalism has a loose relation with the State, as the co-ordination is based on the market mechanisms. The United Kingdom and Ireland are the European prime examples of this type of economy. The second type relies much more on the State and its mechanisms of regulation, and on co-operation with other actors within networks. Competition receives a smaller emphasis when compared to the previous case, resulting in more strategic relations with the other actors. Germany is the main European example of this type of economy. However, as these authors suggest, many countries do not have a coherent form of capitalism. It means that they are in intermediate versions of the ideal types, where their institutions do not generate relevant complementarities, something that increases inefficiencies, resulting in weaker economic performances. This strand of literature assumes that technological specialization patterns are largely determined by the type of capitalism

in the country. LME tend to specialize in radical innovation, while CME focuses on incremental innovation. Radical innovation is particularly relevant in fast-moving technology sectors that lack the ability to take risks in new product strategies and implementation. Incremental innovation tends to be more important for the maintenance of competitiveness in the production of capital goods in order to maintain product quality and ensure customer loyalty that is in line with the relational and stability assumptions of CME.

The VoC approach has been very influential. It has been expanded by other authors (Amable, 2003; Amable & Lung, 2008) to domains, such as product market competition, the wage and labour market institutions; the financial sector and corporate governance; social protection and the role of the State; and the educational, research, development and innovation sectors, to present an elaborated vision of the social systems of innovation and production (SSIP). Results underline the existence of five ideal-types of SSIPs in Europe that present a significant variety of institutional architectures: market-based economies (similar to the liberal market economies, associated with UK and Ireland), continental European capitalism (close to what co-ordinated market economies are in Hall and Soskice's works, Germany and France are the main examples), social-democrat economies (the Scandinavian countries), Mediterranean capitalism (Portugal, Italy, Spain and Greece), and Eastern capitalism (countries associated with the former Soviet Union). Table 1 summarizes key features of these ideal-types.

Boschma and Capone (2013) is one of the few contributions that make explicit the connection of the VoC with resilience by demonstrating that institutions have an impact on the direction of diversification in developed countries. Inspired by the original dichotomy in the VoC literature, the authors tried to move beyond the distinction between

TABLE 1 Institutional characteristics by Variety of Capitalism

Varieties of Capitalism	Product market competition	Wage and labour market institutions	Financial sector and corporate governance	Social protection and the role of the State	Education, R&D and innovation
Market-based economies	Free and unregulated competition	Extremely flexible	Based in market interactions and self-regulation	Underdeveloped	Important role of private sector, particularly in tertiary education
Continental European capitalism	Regulation of entrepreneurial activities	Active employment policy	Bank intermediation	Public system relatively developed, especially in the Health sector	Public system oriented towards secondary education with average performances
Social-democrat economies	Limited regulation of product markets with low administrative costs to entrepreneurial activities	Public intervention and strong presence of workforce unions	Bank intermediation	Public system highly developed	Public system with strong performances
Mediterranean capitalism	Competition extremely regulated, especially in the firms' activities	Labour market protected by strict legislation	Financial markets relatively underdeveloped	Social protection limited to specific groups	Public system with weak performances
Eastern and central Europe capitalism	Strong public intervention with protection *vis-à-vis* from international competition	Flexible labour market	Atypical financial system with financial markets underdeveloped	Weak social protection	Less developed educational system

Source: Berrou and Carrincazeaux (2005).

LME and CME using several institutional indicators to highlight its impact in the direction of diversification, crucial for regional resilience.

3 | METHODOLOGY

This study uses Eurostat data regarding the change of GDP, unemployment rate, and R&D expenditure at NUTS 2 level, to explore the comparison of performances in European territories. The variables used were D_GDP (change of GDP per inhabitant, in purchasing power standard, by NUTS level 2 region, 2008–2013), D_UNEMP (change in unemployment rate, persons aged 15–74, by NUTS level 2 region, 2009–2014) to analyse the socio economic resilience and D_RD (change in gross domestic expenditure on R&D, by NUTS level 2 region, 2007–2012) to analyse the resilience of innovation efforts. These are commonly used variables in the analysis of resilience. The analysis uses this data to find patterns within the European territories (EU 27). The regional data was also aggregated by VoC. This is a strong assumption as the allocation of each region to a similar VoC at national level can be sometimes misleading. Nevertheless, we can agree that the ideal-types of VoC provide a relevant way to organize the different regions based in the institutional architectures. In this process it was used the following groups, based on the suggestions of previous research (Amable & Lung, 2008):

- Continental European capitalism (CEC), 107 regions, comprising Austria, Belgium, Czech Republic, France, Germany, Luxembourg, Switzerland and Netherlands;
- Liberal market economies (LME), 39 regions from United Kingdom and Ireland;
- Social-democrat economies (SDE), 18 regions from Denmark, Finland and Sweden;
- Mediterranean capitalism (MED), 62 regions from Portugal, Greece, Italy, Spain, Malta, and Cyprus;
- Eastern and Central Europe capitalism (EAST), 46 regions from Bulgaria, Hungary, Poland, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia.

With the organized data the first step was to describe it. This was done using the IBM SPSS—Statistical Package for the Social Sciences software, v.22, and Microsoft Excel as the editor for graphics and tables. Then a second step used a cluster analysis to find the consistent groups of cases at regional level. Cluster analysis is a statistical technique that groups a set of objects (cases or variables) in such a way that objects in the same group (called a cluster) are more similar to each other than to others outside the cluster (Maroco, 2014; Pestana & Gageiro, 2005). This facilitated the creation of clusters of similar resilience profiles – resilience clusters. We compared this statistical grouping with the VoC categorization, helping to rethink this typology for regional resilience. A third step was to perform an exploratory econometric approach. Here the dependent variables used were the same ones already analysed, to explain the change of GDP, unemployment rate and R&D expenditure (D_GDP, D_UNMP and D_RD). We assumed that resilience capacity is based in pre-existent characteristics to the shocks of the financial crisis. We also tested the significance of Eurozone, VoC and country dummies. The first versions of the article used SPSS but the final estimation was done in Stata 12.0 to facilitate further post-estimation tests. Correlation tables, grouped by resilience clusters were presented to point variables highly associated with the change patterns in the three variables.

4 | DIVERSITIES OF RESILIENCE ACROSS EUROPE

4.1 | The geographies of resilience in Europe

When aggregating the regions by their variety of capitalism we find relatively consistent performances in each typology. The analysis begins with a consideration of the regional variations in the selected variables: GDP,

Unemployment and R&D (cf. Appendix Table A1 for complete data). South European regions showed the largest fall of GDP (D_GDP) (−8.03 percentage points compared to −0.96 of total regional average). The crisis also affected heavily the liberal market economies that adjusted to the international economic downturn. GDP in the other types of capitalism grew during the crisis. In terms of unemployment rates, the greatest increase was also experienced in the South European regions (7.75 compared to 1.5 of total regional average). The only other VoC to experience an increase in mean unemployment rates was the Eastern economies (increase of 0.31%). Other varieties of capitalism experienced a reduction in unemployment rates during the crisis, particularly the LMEs (−1.30 in average).

Regarding R&D expenditure, the effects of the crisis are not so clear. All types of VoC increased their expenditure in this type of activity, apart from the LME regions (which recorded a fall of −0.08 on average). The increase of R&D expenditure was most intensive in the CEC regions (0.31) and Eastern economies (0.26). South European regions (0.08) and social-democrat economies (0.05) both experienced small rises but these were lower than the overall average (0.18). This is particularly relevant for South European regions as they face huge limitations and weak performances in terms of innovation, and specifically in R&D. The innovation, that could be a solution to overcome the crisis, has decelerated, creating a divergence from the innovative dynamics in more central regions.

The differences between the varieties of capitalism were also analysed using a more formal method. ANOVA tested the difference of means among VoC (cf. Appendix Table A2) and confirmed statistical differences of behaviour of the groups in the three variables under study. The analysis has confirmed that the regional resilience was indeed different in European regions when grouped by VoC.

4.2 | Resilience clusters in Europe

We used the three selected variables of resilience (D_GDP, D_UNEMP, and D_RD) do discover homogeneous groups of regions. A hierarchical cluster process using Wards method with quadratic Euclidean distance was implemented, retaining six clusters regarding the different levels of regional resilience. Based in the performances of the six clusters in the different variables, we can summarize this typology (Figure 1):

- Cluster "*Great performers*"—25 regions, second best group in GDP growth, the best unemployment rate decrease and best R&D expenditure increase. CEC regions, especially from Germany and several from Eastern countries. The crisis was an opportunity to improve their relative situation.
- Cluster "*Fast growth*"—44 regions with strong increase of GDP (the best performer), growth of unemployment below average (third best). Second greatest increase in R&D expenses. Dominated by Eastern regions, particularly from Poland. The crisis was an opportunity to converge to more developed countries.
- Cluster "*Intermediate positive situation*"—83 regions with a positive position—slight GDP increase, growth of unemployment, and relevant R&D growth (above the average in the three variables). Dominated by CEC countries such as Belgium, France, and the Netherlands. The crisis has had a negligenciable effect in this group of regions.
- Cluster "*R&D reduction*"—44 regions with sharp GDP fall (the third worst) and below the average. On the other side a group with a decrease in unemployment (second highest reduction). The only cluster with negative growth in R&D expenditure. Dominated by regions of the LMEs from the UK. Regions suffered a huge drop in GDP and R&D but seem to adjust to crisis with employment.
- Cluster "*Regions in divergence*"—61 regions with second worst GDP variation, second worst unemployment rate growth, the forth position cluster in terms of R&D. Worse than the mean in the three variables. Dominated by regions from the Mediterranean, Portugal, Italy, Spain, but also Croatia. Showed weak resilience to the crisis.
- Cluster "*Mediterranean regions in big trouble*"—15 regions with worse in the GDP breakdown, worse in rising unemployment, weakest increase in R&D far from average values. Dominated by regions of the Mediterranean

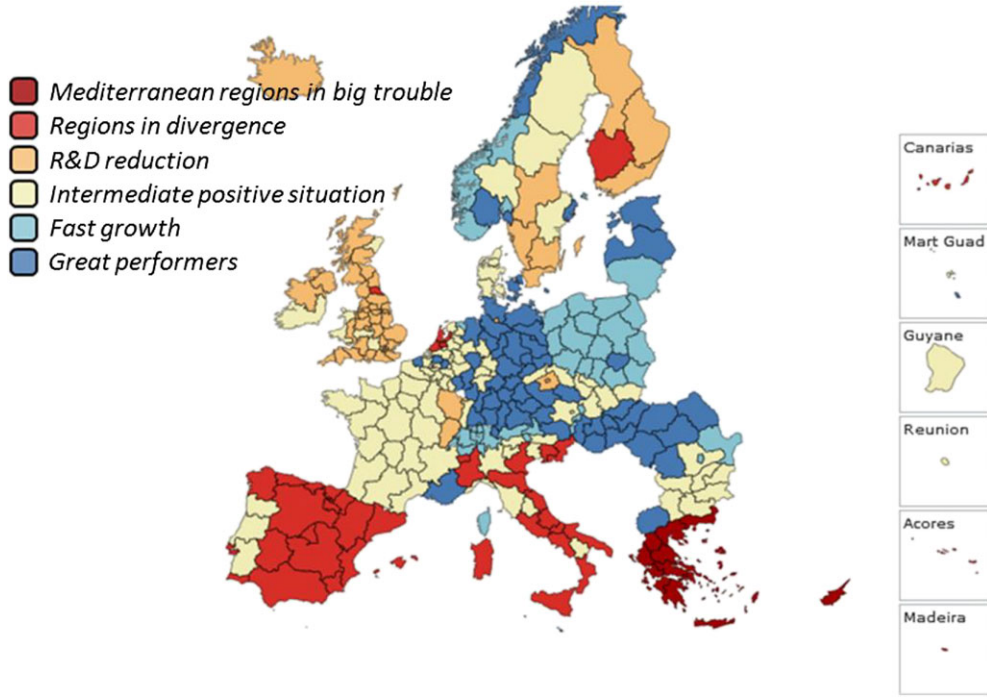

FIGURE 1 Resilience clusters in Europe
Source: Own elaboration with the map generator available at mitweb.itn.liu.se/geovis/eXplorer/euro/

capitalism, particularly Greece and Cyprus. Showed very weak resilience to the economic crisis and are facing difficulties to adjust the economy.

The identified clusters suggest the existence of a core-periphery dynamics, as highlighted by many authors in a myriad of aspects in EU regions (for an example cf. Thomas, 2013). Significant statistical differences in the analysed variables exist (cf. Appendices Tables A3 and A4). Cross-tabulating VoC with the resilience clusters we find that there is a relevant association between the two typologies (cf. Appendix Table A5). CEC includes a high proportion of *great performers* and *intermediate position regions*. EAST is associated with *fast growth* (76% of regions in this cluster belong to East economies). LME is associated to the Cluster of *R&D reduction*. MED regions are associated to the clusters of *regions in divergence* and in *big trouble*. It is relevant to stress that SDE do not form by any means a coherent group and are dispersed by various types of clusters. Formally, a chi-square test of independence rejects the null hypothesis of a non-significant association between the found resilience clusters and the VoC categories, suggesting that there is a link between the types of clusters created with different levels of resilience and the varieties of capitalism (cf. Appendix Table A6).

4.3 | Econometric approach to regional resilience

In this subsection, it is presented an exploratory econometric analysis to find out key variables and differences among resilience clusters. The data was gathered from Eurostat at NUTS 2 level with data prior to the crisis (Eurostat, 2015). The econometric approach followed an estimation strategy using ordinary least squares (OLS) for the three dependent variables for the complete sample of European regions. This approach is affected by limitations, as any other option. The main problem regards the heterogeneity of the total sample. These three variables do not present similar

TABLE 2 Independent variables and descriptive statistics

Variables	Min	Max	Mean	Std. deviation
GDP before crisis, Gross domestic product (GDP) per inhabitant, in purchasing power standard (PPS), by NUTS level 2 region, 2007	25,577	275,228	96,02112	34,433895
Patenting before crisis Patents in EPO by thousand inhabitants, by NUTS level 2 region, 2007	0.000	673,114	91,01102	113,597859
R&D before crisis R&D expenditure in percentage of GDP, by NUTS level 2 region, 2007	0.083	6,766	1,40479	1,166112
Creative class employment before crisis Professionals working in creative occupations, by NUTS level 2 region, 2007	2,492	14,958	7,17706	2,335644
FDI before crisis Foreign Direct Investment, by NUTS level 2 region, 2007	0.000	6813,102	181,27590	509,394997
Strength of regional clusters before crisis Note: As calculated by the European Cluster Observatory (www.clusterobservatory.eu), 2006	2,000	52,000	14,46104	8,458644

Source: Own elaboration with Eurostat data.

results across all the cases (verify for example the standard deviations of the dependent variables).[1] In fact, we suggested and verified that the organization of regions by resilience clusters can bring additional insights and be helpful to understand a more consistent regional behaviour within groups. In order to mitigate this problem, a first approach was the insertion of national, VoC and Eurozone dummies in the OLS estimation. Additionally, correlation tables for each one of the resilience clusters are presented. This process facilitates a direct comparison between key variables associated with resilience in different types of regions. All models were estimated in Stata using a robust estimator of variance. Variance inflation factor (VIF) tests were also run and no presence of multicollinearity was detected.

The descriptive statistics of the complete list of independent variables used in the econometric analysis is listed in Table 2. Estimated models that include versions with country dummies (added for member states with more than one region), VoC dummies and a dummy of belonging or not to Eurozone. We selected a number of variables with data prior to the crisis. The model included a control variable regarding the level of GDP prior to the crisis. The model includes variables that are described in the literature as having a positive effect in the regional resilience and innovation dynamics (for a review see Pinto, 2015), such as the level of R&D that is an instigator of absorptive capacities (Cohen & Levinthal, 1990), the presence of the creative class (Florida, 2002), foreign direct investment that has normally positive effects in the region and in the existing sectors (Barba Navaretti et al., 2004) and the performance of regional clusters (Porter, 1998).

Before the econometric estimation we calculated the correlation for the total sample (Table 3). D_GDP is negatively associated with GDP level, and positively with patenting and the strength of regional clusters. Unemployment rate is negatively and significantly associated with all included variables, except FDI that is not statistically significant. This means these variables move in the opposite direction of unemployment rate, that is, when they are higher the unemployment tends to be smaller. The pattern of R&D variation is less clear. It has nevertheless significant positive correlation with the strength of regional clusters and negative with FDI. It is relevant to underline that some of the variables are highly correlated. This suggests that, even if the econometric results remain valid, they should be interpreted with caution as problems of reverse causality may be present. The meanings of the coefficient should

[1]A second problem may regard the effects of spatial dependence using regional data (Anselin, 2001). Spatial econometrics has developed tools to detect and limit this difficulty, nonetheless the practical relevance of such tools is often limited, with the estimated coefficients of OLS being close to estimations performed by spatial econometric methods, even when the spatial autocorrelation of the phenomenon being modeled is found statistical significant, as for example, measuring regional innovation (Berlemann & Jahn, 2016).

TABLE 3 Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) GDP before crisis	1								
(2) Patenting	0.555*	1							
(3) R&D	0.482*	0.655*	1						
(4) Creative class	0.660*	0.465*	0.585*	1					
(5) FDI	0.146*	−0.039	0.025	0.277*	1				
(6) Strength of clusters	0.312*	0.408*	0.243*	0.270*	0.046	1			
(7) D_GDP	−0.136*	0.161*	0.040	−0.077	0.083	0.205*	1		
(8) D_UNEMP	−0.130*	−0.332*	−0.299*	−0.223*	−0.106	−0.157*	−0.580*	1	
(9) D_RD	−0.010	0.118	−0.079	−0.024	−0.147*	0.189*	0.255*	−0.134*	1

**Note*: Correlation is significant at the 0.05 level.

Source: Own elaboration with Eurostat data

be understood as linkages between dependent and independent variables and not strictly as the ultimate causes of regional resilience.

The econometric models are useful to highlight the significance and signal of the independent variables. Note that four models were estimated for each dependent variable: a baseline version including only the continuous independent variables, a version with Eurozone dummy, another with VoC dummies, and finally a version with national dummies. Estimation results are summarized in Table 4.

GDP growth was positively influenced by patent performance, FDI and the strength of regional clusters. The general model showed a negative significant coefficient of GDP level, meaning the richer the region is the higher the impact of the crisis in the contraction of GDP. The model with the Eurozone dummy suggests that regions in Eurozone member states suffered more (significant negative coefficient). If we integrate the VoC dummies (model 3), GDP, knowledge production, and regional clusters show a positive and significant impact. Creative class employment is negative. LME and MED dummies are significant and negative while EAST is positive. If we include national dummies many of them are statistically significant and negative. Significantly positive only Poland (cf. model 4), underlining its outlier character as a fast-growing country.

Regarding unemployment, the general model suggests that GDP is significant and positive, meaning that regions with higher GDP suffered with increased growth of unemployment rates. In contrast, Patenting and R&D levels prior to the crisis seemed to moderate the rise of unemployment. Adding the dummy EURO it can be noticed that it is statistically significant and negative, meaning that regions with the common currency were more exposed to increases of unemployment. Considering VoC typologies, the model suggests that GDP, R&D, and regional clusters constraint the increase of the unemployment rate while the existence of a high level of creative employment resulted in higher growth rates of unemployment. This last issue may be evidence that creative sectors were heavily hit in the crisis. The LME dummy presents a negative impact, meaning that these countries verified a reduction of unemployment. This may be an evidence of a type of response to cope with the crisis, coherent with the higher flexibility of this variety of capitalism as suggested by theory. In parallel, the MED dummy showed a positive coefficient, underlining the fact that these regions were the most heavily hit by the rise of unemployment. In the model with national dummies, only the strength of regional clusters is significant with negative signal, meaning that regions with stronger clusters have faced a reduced growth of unemployment, showing higher resilience in this dimension. Some countries dummies are significant and negative, Hungary, Spain, Greece and Bulgaria.

The R&D growth is influenced positively by patenting and strength of regional clusters. FDI has a significant and negative impact. The R&D level before the crisis was negative, meaning that in aggregated terms, the regions with higher R&D expenditures were those with higher contractions. The impact belonging to the Eurozone contrasts with

TABLE 4 Econometric models for change in GDP, Unemployment rate and R&D expenditure (Total Sample)

Variable	D_GDP				D_UNEMP				D_RD			
	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)
GDP	−.0637748**	−.0425169	0.03622165*	−0.01147564	0.0202002*	−0.01210241	−0.03625975**	−0.00831369	−0.00097139	−0.002398**	−0.00037939	−0.00181517
Patenting	0.01957894***	0.02122864***	0.0044067	0.00190752	−0.01131884***	−0.01382565***	−0.00258851	0.00162036	0.00072404*	0.00061684	0.00025216	0.00024456
R&D	0.13665963	0.05877175	0.4882452	−0.07104509	−0.56545853*	−0.44710342	−0.59006155**	−0.08431366	−0.09032044	−0.08636681	−0.08429074	−0.11009515
Creative class	−0.47070378	−0.74008519*	−1.14017***	0.10255912	−0.07995791	0.32938265	0.88003022***	0.22112798	0.01306521	0.0308338*	0.0307875*	0.05802447*
FDI	0.0024325***	0.0019318***	0.00083926	0.00057556	−0.00110207	−0.0003412	−6.731e-06	0.00017771	−0.00011***	−0.00008***	−0.00011***	−0.00006611
Strength of clusters	0.16771009**	0.17256161**	0.09320926*	0.02529866	−0.01901885	−0.02639103	−0.04299148*	−0.04301994*	0.008046**	0.007824**	0.00525449*	0.00286311
EURO		−20.66538**				4.0501982***				0.181165**		
LME			−3.3311617*				−1.811065***				−0.07400364	
CEC			1.0389856				1.0349202				0.308209**	
MED			−8.8464***				9.0318234***				0.08710238	
EAST			6.64645**				−0.07361411				0.24654155	
UK				−7.1835102				−0.81402728				−0.27187751
SE				−2.5550671				−0.3458698				−0.16829639
FI				−8.9591422*				0.80679105				−0.11053808
SK				4.3529394				2.1294309				0.18765808
SI				−9.8428681*				4.7564768				0.911843***
RO				2.1954633				0.91172755				−0.14328902
PT				−2.9687957				5.5470906*				0.13512607
PL				8.7483281*				1.7614877				0.08042524
AT				3.0844516				1.2274669				0.35293748

(Continues)

TABLE 4 (Continued)

Variable	D_GDP				D_UNEMP				D_RD			
	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)	Baseline model (1)	Dummy Euro (2)	VoC Dummies (3)	Country Dummies (4)
NL				−4.2453777				4.2707205				0.00240251
HU				1.0106525				−1.8891925				0.1207204
IT				−5.5122235				6.7254517**				0.09111239
FR				−1.4837301				2.0861996				0.09786883
ES				−9.45862**				7.8749207**				−0.08035795
GR				−20.0523***				16.075811***				−0.11935328
IE				−6.2402787				0.67488053				0.28341157
DE				1.1496777				−1.4813723				0.30391858
DK				−0.3538535				2.1272014				−0.0301256
CZ				−1.2117952				0.80573864				0.40278409
BG				−1.3883798				5.5808878*				−0.13632336
BE				−1.2706624				1.6938874				0.21761573
Constant	3.668893*	5.195003**	2.0293616	1.7987633	2.4239087**	0.10489687	−1.8171447	−1.264191	0.15830976*	0.05538822	−0.12380423	0.00147036
N	261	261	261	261	261	261	261	261	256	256	256	256
R-sq	0.168	0.191	0.563	0.766	0.144	0.276	0.644	0.863	0.105	0.143	0.224	0.346
adj. R-sq	0.148	0.169	0.546	0.739	0.124	0.256	0.630	0.847	0.083	0.119	0.193	0.268
Prob > F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Own elaboration with Eurostat data.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

TABLE 5 Correlation for change in GDP, Unemployment and R&D, by Resilience Cluster

	D_GDP						D_UNEMP		
Cluster	Great performers.	Fast growth	Intermediate position	R&D reduction	Regions in divergence	Mediterranean regions in big trouble	Great performers.	Fast growth	Intermediate position
GDP before crisis	−0.3805*	0.2383	0.0151	−0.1503	−0.4426*	−0.5201*	−0.0672	0.0919	−0.1915*
Patenting before crisis	−0.0201	−0.1512	0.2787*	0.0265	−0.0151	−0.2221	−0.2266*	−0.1050	−0.3643*
R&D before crisis	−0.0992	0.1904	0.0924	−0.0616	−0.1355	0.1622	−0.1103	0.0932	−0.3579*
Creative class employment before crisis	−0.2778*	0.3795*	0.0690	−0.1547	−0.3696*	0.0929	−0.1246	0.2030	−0.3538*
FDI before crisis	0.0354	−0.0949	0.1416	−0.2372*	−0.2103	0.0615	−0.2056	0.2905	−0.0394
Strength of regional clusters before crisis	0.3159*	0.6782*	0.2649*	−0.1178	−0.0477	−0.1207	−0.0688	0.0733	−0.1971*

	D_UNEMP			D_RD					
Cluster	R&D reduction	Regions in divergence	Mediterranean regions in big trouble	Great performers.	Fast growth	Intermediate position	R&D reduction	Regions in divergence	Mediterranean regions in big trouble
GDP before crisis	−0.1729	−0.5984*	−0.1750	−0.0573	0.1435	−0.0451	0.0852	0.1014	−0.3334*
Patenting before crisis	0.2523*	−0.6587*	0.1771	−0.0038	0.0195	0.1446	−0.0485	0.1240	0.0441
R&D before crisis	0.3121*	−0.4890*	0.5218*	−0.1662	0.0810	−0.2182*	−0.4307*	0.1107	0.2683*
Creative class employment before crisis	−0.0978	−0.5017*	0.4389*	−0.1450	−0.0401	−0.1253	−0.1106	0.2682*	0.1454
FDI before crisis	−0.3394*	−0.4132*	−0.0368	−0.1510	−0.5188*	−0.1556	−0.0544	0.1161	−0.1016
Strength of regional clusters before crisis	−0.0521	−0.3798*	0.3934*	0.2699*	0.0188	0.2297*	0.1286	0.1962	−0.1004

**Note*: Correlation is significant at the 0.05 level.

Source: Own elaboration with Eurostat data.

other model. Here the dummy EURO presents a significant and positive sign suggesting that these regions had smaller impacts in R&D negative variation. In the model with VoC dummies, creative class and regional clusters are positive while FDI presents a negative coefficient. CEC dummy is the only significant VoC. It is positive, meaning that regions belonging to this type of capitalism faced an intensification of R&D. The model with country dummies, creative class remains the only positively significant variable. Only one national dummy is significant, Slovenia with a positive coefficient.

A cautionary note. The inclusion of dummies originated changed the significance, and in the direction of the impact of GDP level before the crisis in D_GDP and D_UNEMP in the case of VoC dummy. One possible interpretation of the different signals of the coefficients in the general models when compared with the models including national dummies and VoC dummies is the existence of extremely nuanced impacts of these variables by member-states and belonging to different varieties of capitalism. It is also worth mentioning that while the D_GDP and D_UNEMP models presented relatively satisfactory explicative capacity (as measured by the R-squared), the model of R&D change only presented small coefficients of determination (R-sq). These low values suggest that R&D change comprehension remains rather obscure and that (future) research on the determinants of the resilience of innovation will require attention to additional features.

Using the sample of regions by each type of resilience cluster, we calculated the correlation for D_GDP, D_UNEMP and D_RD with the explanatory variables used in the previous econometric models, to find differences among these clusters (Table 5). Main findings are summarized below.

Regarding the change of GDP by resilience clusters. In *great innovators*, growth is associated negatively by GDP level and creative class, and positively by the strength of clusters. *Fast growth regions* also presented a positive influence of the strength of regional clusters but contrarily a positive sign of the creative class. The cluster *intermediate position* presented only one variable with positive sign, patenting. *R&D reduction* cluster shows FDI as the most correlated variable, presenting a negative sign. *Regions in divergence* underline the negative impacts in their growth dynamics of the GDP level and of the creative class. *Mediterranean regions in big trouble* have only one significant and negative coefficient: GDP level. GDP level was significant and negative for three of the six clusters. This means that the richer regions of these clusters felt more intensive the negative impact of the crisis.

The correlation of the explanatory variables with the change in unemployment by resilience cluster also deserves some discussion. Unemployment growth is moderated in *Great performers* and *regions in divergence* clusters by patenting. In *Intermediate regions* GDP level, patenting, R&D, creative class and the strength of regional clusters are significantly and negatively associated with the increase of unemployment. In the *R&D reduction* cluster patenting as a positive sign, more innovative regions were more hit, and FDI negative, showing that attraction of investments is associated with the resilience of employment. All variables were relevant to mitigate the increase of unemployment in the case of *divergence regions*. The R&D level, creative class and strength of regional clusters were particularly important to mitigate the growth of unemployment in *Mediterranean regions in big trouble*.

Regarding the change of R&D, in *great performers*, the strength of clusters is positively associated. In *fast growth regions*, FDI is negatively correlated. In *Intermediate regions* and R&*D reduction*, the R&D level is negatively correlated with the change in R&D suggesting that the higher intensity R&D regions in these clusters were suffering higher decreases in R&D. The cluster *regions in divergence*, shows that creative class is the only significantly correlated variable, with a positive sign, with D_RD. In the cluster of the *regions in big trouble*, GDP before the crisis (negative) and R&D level (positive) were associated with R&D change.

5 | CONCLUSION

Institutional aspects are often refereed as crucial for shaping the responses of the regions to the crises. This article considered that the notion of resilience helps on explaining how specific regions evolve, particularly if they are

reacting to crisis and other shocks. It may be a limited approach as it neglects on how this may affect regions' ability to transform their economic structure after a crisis. In this paper we have explored how the varieties of capitalism approach might inform a better understanding of the asymmetries witnessed in the resilience of regional economies across Europe to the financial crisis of 2007. Using five VoC identified by the literature in the EU, the analysis indicates a strong relationship between these ideal-types and resilience outcomes, with the Southern Mediterranean form of capitalism particularly adversely affected. What is evident from our results, is that the VoC approach provides additional insights into the differential results reported by many researchers.

In the article we implemented an exploratory statistical and econometric analysis in order to highlight the multitude of factors that influence regional resilience. In some cases, the higher GDP level induced more growth of product, employment and innovation, leading to concentration of resources, while in other varieties of capitalism, the more developed regions, probably due to effects of excessive concentration of resources, where the ones that suffered more with the economic downturn. Particularly important and always consistent is the role that regional clusters played to increase the resilience measured by the three variables and in the several types of regions analysed. Using cluster analysis techniques, six regional resilience types were identified showing a core-periphery pattern. This further suggests the need to adjust the existing VoC with the consideration of resilience outcomes. CEC and EAST regions largely making up the *great performers* and the *fast growth* categories. In contrast, Mediterranean Capitalism (MED) regions were in the majority in the least resilient category, hence its name of *Mediterranean regions in big trouble*. Similarly, regions from MED were also in the majority in the *regions in divergence* category. The role of VoC can also be seen in the categories of *R&D reductio*n and i*ntermediate positive situation*. Our work confirms that of other researchers recently, highlighting the role played by national macro-economic conditions on regional resilience outcomes. Using the VoC approach provides a valuable addition to this work, as it incorporates the role of institutional frameworks as well as economic performances. In doing so, it acknowledges the important role played by agency and power relations in negotiating different resilience outcomes, themes which are now rising up the resilience agenda.

In the case of the regions of the *Mediterranean regions in big trouble* another situation is worth a careful attention. The growth of GDP and R&D is highly dependent on the Product level and R&D levels. This means that economic constraints contaminate rapidly the innovation system creating barriers to the dynamics of R&D and innovation. If we take into consideration that R&D is *per se* a high cumulative process, a situation well-known from the literature but also demonstrated by the econometric results where the level of R&D was key to the growth of R&D expenditure, in the event of economic crises these regions—that are already lagging behind in terms of R&D—may lose opportunities of using innovation as a mechanism to mitigate the effects of economic crisis and will augment their gap to more developed regions.

However, whilst regional resilience paths appear to be conditioned by the institutional architectures of the regions concerned, the VoC approach is not without its difficulties. In particular, VoC types associated with social-democrat economies and continental capitalism do not show a clear resilience profile. Why this might be so is an area that would benefit from further research. One suggestion is that it might relate to the limited time horizon available to this study. Our approach has taken a conception of resilience that explores the capacity to withstand or to recover from a short-term economic shock. It is increasingly clear that the financial crisis was a short-term shock with long reverberating consequences, with a cumulative impact potentially greater than the sum of the individual parts. Understanding the long-term resilience outcomes of the initial shock and its subsequent patterning would provide stronger insights into the resilience of places through phases of reorientation and renewal. A second suggestion is that the complex systems that are regional economies preclude analysis using a relatively limited number of indicators that might not reflect the priorities of the actors embedded in the VoC represented in this study. This is particularly so for R&D expenditure, which captures just one element of innovation activity within an economy.

This paper has made an attempt to constructively connect the resilience concept with the VoC approach. This is an ambitious endeavour given the limited conceptualization of points connecting these two theoretical perspectives. There is an opportunity to begin to deconstruct the different VoC identified across Europe to explore how particular

features may have influenced the resilience of regions to the economic crisis. There is a need for further research on what are the structural factors of European regions that shape the reaction to the crises and also how did the crises changed the structural factors in some of these regions. This will require a more qualitative approach than has been taken in this paper. Without a strengthening of the conceptual base future empirical research will be a much more difficult task. There is a role here for detailed case study research that can provide an understanding of the complex adaptive system dynamics and regional evolutionary developments that have impacted on regional resilience in practice.

Despite these limitations, the findings of this article suggest implications for policy-making. Some countries and groups of countries were more resilient in terms of the adaptation of production and employment to the crisis than others. Even if we consider that these indicators (variations in GDP, Unemployment and R&D) are insufficient for revealing completely the "real" resilience phenomena they provide an approximate picture. This emphasizes the importance of recognizing what is valued in particular societies and how these economies may react to economic shocks in the future. Institutional architectures are not fixed in stone but evolve as regions learn (or don't) from their experience of the past. This is particularly important for countries where regions have different modes of governance, as different policy options may prove more able to cope with crisis than others. For instance, Sicily and Lombardy in Italy or Extremadura and the Basque Country in Spain, are part of the same VoC than others in their country but had different responses to the crisis. In the UK, there were fewer differences in outcomes, despite the introduction of devolved governance arrangements for Northern Ireland, Scotland and Wales in 1999. Public policies that reach across multiple territories, such as the European Structural and Investment Funds, would be strengthened through a greater cognizance of the particularities of the institutional frameworks in which regions sit. Where policies are applied more universally, such as those based on smart specialisation strategies or programs such as Horizon 2020 and its successor, they may be limited in their ability to meet the challenges of the technologically backward regions that are simultaneous constrained by the effects of the crisis and austerity.

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APPENDIX

TABLE A1 Average regional change of GDP, unemployment and R&D, grouped by variety of capitalism

		N	Min	Max	Mean	St. Dev.
Total Sample	D_GDP	272	−29.100	24.000	−0.95504	7.014785
	D_UNEMP	272	−6.700	19.000	1.50400	4.559533
	D_RD	267	−2.890	1.450	0.18970	0.370162
EAST	D_GDP	46	−10.200	24.000	5.92826	6.009092
	D_UNEMP	46	−6.700	6.200	0.31304	3.019243
	D_RD	46	−0.270	1.250	0.26478	0.314139
MED	D_GDP	62	−29.100	5.700	−8.03065	6.829723
	D_UNEMP	62	−1.000	19.000	7.75323	4.824722
	D_RD	62	−0.240	0.500	0.09484	0.118705
SDE	D_GDP	18	−12.800	9.100	−0.67222	5.098189
	D_UNEMP	18	−1.500	1.300	−0.08889	0.988694
	D_RD	16	−0.440	0.850	0.05250	0.341594
CEC	D_GDP	107	−9.000	12.100	1.64607	3.613151
	D_UNEMP	107	−4.900	6.500	−0.31412	2.310715
	D_RD	106	−0.490	1.450	0.32604	0.227741
LME	D_GDP	39	−13.600	0.000	−5.09231	3.090000
	D_UNEMP	39	−3.300	1.400	−1.30256	0.859463
	D_RD	37	−2.890	1.000	−0.07595	0.712022

Source: Own elaboration with Eurostat data.

TABLE A2 ANOVA test results for VoC

		Sum of squares	df	Mean square	Z	Sig.
D_GDP	Between groups	7166.456	5	1433.291	59.903	0.000
	Within groups	7584.879	317	23.927		
	Total	14751.335	322			
D_UNEMP	Between groups	3635.891	5	727.178	77.877	0.000
	Within groups	2922.628	313	9.337		
	Total	6558.519	318			
D_RD	Between groups	6.025	5	1.205	11.870	0.000
	Within groups	32.178	317	0.102		
	Total	38.203	322			

Source: Own elaboration with Eurostat data.

TABLE A3 Descriptive statistics by statistical clustering process

Clusters		N	Mean	St. dev.	St. error	Min
Great performers	D_GDP	61	−1.000	6.100	4.12343	1.513455
	D_UNEMP	61	−6.700	1.000	−2.09526	1.840371
	D_RD	60	−0.250	1.450	0.36150	0.270297
Fast growth	D_GDP	25	5.600	24.000	10.71600	4.132058
	D_UNEMP	25	−3.100	3.900	0.76800	1.804328
	D_RD	25	−0.270	.800	0.26200	0.225000
Intermediate positive situation	D_GDP	83	−3.900	3.200	0.16988	1.726249
	D_UNEMP	83	−2.700	6.200	1.12651	2.144709
	D_RD	83	−0.490	1.000	0.23554	0.242015
R&D reduction	D_GDP	44	−13.600	−1.900	−5.54773	2.730916
	D_UNEMP	44	−3.300	1.300	−1.04545	1.012125
	D_RD	40	−2.890	0.610	−0.10675	0.663771
Regions in divergence	D_GDP	44	−11.700	0.300	−6.48636	2.507068
	D_UNEMP	44	−0.300	12.100	5.63636	2.606976
	D_RD	44	−0.240	1.250	.13045	0.264777
Mediterranean regions in big trouble	D_GDP	15	−29.100	−9.400	−17.58667	5.641538
	D_UNEMP	15	7.800	19.000	14.81333	3.036179
	D_RD	15	−0.070	0.110	0.09267	0.049493

Source: Own elaboration with Eurostat data.

TABLE A4 ANOVA test results for resilience clusters

		Sum of squares	df	Mean square	Z	Sig.
D_GDP	11507.055	5	2301.411	334.870	0.000	11507.055
	1828.100	266	6.873			1828.100
	13335.155	271				13335.155
D_UNEMP	4510.030	5	902.006	213.486	0.000	4510.030
	1123.882	266	4.225			1123.882
	5633.912	271				5633.912
D_RD	5.887	5	1.177	10.056	0.000	5.887
	30.560	261	0.117			30.560
	36.447	266				36.447

Source: Own elaboration with Eurostat data.

TABLE A5 Cross-tabulation—VoC × resilience clusters

VoC		LME	CEC	SDE	MED	EAST
Clusters	Great performers		**68.9%**	4.9%	1.6%	24.6%
	Fast growth		20.0%	4.0%		**76.0%**
	Intermediate positive situation	7.2%	**60.2%**	7.2%	13.3%	12.0%
	R&D Reduction	**72.7%**	11.4%	15.9%		
	Regions in divergence	2.3%	11.4%	2.3%	**79.5%**	4.5%
	Mediterranean regions in big trouble				**100.0%**	

Note: Bold most representative VoC in each Resilience cluster.

Source: Own elaboration with Eurostat data.

TABLE A6 Chi-square tests of independence —Voc × resilience clusters

	Value	df	Sig. (2 tails)
Pearson chi-square test	373.594	20	0.000
Likelihood ratio test	329.299	20	0.000

Eight cells (26.7%) expected a count minor than five. The minimal expected count is 1.33.

Source: Own elaboration with Eurostat data.