Article

Diversity, Disparity and Territorial Resilience in the Context of the Economic Crisis: An Analysis of Rural Areas in Southern Spain

Pedro Sánchez-Zamora * and **Rosa Gallardo-Cobos**

Department of Agricultural Economics, Sociology and Policy, ETSIAM, Universidad de Córdoba, 14014 Córdoba, Spain; rosagallardo@uco.es
* Correspondence: pedro.sanchez@uco.es; Tel.: +34-957-21-84-44

check for updates

Abstract: This paper analyses territorial resilience in rural Andalusia, Spain, after the impact of the recent economic crisis and identifies the factors associated with the highest recovery rates in different contexts and territories. To this end, we developed a methodology that incorporates the heterogeneity and diversity of rural territories and uses composite indices calculated using Data Envelopment Analysis (DEA) in order to measure levels of resilience and identify the factors that impact recovery in rural counties. The results reveal how different aspects of economic, social, human, and natural capital promote resilient territorial dynamics in rural Andalusia. These results provide useful information for political decision-makers in the design of public policies, especially at a time like the present when the EU is immersed in debate on the reform of rural development policies for the next programming period beyond 2020.

Keywords: territorial resilience; economic crisis; resilience factors; rural territories; Andalusia; composite indices

1. Introduction

In the field of scientific disciplines, such as economics and political science, the most recent literature does not hesitate to include the economic and financial crisis of 2007–2008 as one of the main and most important events in the twenty-first century to date. Some authors describe the crisis as "the great recession", and at a European level, it is regarded as the most severe defining moment since the 1930s, the Second World War, and in the entire history of the European Union [1–3].

What began as a financial and banking crisis stemming from the collapse of the housing bubble and the over-expansion of credit in the United States quickly spread through the global financial system to hit real economies in much of Europe [4]. Indeed, even today most European economies are still recovering from the consequences of the crisis, which was especially severe in terms of GDP and the labour market [5,6].

However, despite the widespread impact of the crisis in Europe, intensity and recovery rates have been very different [7]. Research on the different socio-spatial trajectories surrounding the crisis has identified a complex web of reactions and has revealed its disparate territorial effects [8,9]. Whereas some countries, such as Greece, Italy or Spain have suffered significant losses in terms of GDP and employment, others, such as Germany and Poland, have maintained their levels of employment and economic growth [10].

This situation highlights one of the most important consequences of the crisis: the increase in inequalities between European territories. Interregional differences in both GDP per capita and employment decreased considerably during the period 2000–2007, stabilised in 2008, and clearly

reversed the trend from 2009 onwards [11]. Đokić et al. [12] highlight that previous research reveals that periods of economic growth may be related to regional convergence, while periods of economic recession may trigger regional divergences [13–15].

These disparities are not only observed in analyses between countries but are also evident between regions and territories within countries themselves [16,17]. In the EU, the Spanish economy was one of the most affected by the economic and financial crisis. During the crisis, the level of GDP and the employment rate suffered significant falls in comparison to the EU average. This caused the convergence path to stagnate in 2007 and to take a downward turn until 2013. The impact of the crisis, together with the effects of the austerity policies which were implemented as a consequence, had important repercussions at a regional and territorial level. In this context, although every region in Spain suffered significantly from the crisis, there are important differences between them. In general, the regions with the highest levels of income and employment suffered the least from the effects of the crisis. This has contributed to the increase in territorial disparities and has had a very negative impact on internal convergence processes [18].

At an intraregional level, heterogeneous patterns have also been observed between territories and cities as a result of the crisis [19,20]. In Spain, one of the most affected regions was Andalusia, which tripled its unemployment rate during the period 2007–2013. This was exacerbated by the fall in average income per capita, the increase in long-term and youth unemployment, and cuts in public and private investment, inter alia. Moreover, not only has Andalusia been one of the most affected regions in Spain, the crisis has also had an uneven impact across a large number of its territories [21], which has contributed to accentuating intraregional imbalances [22].

The exceptional severity of the economic crisis and the spatial heterogeneity of its impact have led to growing interest in recent years in the concept of resilience [23,24]. The term "resilience" is commonly used in everyday language, as well as in various scientific disciplines. As such, there is a lack of consensus on its definition and it has become subject to a variety of different meanings and connotations [25–27]. Martin [28] states that resilience is not a unitary concept with a precise and universally accepted definition. In fact, according to several authors, the concept of resilience remains diffuse [29–32] and has acquired a polysemic nature [33]. However, all interpretations seem to converge in a shared meaning: the capacity to respond effectively to change; especially to unpredictable and sudden change [34].

Despite criticism of the use of the term in regional studies [35,36], the number of publications on regional resilience has increased significantly in recent years [32]. The term has attracted the attention of regional analysts, spatial economists, and economic geographers, who have used it in their studies as an analytical approach to try to understand the effects of the crisis from the perspective of unemployment [37], social exclusion [38,39], and the capacity of territories to resist the effects of a prolonged recession [21,28,31,40–43].

The wide-range of studies on regional and territorial resilience differs according to the object of study, the temporal and spatial scale on which the analysis is based, and the type of adverse event studied (sudden shock, long-term trend "slow-burn", etc.). Most studies on regional resilience are eminently qualitative in nature, mainly because there is still no generally accepted methodology to measure regional resilience, its determining factors, and its link with long-term regional growth patterns [24]. However, more research is being performed in the context of the economic crisis, based on different variables of analysis, time scales, and methodologies in an attempt to measure the resilience of different territories and to identify the explanatory factors that affect resilience. Studies of particular interest in the field are those that perform a NUTS 2 scale analysis at a European [23,24,44–47] and domestic [18,48] level, those that use a NUTS 3 scale [10,12] analysis, and those that scale down to a Local Administrative Units (LAU) Local Administrative Units analysis in an urban environment [19,20,49].

For rural areas, the concept of resilience has been applied to the analysis of complex socio-ecological systems from the perspective of sustainable development [50–53], the analysis of community resilience [54–58], farming resilience [59–61], and the agri-food system and food

security [62–65]. However, this concept has not yet been widely used in a rural setting to try to understand the effects of the economic crisis from a territorial perspective.

Studies that do approach the empirical analysis of resilience from a territorial perspective in a rural environment have been performed by Sánchez-Zamora et al. [21,66]. The authors identify a series of factors linked to the early stages of resilience, such as preparation and the first response of territories after the first initial shock. However, due to the moment in time in which the research was performed, the recovery stage and the identification of the factors that impact recovery were not considered. In order to advance in the study of this crucial stage of resilience, the authors highlight the need for future research to take into account the context in which the territories under study develop. In effect, the rural milieu is diverse, the potential methods of development are multiple, and the disparities between rural–rural territories are a reality. This diversity implies that there are no common stages of development, that points of departure and arrival of development and resilience are potentially different, and that it is precisely these differences in a combination of different factors that might explain territorial success or failure [67].

Although existing studies on territorial resilience contemplate a diversity of contexts, they often fail to incorporate this factor sufficiently in empirical analyses, which, on many occasions, has led to very different types of territory being regarded as a homogeneous "whole". The analysis of territorial resilience and its explanatory factors should, therefore, be performed between types of territories that are more or less homogeneous in terms of their circumstances and resources.

In this context, the objective of this study is to identify the factors associated with resilience in different types of rural territories in Andalusia. The aim is to provide useful information for the design of public policies that enable rural areas to adapt more adequately to the consequences of the economic crisis. To this end, this research focuses on the analysis of the recovery stage of territorial resilience, i.e., the time interval following the impact of the crisis, which allows us to analyse the recovery capacity of territories after the shock to which they were subjected. The fact that the EU is currently immersed in the debate on the future of rural development policies for the next programming period beyond 2020 further increases the interest of this research.

In order to achieve the objective, following this introductory section, Section 2 describes the theoretical and conceptual context of territorial resilience. Section 3 presents the geographical scope, the unit of analysis, and the selected time period, as well as the research methodology and stages. Section 4 presents and discusses the results. Lastly, Section 5 presents the main conclusions that can be drawn from the study as a whole.

2. Territorial Resilience

2.1. From Regional Resilience to Territorial Resilience

In the scientific literature, two approaches can be identified, which based on the study of complex socio-ecological systems, are particularly relevant to the analysis of regional resilience [27,31,68]: (i) analysis via equilibrium, and (ii) analysis via complex adaptive systems. The former refers both to a system's capacity to return to its normal state of equilibrium once it has suffered a shock ("mechanical resilience" in mono-equilibrium systems), and to its ability to tolerate shocks before changing its structure and moving to a new state of equilibrium ("ecological resilience" in multi-equilibrium systems). The latter approach, complex adaptive systems, does not rely on equilibrium assumptions but alludes to the ongoing capacity of a system to continuously reconfigure itself, i.e., to adapt its structure and continuously develop over time.

The framework proposed by studies in the field of socio-ecological systems and regional economy is, indisputably, an important methodological and conceptual reference model with which to address the analysis of resilience from a territorial perspective. Applied to a territory, in practice this idea becomes two concepts. The first concept of resilience can be measured either as the capacity of a region to withstand external pressures while maintaining its structural and functional attributes, or as the

capacity of a territory to respond positively to external change. In such cases, a territory is said to have "static resilience" [69], which allows it either to return to a level of equilibrium, or to pass to another level of equilibrium [70–72].

The second concept of resilience [73] can be defined as the ongoing capacity of a territory to devise and deploy new resources and capacities that allow it to adapt favourably to the dynamics of transformation driven by the changing environment. In these cases, regions are said to have "dynamic resilience" [69] characterised by their capacity for adaptation and long-term learning in the face of external or internal change [30,70–72].

An operational perspective requires a broader vision in order for territorial resilience to go beyond both concepts and be understood as the capacity of a territory to anticipate, prepare, respond, recover, and adapt to shock. Using this definition, four stages have been identified in the analysis of territorial resilience: (i) anticipation, preparation; (ii) response; (iii) recovery; and (iv) adaptation and long-term learning [74]. As a result, this study is based on a temporal analysis, in which the stages are delimited by the moment at which the shock or impact occurred. Moreover, although the trajectory followed by a territory in each of the stages may be a decisive factor in its level of resilience, in reality a territory can only be regarded as resilient if it displays satisfactory behaviour in the recovery and the later adaptation and long-term learning stage. As mentioned previously, this research focuses on the analysis of resilience in the recovery stage.

2.2. Factors Associated with Territorial Resilience

Studying territorial resilience involves not only analysing changes that occur in territorial organisation as a consequence of shock, but also analysing territorial factors associated with different levels of response and recovery. Previous studies reveal the complex and multidimensional nature of territorial resilience and the decisive influence that the availability of territorial resources and capital (economic, social, human, and natural) exert on resilience [10,75]. The territorial factors that have previously been associated with different levels of regional and territorial resilience are described below:

- Economic capital includes factors such as employment and the labour market [76], level of income [10], innovation and entrepreneurship [45,77–79], economic structure [80], specialisation [16,81] and diversification [45,82], economic dynamism [10], the importance of the agricultural and agri-food sector [48,83], the financial, industrial and construction sectors [84], and tourism and the service sector [10,37,48].
- Social capital includes factors associated with public-private partnerships and their levels of interaction [85], institutional agreements, governance, investment in public services, citizen participation, political leadership [76,86–88], and the extent of regional association and cooperative networks [66,89].
- Human capital includes factors such as demographic structure, population density, ageing and generational replacement [21,23], training and education [23,81,90,91], migratory movements [92], and access to basic services [10,93] and information and communication technology (ICT) [21].
- Lastly, natural capital includes factors associated with territorial accessibility and connectivity [76,94], availability of natural resources [66], biodiversity [95], forest areas [96], and environmental quality and invulnerability in relation to climate change [97].

3. Methodology

3.1. Research Scope, Unit of Analysis and Time Scale

We selected the rural milieu of the Autonomous Region of Andalusia as the geographical area of analysis for our study on territorial resilience. Andalusia is regarded as predominantly rural in terms of surface area (although not population) and is located in a peripheral area in regard to both Spain and the EU, being relatively distant from the main political and economic decision-making centres (Figure 1). It is characterised by its vast geographical expanse and economic diversity, the rich

biodiversity of its ecosystems, its good rural–urban demographic balance, the significant weight of the agri-food sector, and the presence of wide-ranging, heterogeneous association networks (cooperatives, trade unions, irrigation communities, professional organisations, Rural Development Groups, etc.). It is also undergoing an intense rural development process owing to the implementation of the EU Leader initiative and the Spanish Proder programme (Nationwide programme for the economic development and diversification of rural areas through the implementation of the LEADER initiative) in 52 of its territorial units.

Figure 1. Location of the research area in grey.

However, as stated previously, Andalusia is also one of the regions hardest hit by the negative impact of the economic crisis. Although the impact of the recent economic and financial crisis was somewhat homogeneous at a European level, the specific characteristics of Spain, and more precisely Andalusia, made it very different. The crisis in Andalusia was not only financial and economic, but also structural, complex and prolonged. Moreover, the crisis contributed decisively to generating high levels of inequality between different territories and sectors of the population. As a consequence, Andalusia has become the perfect research laboratory in which to perform a territorial resilience analysis.

We determined that the most suitable territorial unit of analysis to use in our study would be at a county level (LAU 1). The choice of counties as a unit of analysis is justified due to the growing expansion of local markets and the scope of rural policies. A county combines a set of natural, historical, social, economic, and legislative features which contribute to building the identity of a territory whose system of governance gives rise to a macro-micro synthesis, on which development processes are based. As a result, we analysed 52 of Andalusia's counties, each managed by a Rural Development Group, which constitutes a large area of the overall territory (around 80%), including 698 municipalities and more than 3 million inhabitants.

In order to analyse resilience and its explanatory factors, we have selected the period between 2012/2013–2016; years subsequent to the economic crisis (2008–2012), in which a large number of territories began to show diverse symptoms of recovery, reorganisation, and adaptation.

3.2. Research Methodology and Stages

The five stages of the methodology used to achieve the main objective and the statistical methods involved in each are shown in Figure 2.
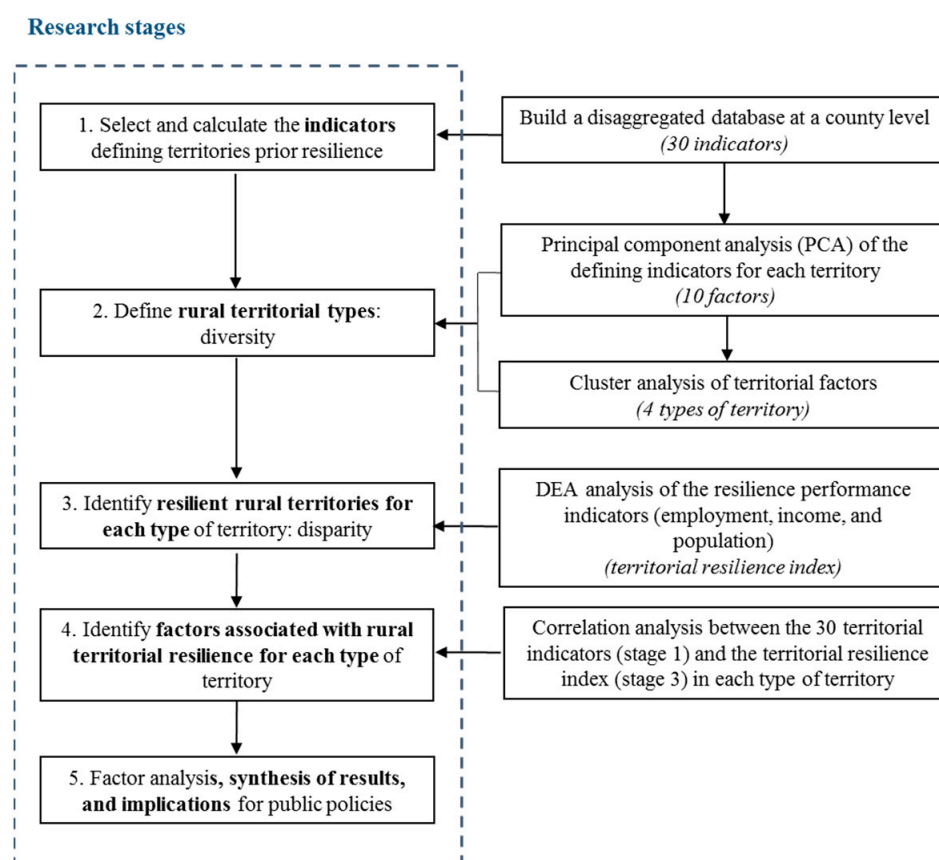
Research stages

Figure 2. Research methodology.

3.2.1. Selection of Territorial Indicators Associated with Territorial Resilience

The indicators used in the analysis are based on the literature review performed in Section 2.2, on factors previously associated with territorial resilience, which directly or indirectly reflect the characteristics of the territories analysed. The list of indicators was then classified under the four territorial capital indicators: economic, social, human, and natural capital. In order to compile the list, data from the years 2012/2013 and 2016 was collected from available statistical data published by official bodies (EUROSTAT, INE, SIMA, Anuario La Caixa, MAPA, Consejería de Agricultura de la Junta de Andalucía). Due to the scarcity of aggregated data at a county level, the indicators selected for the empirical analysis had to be compiled at municipality level then aggregated at the county level. Consequently, we collected data from the 698 municipalities that constitute the 52 rural counties analysed.

Table 1 summarises the most significant characteristics of the 30 indicators that describe the territories finally selected.

3.2.2. Determining the Typology of Rural Territories

The typology of rural territories was determined based on the system of indicators shown in Table 1. Although the very act of creating a typology for analytical purposes reduces and simplifies a reality that is much richer and more diverse, it offers the possibility to group similar territorial issues together and identify relatively homogeneous contexts in which to be able to deepen the analysis of resilience.

In order to determine a typology, after the selection and univariate analysis of the indicators, we performed a factor analysis (PCA procedure), and with the resulting factors, a cluster analysis (hierarchical aggregation procedure).

Table 1. Characteristic indicators of rural territories.

Capital	Variable	Indicator	Notation	Definition
Economic	Employment	Employment rate	EMPL	Employed-to-active population ratio (100-unemployment rate) (%)
	Income	Income per capita	INCOME	Level of income weighted by the total county population (€/pers)
	Innovation and investment	Business investment	INVEST	Investment in the creation of new businesses (€/pers)
	Economic structure	Economic diversification	DIVER	Based on the inverse of the Herfindahl-Hirschman Index (HHI). Data corresponds to the number of new business and professional activities weighted by the population corresponding to the primary sectors, construction, industry and services (*dimensionless*)
	Economic dynamism	Economic activity index	EAI	Total number of new business and professional activities weighted by population (*dimensionless*)
	Agricultural sector	Agricultural index	AGRI	Number of new business and professional activities corresponding to agriculture, livestock farming, and fishing weighted by population (*dimensionless*)
	Industrial sector	Industrial index	INDUS	Number of new business and professional activities corresponding to industrial activities weighted by population (*dimensionless*)
	Construction industry	Construction index	CONST	Number of new business and professional activities corresponding to construction weighted by population (*dimensionless*)
	Service sector	Service index	SERVI	Number of new business and professional activities corresponding to the service sector weighted by population (*dimensionless*)
Social	Investment	Expenditure vs. Income per capita	EXPEN	Percentage of expenditure per capita versus income per capita (%)
	Taxation	Surplus	SURPLUS	Current budget surplus or deficit (€)
	Participation	Average voter turnout in elections	PART	Average percentage of votes in general, regional, and local elections per total voters (%)
	Partnership	Private sector participation	PRIV	Percentage of private members and businesses on the board of directors of Rural Development Groups (%)
	Associations	Association networks	ASSOC	Number of sector and business associations, cooperatives and civic associations in the overall structure of Rural Development Group (%)
	Cooperatives	Cooperative networks	COOP	Number of cooperatives per thousand total population (*dimensionless*)
Human	Demographic	Population	POP	Total population in county (*pers*)
	Density	Population density	DENS	Population per square kilometre (*pers /km²*).
	Generational replacement	Youth index	YOUTH	Percentage of total population under 20 (*%*).
	Ageing	Ageing index	AGE	Percentage of total population over 64 (*%*).
	Population attraction	Foreign-born population	FBP	Weight of foreign-born population versus total population (*%*).
	Education and training	University education	UNI	Percentage of the population with university education (%)
	Access to basic services	Level of resources	RES	Number of education and primary healthcare centres per thousand total population (*dimensionless*)
	Connectivity	Internet penetration	ADSL	Number of ADSL per thousand inhabitants (*dimensionless*)

Table 1. *Cont.*

Capital	Variable	Indicator	Notation	Definition
Natural	Remoteness	Distance	DIST	Distance from provincial capital (NUTS 3) (*Km.*)
	Isolation	Altitude	ALT	Altitude above sea-level (*m*)
	Climate change	Inverse CO_2 emissions	CC	Based on the inverse value of total CO_2 emissions (1/CO_2 emissions) (*1/Mt CO_2 equivalent*)
	Biodiversity	Natura 2000	NATU	Percentage of surface-area designated as Special Area of Conservation (SAC) and Special Protection Area (SPA) versus total surface-area (%)
	Nature	Forest surface-area	FOREST	Percentage of surface-area covered by natural vegetation and forests versus total surface-area (%)
	Invulnerability	Surface-area with low risk of erosion	INVUL	Percentage of surface-area with erosion levels classified as low or medium (%)
	Availability of resources	Water distribution	WATER	Percentage of region covered by reservoirs, marshland, salt flats, aquaculture, and rivers, streams and other wet lands versus total surface-area (%).

3.2.3. Identifying Resilient Rural Territories in Each Type of Territory

Resilience processes of change were identified by creating a composite index, via Data Envelopment Analysis (DEA), comprising variables to measure resilience. This approach enabled us to obtain a weighting system for the variables without resorting to the arbitrary assignment of weights and without using methods based on the aggregation of the personal opinion of experts.

Literature has already explored the utility of DEA in constructing sustainability indices at a company level [98], to analyse changes over time in living conditions [99], to reappraise the United Nations Human Development Index [100–102], to create a rural municipalities socioeconomic potential index [103], to analyse rural territorial dynamics [21,66], and to analyse territorial cohesion [104]. The model proposed below is based on this literature

DEA is a technique initially designed by Charnes et al. [105] to calculate various measures of efficiency in productive units, or more generically, decision making units (DMUs), via mathematical programming. Traditionally, a DEA approach tries to compare the behaviour of a set of DMUs in relation to the transformation of inputs into outputs, taking as a reference a production frontier composed of the best practices observed in the set. The basic theoretical framework that underlies DEA is a production function in which the following set $k = 1, \ldots, K$ of DMUs is assumed, which makes use of an input vector $x = (x_1, \ldots, x_M)$ to produce an output vector $y = (y_1, \ldots, y_R)$. As a result, DEA defines the efficiency of a decision making unit DMU_0 by means of the maximum value of a ratio that transforms its inputs into outputs:

$$Max_{u_{ro}v_{mo}} \frac{\sum\limits_{r=1}^{R} u_{ro}y_{ro}}{\sum\limits_{m=1}^{M} v_{mo}x_{mo}}$$

Subject to:

$$\frac{\sum\limits_{r=1}^{R} u_{ro}y_{rk}}{\sum\limits_{m=1}^{M} v_{mo}x_{mk}} \le 1 \quad k = 1, \ldots, k$$

$$u_{ro} \ge 0 \quad r = 1, \ldots, R$$

$$u_{mo} \ge 0 \quad m = 1, \ldots, M$$

$\qquad$ (1)

Weights u_{ro} and u_{ro} represent the non-negative weights applied to output y_{ro} and input x_{mo}, and are chosen with the aim of placing DMU_0 in the most favourable light possible when compared to others; in other words, they are calculated to maximize the corresponding efficiency ratio. Consequently, weights are unique to each unit and are selected to the best advantage of the DMU analysed (in this case DMU_0). This maximization is subject to several constraints, including those that establish that the efficiency ratios of the *k* decision making units, calculated with the very same, specific weighting vectors, must have an upper limit equal to the unit. Accordingly, a DMU_0 will be considered efficient if a set of weights can be found such that

$$\sum_{r=1}^{R} u_{ro}y_{ro} - \sum_{m=1}^{M} v_{mo}x_{mo} \geq \sum_{r=1}^{R} u_{ro}y_{rk} - \sum_{m=1}^{M} v_{mo}x_{mk} \text{ for all other UD}_k \tag{2}$$

This fractional optimisation problem can be expressed in linear form after performing the appropriate transformations (see Cooper et al. [106]), and also allowing the expression (1) to be used to evaluate the relative behaviour of a DMU. Our objective was to create a composite index based on a set of variables that determine the classification of territories according to their resilient behaviour. In order to do so, and from a Multicriteria Decision Analysis (MCDA) perspective, a DEA analysis can be integrated to a function that aggregates outputs and inputs into a single measure of value [107]. The problem can be simplified by assuming a single input for each DMU and making it equal to the unit. Consequently, for DMU_0, the following model is proposed:

$$Max_{\mu_{ro}} \quad h_0 = \sum_{r=1}^{R} \mu_{ro}I_{ro}$$

Subject to:

$$\sum_{r=1}^{R} \mu_{ro}I_{rk} \leq 1 \quad k = 1,\ldots,K$$
$$\mu_{ro} \geq 0 \qquad r = 1,\ldots,R \tag{3}$$

where h_0 is technical efficiency (in this case, territorial cohesion in the corresponding dimension) of DMU_0 (in this case, the territory being analysed); μ_{ro} is the weight of indicator *r*, the most favourable for the attributes of DMU_0; and I_{rk} represents the value of indicator *r* for DMU_k. Note that it is now used instead of as a reminder that we are no longer using outputs in our objective function, but measurable attributes or characteristics of the DMUs. Instead of measuring the efficiency of a DMU in the input-output transformation, the objective function now involves obtaining the maximum value of a composite index from a set of indicators corresponding to different aspects of territorial resilience.

The following variables were selected for our study to measure resilient behaviour: employment, income, and population. All three are important development variables that are associated with the measurement of citizen wellbeing and quality of life, as well as population retention in rural areas. In order to measure the variables, the following three indicators were included in the model: (i) percentage increase in the employment rate during the period analysed (2012/2013–2016); (ii) percentage increase in net income per capita during the period analysed; and (iii) percentage increase in the population during the period analysed. As a consequence, we argue that the dynamics of a territory can be considered resilient if during the period analysed it has been able to increase its level of employment, income per capita, and population, or, depending on the context, to minimise losses.

Specifically, a CCR model (named for Charnes, Cooper and Rhodes who initially proposed the model in 1978. This model can have input or output orientation and operates under the assumption of constant returns to scale) was applied focusing on outputs and with a virtual input equal to the unit, which was calculated using Banxia Frontier Analyst software.

3.2.4. Identifying the Factors Associated with Territorial Resilience for Each Type of Territory

Once the resilience indices of each of the counties were estimated, the next step was to identify the factors that might contribute to the processes of change in each type of rural territory. To this end, a correlation analysis (Spearman coefficient) was performed between the indicators characterising the rural territory used to prepare the typologies and the corresponding resilience index. The aim was to identify in each type of rural territory which explanatory factors or indicators (year 2012/2013) might be contributing to their recovery after the impact of the economic crisis (2012/13–2016).

3.2.5. Analysis of Results and Implications for the Design of Public Policies

Lastly, a synthesis and critical analysis of the results obtained in each of the stages of the methodology was performed, and the possible implications that these may have for the design of public policies and strategies with an impact on rural territories was discussed.

4. Results and Discussion

When determining the typology of rural territories, we used a factor analysis to reduce the original 30 indicators to a total of 10 factors. These results are summarised in Appendix A.

The factors are as follows:

- Economic capital: Factor 1 represents employment and economic diversification, Factor 2 represents income and economic dynamism, and Factor 3 represents innovation and entrepreneurship.
- Social capital: Factor 4 represents the provision of public services, citizen participation and cooperative networks, and Factor 5 represents management.
- Human capital: Factor 6 represents demographics and education, Factor 7 represents access to resources and basic services, and Factor 8 represents connectivity and access to the Internet.
- Natural capital: Factor 9 represents biodiversity, forest areas and environmental quality, and Factor 10 represents invulnerability, remoteness and marginality.

By using a cluster analysis based on the factors obtained we were able to identify four types of rural territories. Figure 3 shows the resulting typology.
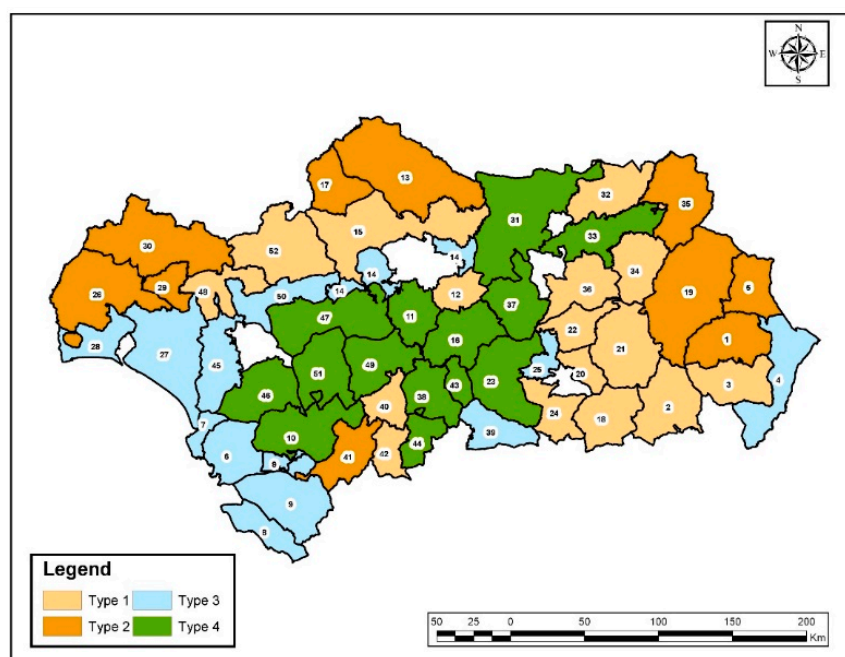

Figure 3. Typology of rural territories.

We determined four types of rural territories based on their main characteristics: Types 1 and 2 represent peripheral, remote territories with deficient ICT infrastructures. They are generally located in mountainous areas that present important demographic problems of depopulation and ageing. They are primarily characterised by their valuable natural resources—extensive forest areas and protected natural spaces with rich biodiversity and important agri-environmental quality. The agricultural and livestock sector play an important role in the rural economy of these counties, as do the business and professional activities linked to commerce and rural tourism. Employment levels are above average. However, employment is often low-skilled given that the population usually has the lowest levels of education. People in these areas often have a strong sense of belonging and regional or local identity. These regions present the highest levels of citizen participation and number of cooperative networks, as well as greater implication from the private sector and professional and civic associations in development processes. Type 1, which are closer to major centres of development and have better access to the Internet, have higher levels of employment, economic diversification, innovation, and entrepreneurship. In turn, Type 2, which are more peripheral and have greater problems of depopulation and ageing, present high levels of income per capita and are important areas for industry, primarily linked to the agri-food sector.

Types 3 and 4 represent counties that due to their orography and more favourable geographical situation, located nearer to large urban centres and provincial capitals, present better infrastructures for connecting and communicating with regional development centres. They have greater demographic potential, and the highest levels of population density, young people with university education, and foreign-born populations. These counties do not usually have large forest areas or protected natural parks but present the lowest levels of environmental quality. In addition to the agricultural and agri-food sectors, the industrial sector, and in particular, business and professional activities linked to the service sector play a very important role in the rural economy of many counties. In general, counties with higher population dynamics present lower levels of regional or local identity, citizen participation, cooperative networks, and management. Type 3, which are somewhat closer to provincial capitals and coastal areas, present better connections, greater demographic potential, population attraction for foreign-born citizens, and high levels of income per capita. They also present high levels of entrepreneurship linked primarily to the service sector and tourism, two of the most important sectors for their economy and where a large number of professional activities are developed. However, these areas also have the highest levels of unemployment. In turn, Type 4 rural territories are well connected, but somewhat further away from large urban centres. They are notable primarily for the importance of their agrarian, agri-food and industrial sectors, and the extensive network of cooperatives and SMEs linked to these activities.

A synthetic territorial resilience index associated with each of the 52 counties was developed by applying the DEA analysis in a differentiated way for each of the four types of rural territories. Table 2 summarises the results obtained in the analysis in each of the four types of territories.

The results show that seventeen counties (five belonging to Type 1, three to Type 2, five to Type 3, and four to Type 4) present the most favourable situation (those with indices = 100) within the geographical scope studied and from the perspective of the indicators selected to measure territorial resilience. These counties, the type of territory to which they belong, and their geographical location are shown in Figure 4.

Of the seventeen counties, Valle del Lecrín Temple and Costa Interior (Type 1), Andévalo Occidental (Type 2), Litoral de la Janda (Type 3), and Valle del Guadalhorce (Type 4) are those which, within their type, most often constitute a control group for those counties which present an unfavourable situation or still have the capacity to improve (those with indices of <100). In other words, they act as a benchmark for counties in an unfavourable situation to measure improvement. The importance of identifying this group of counties lies in the fact that when comparing each subregion with its control group, we can determine the distance it must travel in each of the variables

contemplated in the analysis in order to reach the same situation of efficiency (or in this case resilience) enjoyed by the group.

Table 2. Resilience indices of rural counties.

| Num.	County	RI	Type
1	Almanzora	95.3	Type 2
2	Alpujarra-Sierra Nevada Almeriense	67.72	Type 1
3	Filabres Alhamilla	100	Type 1
4	Levante Almeriense	100	Type 3
5	Los Vélez	100	Type 2
6	Campiña de Jerez	72.63	Type 3
7	Costa Noroeste de Cádiz	88	Type 3
8	Litoral de la Janda	100	Type 3
9	Los Alcornocales	100	Type 3
10	Sierra de Cádiz	99.31	Type 4
11	Campiña Sur	66.49	Type 4
12	Guadajoz y Campiña Este	91.15	Type 1
13	Los Pedroches	72.77	Type 2
14	Medio Guadalquivir	84.97	Type 3
15	Sierra Morena Cordobesa	86.21	Type 1
16	Subbética Cordobesa	50.7	Type 4
17	Valle del Alto Guadiato	57.08	Type 2
18	Alpujarra-Sierra Nevada de Granada	75.86	Type 1
19	Altiplano de Granada	71.89	Type 2
20	Arco Noroeste de la Vega de Granada	100	Type 1
21	Guadix	96.2	Type 1
22	Los Montes de Granada	100	Type 1
23	Poniente Granadino	92.93	Type 4
24	Valle Lecrín Temple y Costa Interior	100	Type 1
25	Vega Sierra-Elvira	91.47	Type 3
26	Andévalo Occidental	100	Type 2
27	Condado de Huelva	100	Type 3
28	Costa Occidental de Huelva	86.68	Type 3
29	Cuenca Minera de Riotinto	50	Type 2
30	Sierra de Aracena y Picos de Aro	90	Type 2
31	Campiña Norte de Jaén	50.85	Type 4
32	Condado de Jaén	66.83	Type 1
33	La Loma y las Villas	41.5	Type 4
34	Sierra de Cazorla	68.35	Type 1
35	Sierra de Segura	32.19	Type 2
36	Sierra Mágina	81	Type 1
37	Sierra Sur de Jaén	79.92	Type 4
38	Antequera	79.26	Type 4
39	Axarquía	97.49	Type 3
40	Guadalteba	99.46	Type 1
41	Serranía de Ronda	100	Type 2
42	Sierra de las Nieves	100	Type 1
43	Territorio Nororiental de Málaga	98.99	Type 4
44	Valle del Guadalhorce	100	Type 4
45	Aljarafe-Doñana	100	Type 3
46	Bajo Guadalquivir	100	Type 4
47	Campiña y los Alcores de Sevilla	100	Type 4
48	Corredor de la Plata	95.57	Type 1
49	Estepa Sierra Sur	100	Type 4
50	Gran Vega de Sevilla	89.1	Type 3
51	Serranía Suroeste Sevillana	90.98	Type 4
52	Sierra Morena Sevillana	84.01	Type 1
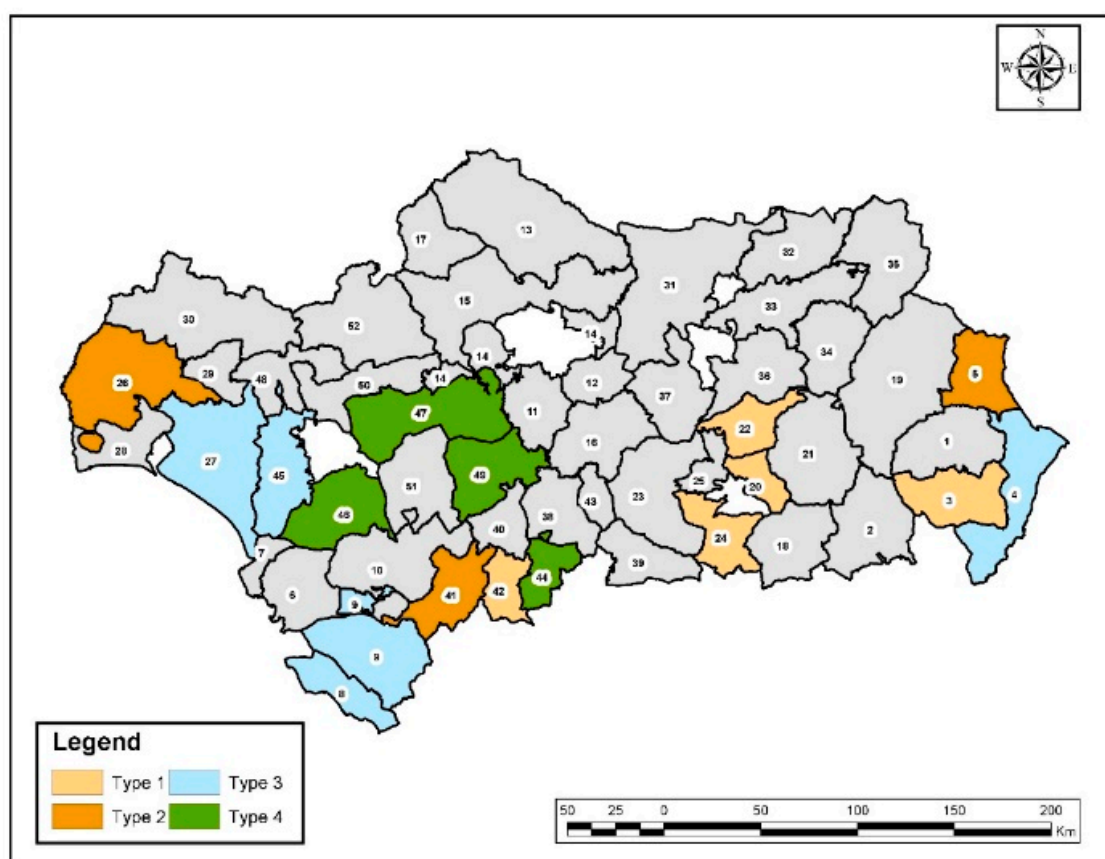
Figure 4. Location of resilient counties.

Table 3 shows the results obtained in relation to the correlation analysis performed between the indicators describing rural territories and the corresponding resilience index of the counties that constitute each type of territory.

Table 3. Correlation indices by type of territory.

Dimension/Indicator	Resilience Indices			
	Spearman Coefficient			
	Type 1	Type 2	Type 3	Type 4
Economic Capital				
DIVER	0.617 (**)			
AGRI			0.674 (**)	0.491 (*)
SERVI		0.595 (*)		
Social Capital				
EXPEN			0.544 (*)	
PRIV	0.447 (*)			
ASSOC		0.595 (*)		
Human Capital				
YOUTH	0.493 (*)			0.593 (*)
AGE				−0.598 (*)
FBP			0.580 (*)	
UNI	0.463 (*)			
ADSL			0.537 (*)	
Natural Capital				
DIST	−0.544 (*)			
FOREST			0.560 (*)	

Note: ** The correlation is significant at the 0.01 level (2-tailed); * the correlation is significant at the 0.05 level (2-tailed).

In Type 1, the results show significant correlations between the resilience index and various indicators associated with different aspects of territorial capital. In economic capital, the diversification factor (DIVER) has been decisive in the development of rural subregional economies. Despite the limitations derived from orography, mountainous territories that have diversified their economic and professional activities, which are usually based on the potential of their valuable natural and cultural resources, achieve the highest levels of resilience. In social capital, the results show a positive correlation between the resilience index and the involvement of the private sector in the development of counties (PRIV). The best levels of development have been achieved in those counties where new activities have been undertaken and have been developed or supported by private initiatives. In human capital, the results show positive correlations between the resilience index and the presence of young people (YOUTH), and between young people and high levels of education (UNI). These two factors are of vital importance for the development of this type of territory, given that their physical conditions present important demographic problems. The growing attraction of these territories as places of second residence or even main residence for those who have found a permanent place in which to live and work has been a creative way of reactivating and promoting the development of some counties in the rural interior after the impact of the economic crisis. Lastly, in natural capital, another determining factor is geographical enclave and the distance of counties to the main focuses of economic development in the region (DIST). Those counties closest to provincial capitals have been benefited by the rural-urban exchange, which, in some cases, has contributed to reducing traditional isolation.

In Type 2, the results show significant correlation between the resilience index and two territorial indicators, economic capital and social capital. The former represents greater activity in the service sector (SERVI). Levels of resilience are higher in those territories within this group which have an important agri-food sector, as well as economic and professional service sector activities linked to agriculture and livestock farming. In turn, the latter represents the number of associations that exist in a territory (ASSOC). The territories in this type are notable for citizen participation and the involvement of sectorial, business, cooperative, and civic associations in territorial development processes. As such, in times of economic crisis, those regions in which associations have a greater presence have achieved greater levels of territorial resilience.

In Type 3, the results show significant correlation between the resilience index and various indicators associated with different types of territorial capital. In economic capital, a positive correlation can be observed between the agricultural index (AGRI) and territorial resilience. Although the primary sector in these territories was never the most important, it became strategic in the context of the economic crisis. During periods of economic prosperity, one of the most prosperous sectors was construction. However, once the housing bubble burst, the destruction of employment in this sector was relentless, and agriculture became a refuge sector capable of absorbing much of the unemployment generated. In social capital, the results show a positive correlation between the resilience index and public spending (EXPEN). The counties where public institutions and local councils have invested a greater percentage of their budget in improving public services have reached higher levels of resilience. In human capital, the results show that both the foreign-born population (FBP) and the level of connectivity and Internet penetration (ADSL) are determining factors in the resilience of rural territories. Current technological advances in communication have opened new ways to reinforce the viability of these areas, to intensify even more their relationship with the nearest urban centres, and to increase the population attraction for the settlement of native and foreign-born citizens. In natural capital, a factor that has also been a determinant is forest areas (FOREST). In the type of territory where tourism is important, those with the greatest availability of natural resources are those that have proved to be most resilient to the impact of the economic crisis.

Lastly, in Type 4, the results show significant correlation between the resilience index and three territorial indicators, one for economic capital and two for human capital. The former represents the agricultural sector (AGRI). Although the agricultural and agri-food sector in most territories is already of vital importance, the results indicate that in the context of economic crisis, agriculture plays an

essential role in sustaining rural economies, and is regarded as one of the elements to be considered in territorial change and resilience processes. The other two indicators represent the demographic structure, both the percentage of young people (YOUNG) and the percentage of the ageing population (AGE). The resilience index is positively correlated with the former and negatively correlated with the latter. It should be understood that the presence of a young population, which has an important role in generational replacement and continuity, territorial dynamics, greater capacity to adapt to change, and greater awareness towards innovation and the incorporation of new technologies, is a significant factor in the promotion of resilient territorial dynamics.

5. Conclusions

This study has made progress in the conceptualisation, evaluation and measurement of territorial resilience in different types of rural territories in Andalusia, as well as in the identification of the factors associated with resilience in each. However, this exercise has not been simple from a theoretical and methodological perspective. The difficulty involved in adopting the conceptual framework of resilience for its application in the analysis of territories and their processes of change highlights the immense theoretical layers yet to be explored. In turn, it is also important to recognise that the rural milieu is heterogeneous and diverse, and the factors that intervene in the processes of change are complex and varied, as are the relationships established between them.

However, despite the difficulties, we were able to advance in the conceptualisation of territorial resilience, and in particular, design a methodology to approach the empirical analysis of the factors that affect resilience in the diversity and heterogeneity of rural territories in a differentiated way. This methodology presents practical usefulness, application possibilities, and enables the extraction of a series of conclusions:

1. It presents an integrated view of territorial resilience and its explanatory factors, taking into account economic, social, human, and natural dimensions. No attempt has been made to perform an exhaustive analysis for each of these dimensions, given that other more specific methodology exists for this purpose. However, they have been dealt with in the integrated and holistic way required of territorial analyses.
2. It is based on a territorial approach, insofar as the methodology is adapted specifically to each territory, which it takes as a unit of analysis, and regards rural counties as basic management units on which rural policies have an impact.
3. It is based on a careful selection of indicators that characterise territorial resilience and its explanatory factors, performed on the basis of a conceptual reference framework and criteria of reliability (official sources of data) and applicability (operative costs calculation is based on data sources). In turn, the availability of the statistical data used in the methodology guarantees automatic follow-up on the evolution of the indicators.
4. The analysis of territorial resilience through the proposed methodology can be considered a potentially useful tool to provide information to political decision-makers in charge of the design and implementation of public policies.
5. Although the results obtained in this study cannot be generalised beyond the scope of Andalusia, the proposed methodology can be extrapolated for the analysis of other territories.
6. It should be highlighted that the methodological tools used to measure territorial cohesion (DEA) only provide relative, not absolute, results, given that territories are classified and hierarchized by comparing them to each other.

The methodology used in our study has provided results that lead us to conclude that the main factors that have driven resilient territorial dynamics in rural Andalusia are: (i) the diversification of the rural economy; (ii) the professional and business activities developed around the agrarian and agri-food sector; (iii) the availability of services relating to commerce, tourism, catering, transport and communication, financial institutions, etc.; (iv) budgetary expenditure and the provision of public goods

and services by the competent authorities; (v) public institutional capacity and management, private initiative and partnerships between associations and Rural Development Groups; (vi) availability of, and access to, ICT; (vii) demographic potential, young people and education; and (viii) biodiversity, forest areas and environmental quality.

From these results, the following elements of analysis and implications and proposals can be extracted for the design of policies with an impact on rural territories:

1. Diverse rural realities require flexible policies that enable the correct use of the principle of subsidiarity.
2. This flexibility implies the need for objectives and measures adapted to different realities and prioritised in a variety of ways. This will enable rural territories to progress by acting on the issues that affect them directly and focusing on the factors that might have an impact on their development.
3. Although public policies with an impact on these territories recognise the diversity of rural areas, this recognition has not been sufficiently transferred to the planning of objectives and the design of measures.
4. Public policies should recognise the uniqueness of rural territories and establish the corresponding diagnosis to encourage the most appropriate policies and measures to promote development.
5. The development of rural territories depends on factors that are linked to the scope of diverse public policies (rural, agricultural, territorial). This implies the need for comprehensive and complementarity policies, as well as coordination of funding.

Lastly, it is important to highlight that this study analyses the third stage of territorial resilience, "a territory's capacity to recover from shock". For future study, it would be interesting to deepen the analysis of the last stage of resilience once a longer period of time has passed since the economic crisis, "a territory's capacity for adaptation and long-term learning", in order to try to validate and contrast the results obtained in this study.

Author Contributions: The authors contributed equally to this work.

Appendix A

Table A1. Results of factorial analyses.

Indicators	Territorial Capital									
	Economic			Social			Human		Natural	
	Factors									
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
	Loaded Factors									
EMPL	0.750									
DIVER	0.714									
AGRI	0.779									
INDUS	0.805									
CONST	0.835									
INCOME		0.538								
EAI		0.901								
SERVI		0.794								
INVEST			0.976							
EXPEN				0.839						
PART				0.679						
COOP				0.647						
SURPLUS				−0.843						
PRIV					0.815					
ASSOC					0.588					
POP						0.891				
DENS						0.846				
YOUTH						0.733				
UNI						0.723				
AGE							0.505			
RES							0.937			
FBP							0.408			
ADSL								0.966		
FOREST									0.859	
NATU									0.744	
CC									0.612	
DIST										0.514
ALT										0.815
WATER										−0.822
INVUL										−0.555
% variance	31,409	23.153	20.381	40.036	18.304	60.977	16.129	8.813	33.844	23.213
% accumulated variance	31.409	54.562	74.943	40.036	58.34	60.977	77.107	85.920	33.844	57.057
Statistics	KMO: 0.508 Bartlett: 16.165 Sig. 0.095			KMO: 0.614 Bartlett: 72.375 Sig. 0.000			KMO: 0.817 Bartlett: 281.382 Sig. 0.000		KMO: 0.607 Bartlett: 78.838 Sig. 0.000	

References

1. European Commission. Economic crisis in Europe: Causes, consequences and responses. In *European Economy, 7*; European Commission: Luxembourg, 2009.
2. Capello, R.; Caragliu, A. After crisis scenarios for Europe: Alternative evolutions of structural adjustments. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 81–101. [CrossRef]
3. Webber, D.J.; Healy, A.; Bristow, G. Regional growth paths and resilience: A European analysis. *Econ. Geogr.* **2018**, *94*, 355–375. [CrossRef]
4. Cuadrado-Roura, J.R.; Martin, R.; Rodríguez-Pose, A. The economic crisis in Europe: Urban and regional consequences. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 3–11. [CrossRef]
5. Fingleton, B.; Garretsen, H.; Martin, R. Shocking aspects of monetary union: The vulnerability of regions in Euroland. *J. Econ. Geogr.* **2015**, *15*, 907–934. [CrossRef]
6. Fratesi, U.; Rodríguez-Pose, A. The crisis and regional employment in Europe: What role for sheltered economies? *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 33–57. [CrossRef]
7. Christopherson, S.; Clark, G.L.; Whiteman, J. Introduction: The Euro crisis and the future of Europe. *J. Econ. Geogr.* **2015**, *15*, 843–853. [CrossRef]
8. Hadjimichalis, C.; Hudson, R. Contemporary crisis across Europe and the crisis in regional development theories. *Reg. Stud.* **2014**, *48*, 208–218. [CrossRef]

9. Sensier, M.; Bristow, G.I.; Healy, A. Measuring regional economic resilience across Europe: Operationalizing a complex concept. *Spat. Econ. Anal.* **2016**, *11*, 128–151. [CrossRef]

10. Fratesi, U.; Perucca, G. Territorial capital and the resilience of European regions. *Ann. Reg. Sci.* **2018**, *60*, 241–264. [CrossRef]

11. European Commission. The urban and regional dimension of the crisis. In *8th Progress Report on Economic, Social and Territorial Cohesion*; European Commission: Brussels, Belgium, 2013.

12. Đokić, I.; Fröhlich, Z.; Rašić-Bakarić, I. The impact of the economic crisis on regional disparities in Croatia. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 179–195. [CrossRef]

13. Dunford, M.; Perron, D. Regional inequality, regimes of accumulation and economic development in contemporary Europe. *Trans. Inst. Br. Geogr.* **1994**, *19*, 163–182. [CrossRef]

14. Evans, P.; McCormic, B. The new pattern of regional unemployment: Causes and policy significance. *Econ. J.* **1994**, *104*, 633–647. [CrossRef]

15. Dunford, M.; Smith, A. Catching up or falling behind? Economic performance and regional trajectories in the "New Europe". *Econ. Geogr.* **2009**, *76*, 169–195. [CrossRef]

16. Groot, S.P.T.; Mohlmann, J.L.; Garretsen, J.H.; de Groot, H.L.F. The crisis sensitivity of European countries and regions: Stylized facts and spatial heterogeneity. *Camb. J. Reg. Econ. Soc.* **2011**, *4*, 437–456. [CrossRef]

17. Capello, R.; Caragliu, A.; Fratesi, U. Spatial heterogeneity in the costs of the economic crisis in Europe: Are cities sources of regional resilience? *J. Econ. Geogr.* **2015**, *15*, 951–972. [CrossRef]

18. Cuadrado-Roura, J.R.; Maroto, A. Unbalanced regional resilience to the economic crisis in Spain: A tale of specialization and productivity. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 153–178. [CrossRef]

19. Lee, N. Grim down South? The determinants of unemployment increases in British cities in the 2008–2009 recession. *Reg. Stud.* **2014**, *48*, 1761–1778. [CrossRef]

20. Sedita, S.R.; De Noni, I.; Pilotti, L. Out of the crisis: An empirical investigation of place-specific determinants of economic resilience. *Eur. Plan. Stud.* **2017**, *25*, 155–180. [CrossRef]

21. Sánchez-Zamora, P.; Gallardo-Cobos, R.; Ceña-Delgado, F. El medio rural andaluz frente a la crisis económica: Un análisis de los factores de resiliencia territorial. *Econ. Agrar. Recur. Nat.* **2014**, *14*, 27–56. [CrossRef]

22. Cañete, J.A.; Navarro, F.; Cejudo, E. Territorially unequal rural development: The cases of the LEADER Initiative and the PRODER Programme in Andalusia (Spain). *Eur. Plan. Stud.* **2018**, *26*, 726–744. [CrossRef]

23. Giannakis, E.; Bruggeman, A. Determinants of regional resilience to economic crisis: A European perspective. *Eur. Plan. Stud.* **2017**, *25*, 1394–1415. [CrossRef]

24. Staníčková, M.; Melecký, L. Understanding of resilience in the context of regional development using composite index approach: The case of European Union NUTS-2 regions. *Reg. Stud. Reg. Sci.* **2018**, *5*, 231–254.

25. Baggio, J.A.; Brown, K.; Hellebrandt, D. Boundary object or bridging concept? A citation network analysis of resilience. *Ecol. Soc.* **2015**, *20*, 2. [CrossRef]

26. Evenhuis, E. New directions in researching regional economic resilience and adaptation. *Geogr. Compass* **2017**, *11*, e12333. [CrossRef]

27. Martin, R.L. Shocking aspects of regional development: Towards an economic geography of resilience. In *The New Oxford Handbook of Economic Geography*; Clark, G., Gertler, M., Feldman, M.P., Wójcik, D., Eds.; Oxford University Press: Oxford, UK, 2018; pp. 839–864. ISBN 9780198755609.

28. Martin, R. Regional economic resilience, hysteresis and recessionary shocks. *J. Econ. Geogr.* **2012**, *12*, 1–32. [CrossRef]

29. Klein, R.; Nicholls, R.; Thomalla, F. Resilience to natural hazards: How useful is this concept? *Glob. Environ. Chang.* **2003**, *5*, 35–45. [CrossRef]

30. Pendall, R.; Foster, K.; Cowell, M. Resilience and regions: Building understanding of the metaphor. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 71–84. [CrossRef]

31. Martin, R.; Sunley, P. On the notion of regional economic resilience: Conceptualization and explanation. *J. Econ. Geogr.* **2015**, *15*, 1–42. [CrossRef]

32. Fröhlich, K.; Hassink, R. Regional resilience: A stretched concept? *Eur. Plan. Stud.* **2018**, *26*, 1763–1778. [CrossRef]

33. Reghezza-Zitt, M.; Rufat, S.; Djament-Tran, G.; Le Blanc, A.; Lhomme, S. What resilience is not: Uses and abuses. *Cybergeo Eur. J. Geogr.* **2012**. Available online: http://cybergeo.revues.org/25554 (accessed on 19 April 2018).

34. Darnhofer, I. Resilience and why it matters for farm management. *Eur. Rev. Agric. Econ.* **2014**, *41*, 461–484. [CrossRef]

35. MacKinnon, D.; Derickson, K.D. From resilience to resourcefulness. *Prog. Hum. Geog.* **2013**, *37*, 253–270. [CrossRef]

36. Cretney, R. Resilience for whom? Emerging critical geographies of socio-ecological resilience. *Geogr. Compass* **2014**, *8*, 627–640. [CrossRef]

37. Marelli, E.; Patuelli, R.; Signorelli, M. Regional unemployment in the EU before and after the global crisis. *Post-Communist Econ.* **2012**, *24*, 155–175. [CrossRef]

38. Rhodes, M. *Southern European Welfare States: Between Crisis and Reform*; Routledge: London, UK, 2014.

39. Crouch, C. *Governing Social Risks in Post-Crisis Europe*; Edward Elgar Publishing: Cheltenham, UK, 2015.

40. Bristow, G. Resilient regions re-'place'ing regional competitiveness. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 153–167. [CrossRef]

41. Davies, S. Regional resilience in the 2008–2010 downtown. Comparative evidence for European countries. *Camb. J. Reg. Econ. Soc.* **2011**, *4*, 369–382. [CrossRef]

42. Fingleton, B.; Garretsen, H.; Martin, R.L. Recessionary shocks and regional employment. Evidence of the resilience of UK regions. *J. Reg. Sci.* **2012**, *52*, 109–133. [CrossRef]

43. Sánchez-Zamora, P.; Gallardo-Cobos, R.; Ceña-Delgado, F. Analyzing resilience factors in rural territories of Andalusia through techniques of Analytical Network Process (ANP). *Inf. Tec. Econ. Agrar.* **2017**, *113*, 68–89.

44. Brakman, S.; Garretsen, H.; van Marrewijk, C. Regional resilience across Europe: On urbanisation and the initial impact of the great recession. *Camb. J. Reg. Econ. Soc.* **2015**, *8*, 225–240. [CrossRef]

45. Crescenzi, R.; Luca, D.; Milio, S. The geography of the economic crisis in Europe: National macroeconomic conditions, regional structural factors and short-term economic performance. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 13–32. [CrossRef]

46. Rizzi, P.; Graziano, P.; Dallara, A. A capacity approach to territorial resilience: The case of European regions. *Ann. Reg. Sci.* **2018**, *60*, 285–328. [CrossRef]

47. Tsiapa, M.; Kallioras, D.; Tzeremes, N.G. The role of path-dependence in the resilience of EU regions. *Eur. Plan. Stud.* **2018**, *26*, 1099–1120. [CrossRef]

48. Giannakis, E.; Bruggeman, A. Economic crisis and regional resilience: Evidence from Greece. *Pap. Reg. Sci.* **2015**, *96*, 451–477. [CrossRef]

49. Tan, J.; Lo, K.; Qiu, F.; Liu, W.; Li, J.; Zhang, P. Regional economic resilience: Resistance and recoverability of resource-based cities during economic crises in Northeast China. *Sustainability* **2017**, *9*, 2136. [CrossRef]

50. Walker, B.; Holling, C.S.; Carpenter, S.R.; Kinzig, A. Resilience, adaptability and transformability in social-ecological systems. *Ecol. Soc.* **2004**, *9*, 5. [CrossRef]

51. Stayner, R. The changing economics of rural communities. In *Sustainability and Change in Rural Australia*; Cocklin, C., Dibdin, J., Eds.; University of New South Wales Press: Sydney, Australia, 2005; pp. 121–138.

52. Plummer, R.; Armitage, D. A resilience-based framework for evaluating adaptive co-management: Linking ecology, economics and society in a complex world. *Ecol. Econ.* **2007**, *61*, 62–74. [CrossRef]

53. Nkhata, A.B.; Breen, C.M.; Freimund, W.A. Resilient social relationships and collaboration in the management of social-ecological systems. *Ecol. Soc.* **2008**, *13*, 2. [CrossRef]

54. Wilson, G. Multifunctional 'quality' and rural community resilience. *Trans. Inst. Br. Geogr.* **2010**, *35*, 364–381. [CrossRef]

55. McManus, P.; Walmsley, J.; Bourke, L.; Argent, N.; Baum, S.; Martin, J.; Pritchard, B.; Sorensen, A. Rural community and rural resilience: What is important to farmers in keeping their country towns alive? *J. Rural Stud.* **2012**, *28*, 20–29. [CrossRef]

56. Schouten, M.A.H.; van der Heide, C.M.; Heijman, W.J.M.; Opdam, P.F.M. A resilience-based policy evaluation framework: Application to European rural development policies. *Ecol. Econ.* **2012**, *81*, 165–175. [CrossRef]

57. Berkes, F.; Ross, H. Community resilience: Toward and integrated approach. *Soc. Nat. Resour.* **2013**, *26*, 5–20. [CrossRef]

58. Skerratt, S. Enhancing the analysis of rural community resilience: Evidence from community land ownership. *J. Rural Stud.* **2013**, *31*, 36–46. [CrossRef]

59. Darnhofer, I.; Lamine, C.; Strauss, A.; Navarrete, M. The resilience of family farms: Towards a relational approach. *J. Rural Stud.* **2016**, *44*, 111–122. [CrossRef]

60. Ashkenazy, A.; Chebach, T.C.; Knickel, K.; Peter, S.; Horowitz, B.; Offenbach, R. Operationalising resilience in farms and rural regions—Findings from fourteen case studies. *J. Rural Stud.* **2018**, *59*, 211–221. [CrossRef]

61. Poláková, J. Sustainability—Risk—Resilience: How does the case of the good agricultural and environmental conditions measure up? *Sustainability* **2018**, *10*, 1614. [CrossRef]

62. Romano, D.; d'Errico, M. La resilienza all'insicurezza alimentare. *Agriregionieuropa* **2015**, *11*, 12–18.

63. Tendall, D.M.; Joerin, J.; Kopainsky, B.; Edwards, P.; Shreck, A.; Le, Q.B.; Kruetli, P.; Grant, M.; Six, J. Food system resilience: Defining the concept. *Glob. Food Secur. Agric.* **2015**, *6*, 17–23. [CrossRef]

64. Jaconi, J.; Mukhovi, S.; Llanque, A.; Augstburger, H.; Käser, F.; Pozo, C.; Peter, M.N.; Delgado, J.M.F.; Kiteme, B.P.; Rist, S.; et al. Operationalizing food system resilience: An indicator-based assessment in agroindustrial, smallholder farming, and agroecological contexts in Bolivia and Kenya. *Land Use Policy* **2018**, *79*, 433–446.

65. Knickel, K.; Redman, M.; Darnhofer, I.; Ashkenazy, A.; Chebach, T.C.; Sumane, S.; Tisenkopfs, T.; Zemeckis, R.; Atkociuniene, V.; Rivera, M.; et al. Between aspirations and reality: Making farming, food systems and rural areas more resilient, sustainable and equitable. *J. Rural Stud.* **2018**, *59*, 197–210. [CrossRef]

66. Sánchez-Zamora, P.; Gallardo-Cobos, R.; Ceña-Delgado, F. Rural areas face the economic crisis: Analyzing the determinants of successful territorial dynamics. *J. Rural Stud.* **2014**, *35*, 11–25. [CrossRef]

67. Saraceno, E. Disparity and diversity: Their use in EU rural policies. *Sociol. Ruralis* **2013**, *53*, 331–348. [CrossRef]

68. Holling, C.S. Resilience and stability of ecological systems. *Annu. Rev. Ecol. Evol. Syst.* **1973**, *4*, 1e23. [CrossRef]

69. Hamdouch, A.; Depret, M.; Tanguy, C. *Mondialisation et Resilience des Territoires: Trajectoires, Dynamiques D'acteurs et Experiences Locales*; Presses de l'Université du Québec: Québec City, QC, Canada, 2012.

70. Christopherson, S.; Michie, J.; Tyler, P. Regional resilience: Theoretical and empirical perspectives. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 3–10. [CrossRef]

71. Pike, A.; Dawley, S.; Tomaney, J. Resilience, adaptation and adaptability. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 59–70. [CrossRef]

72. Simmie, J.; Martin, R. The economic resilience of regions: Towards an evolutionary approach. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 27–43. [CrossRef]

73. Hassink, R. Regional resilience: A promising concept to explain differences in regional economic adaptability? *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 45–58. [CrossRef]

74. Sánchez-Zamora, P.; Gallardo-Cobos, R.; Ceña-Delgado, F. La noción de resiliencia en el análisis de las dinámicas territoriales rurales: Una aproximación al concepto mediante un enfoque territorial. *Cuad. Desarro. Rural* **2016**, *13*, 93–116. [CrossRef]

75. Camagni, R. Regional competitiveness: Towards a theory of territorial capital. In *Modelling Regional Scenarios for the Enlarged Europe: European Competitiveness and Global Strategies*; Capello, R., Camagni, R., Chizzolini, P., Frasati, R., Eds.; Springer: Berlin, Germany, 2008; pp. 33–48.

76. Martin, R.; Sunley, P.; Gardiner, B.; Tyler, P. How regions react to recessions: Resilience and the role of economic structure. *Reg. Stud.* **2016**, *50*, 561–585. [CrossRef]

77. Chapple, K.; Lester, W.T. The resilient regional labour market? The US case. *Camb. J. Reg. Econ. Soc.* **2010**, *3*, 85–104. [CrossRef]

78. Foster, K. In search of regional resilience. In *Building Regional resilience: Urban and Regional Policy and Its Effects*; Weir, M., Wial, H., Wolman, H., Eds.; Brookings Institution Press: Washington, DC, USA, 2012; Volume 4.

79. Rizzi, P.; Graziano, P.; Dallara, A. The regional competitiveness: An alternative approach. *Riv. Int. Sci. Soc.* **2015**, *3*, 307–366.

80. Petrakos, G.; Psycharis, Y. The spatial aspects of economic crisis in Greece. *Camb. J. Reg. Econ. Soc.* **2016**, *9*, 137–152. [CrossRef]

81. Di Caro, P. Testing and explaining economic resilience with an application to Italian regions. *Pap. Reg. Sci.* **2015**, *96*, 93–113. [CrossRef]

82. Brown, L.; Greenbaum, R.T. The role of industrial diversity in economic resilience: An empirical examination across 35 years. *Urban Stud.* **2017**, *54*, 1347–1366. [CrossRef]

83. Copus, A.K.; Courtney, P.; Dax, T.; Meredith, D.; Noguera, J.; Shucksmith, M.; Talbot, H. *European Development Opportunities for Rural Areas (EDORA)*; Applied Research 2013/1/2, Final Report ESPON 2013 Programme; ESPON & UHI Millennium Institute: Luxembourg, 2011; ISBN 978-99959-684-1-0.

84. Lagravinese, R. Economic crisis and rising gaps North-South: Evidence from the Italian regions. *Camb. J. Reg. Econ. Soc.* **2015**, *8*, 331–342. [CrossRef]

85. Bryden, J.M.; Courtney, P.; Atterton, J.; Timm, A. Scotland—North and South. In *Why Local Economies Differ: The Dynamics of Rural Areas in Europe*; Bryden, J., Hart, K.J., Eds.; Edwin-Mellen Press: Lampeter, UK, 2004.

86. Evans, R.; Karecha, J. Staying on top: Why is Munich so resilient and successful? *Eur. Plan. Stud.* **2014**, *22*, 1259–1279. [CrossRef]

87. Perucca, G. The role of territorial capital in local economic growth: Evidence from Italy. *Eur. Plan. Stud.* **2014**, *22*, 537–562. [CrossRef]

88. Wink, R.; Kirchner, L.; Koch, F.; Speda, D. There are many roads to reindustrialization and resilience: Place-based approaches in three German urban regions. *Eur. Plan. Stud.* **2016**, *24*, 463–488. [CrossRef]

89. Moyano, E. Capital social y acción colectiva en el sector agrario. *Revist. Esp. Sociol.* **2008**, *10*, 15–37.

90. Crescenzi, R.; Rodríguez-Pose, A. *Innovation and Regional Growth in the European Union: Advances in Spatial Sciences*; Springer: Berlin, Germany, 2011.

91. Rodriguez-Pose, A. Do institutions matter for regional development? *Reg. Stud.* **2013**, *47*, 1034–1047. [CrossRef]

92. ESPON. Territorial Dynamics in Europe—Trends in Population Development. In *Territorial Observation No. 1*; ESPON: Luxembourg, 2008.

93. European Commission. *Study on Employment, Growth and Innovation in Rural Areas (SEGIRA)*; European Commission: Brussels, Belgium, 2010.

94. Östh, J.; Reggiani, A.; Galiazzo, G. Spatial economic resilience and accessibility: A joint perspective. *Comput. Environ. Urban Syst.* **2015**, *49*, 148–159. [CrossRef]

95. Schneiderbauer, S.; Pedoth, L.; Zhang, D.; Zebisch, M. Assessing adaptive capacity within regional climate change vulnerability studies—An Alpine example. *Nat. Hazards* **2013**, *67*, 1059–1073. [CrossRef]

96. Tran, L.; O'Neill, R.V.; Smith, E.R. Spatial pattern of environmental vulnerability in the Mid-Atlantic region, USA. *Appl. Geogr.* **2010**, *30*, 191–202. [CrossRef]

97. Agarwal, S.; Rahman, S.; Errington, E. Measuring the determinants of relative economic performance of rural areas. *J. Rural Stud.* **2009**, *25*, 309–321. [CrossRef]

98. Callens, I.; Tyteca, D. Towards indicators of sustainable development for firms. A productive efficiency perspective. *Ecol. Econ.* **1999**, *28*, 41–53. [CrossRef]

99. Hashimoto, A.; Kodama, M. Has livability of Japan gotten better for 1956–1990? A DEA approach. *Soc. Indic. Res.* **1996**, *40*, 359–373. [CrossRef]

100. Mahlberg, B.; Obersteiner, M. *Remeasuring the HDI by Data Envelopment Analysis*; Interim Report No. IR-01-069; International Institute for Applied Systems Analysis: Luxembourg, 2001.

101. Despotis, D.K. Improving the discriminating power of DEA: Focus on globally efficient units. *J. Oper. Res. Soc.* **2002**, *53*, 314–323. [CrossRef]

102. Despotis, D.K. A reassessment of the human development index via data envelopment analysis. *J. Oper. Res. Soc.* **2005**, *56*, 969–980. [CrossRef]

103. Reig, E. *Análisis del Potencial Socioeconómico de Municipios Rurales con Métodos no Paramétricos: Aplicación al Caso de Una Zona Leader*; Documento de Trabajo No. 4/2010; Fundación BBVA: Bilbao, Spain, 2010.

104. Sánchez-Zamora, P.; Gallardo-Cobos, R.; Romero-Huertas, C. Assessing the determinants of territorial cohesion: Evidence from Colombian departments. *Geoforum* **2017**, *87*, 48–61. [CrossRef]

105. Charnes, A.; Cooper, W.W.; Rhodes, E. Measuring the efficiency of decision-making units. *Eur. J. Oper. Res.* **1978**, *2*, 429–444. [CrossRef]

106. Cooper, W.W.; Seiford, L.M.; Tone, K. *Data Envelopment Analysis: A Comprehensive Text with Models, Applications, References and DEA-Solver Software*, 2nd ed.; Springer: New York, NY, USA, 2007.

107. Stewart, T.J. Relationships between data envelopment analysis and multicriteria decision analysis. *J. Oper. Res. Soc.* **1996**, *47*, 654–665. [CrossRef]