

# The determinants of economic resilience in rural regions. An examination of the Portuguese case

## Abstract

This paper examines the factors that contributed to the economic resilience of rural regions in Portugal following the recent crisis. Portugal has for a long time faced the issue of regionalisation. However, rural regions in Portugal are not homogenous. Rural regions in Portugal are very diverse and experience very different economic realities. This paper adds to the growing body of literature on regional resilience by focusing exclusively on rural regions. Using an adaptation of Martin's (2012) sensitivity index as a measure of resilience and bivariate analysis this paper examines the determinants of resilience in rural regions. In terms of economic structure, the paper interestingly finds that reliance on agriculture was beneficial while innovativeness hindered resilience. As for measures of social capital, the paper presents some contradictory findings. Higher rates of crime had a negative impact on resilience, however higher political participation also had a negative impact.

## Keywords

Regional economic resilience • rural areas • Portugal • recession • rural development

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Barrai Hennebry 

Faculty of Human Geography and Planning,  
Adam Mickiewicz University in Poznań, Poland  
e-mail: [hennebry@amu.edu.pl](mailto:hennebry@amu.edu.pl)

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## Introduction

Portugal has for a long time faced an issue of regionalisation along with an increasing urban-rural divide. In Portugal, the majority of the population and wealth tends to be concentrated in coastal regions: along the Lisbon-Porto axis, as well as the Algarve on the southern coast. This has caused the peripheralisation of inland regions. Ruben Lois-González (2007, p. 78) analysed geography textbooks for six different countries to understand how different countries viewed the idea of marginality and peripherality. In the case of Portugal, he found the following:

“Lisbon, the capital, is seen as the centre of the country, although the spotlight is cast on the Lisbon-Porto axis concentrating all the wealth, dynamism and population. There are frequent allusions to a *littoralization* process, the polarization of growth in coastal areas. Finally, the islands and the interior border areas are clearly marked as peripheral territories.”

This littoralisation has been the result of a long-term trend. Osiński (1996, p. 164) showed that the share of the population based in districts on the border with Spain “decreased from 45.67 per cent in 1864 to [...] 27.80 per cent in 1991.” As well as population, there has been an increasing disparity in terms of wealth due to the “absence of transfers of investments and of responsibilities to the peripheral zones and the impoverishment of the countryside, solely for the benefit of industrial growth in an urban environment without any true sharing or distribution” (Mayer 1981, p. 344).

Even though Portugal has an issue with urban-rural disparities, this doesn't mean that the rural regions of Portugal should be seen as homogenous; in fact, Portugal's rural regions are very diverse and experience very different economic realities. This paper seeks to examine how the different characteristics of

rural regions have contributed to their resilience or vulnerability to the recent financial crisis of 2008/9. The rest of the paper is structured as follows: section two will outline what is meant by the term *regional economic resilience* and briefly discuss the results of other studies done on the topic; section three will discuss the data and methodology of the study; section four will provide the results; and finally, section five will discuss these results and provide some conclusions and suggestions for further research.

## Regional Economic Resilience

It should not be surprising that the topic of regional economic resilience has been gaining in popularity in recent years; as Hassink (2010, p. 45) stated “the most intriguing questions in economic geography is why some regional economies manage to renew themselves, whereas others remain locked in decline.” With the recent surge in interest, there have been a number of papers published regarding the concept of resilience from a regional economics point of view (Simmie & Martin 2010; Martin 2012; Lang 2012; Tóth 2015). However, there has also been difficulty in defining resilience. In general, the definitions for resilience in regional economics are based on work from other fields of study (Martin & Sunley 2015), and all lend themselves to different schools of thought in economics. These definitions can be divided into three different categories. The first definition sees resilience of an economy as the “speed of return to equilibrium” (Holling 1996, p. 33). This definition comes from engineering and fits well with the neo-classical school of economic thought. It assumes that the economy has one equilibrium point. A shock, such as a recession, will be temporary and will not have a permanent effect

on the economy (Cellini & Cuccia 2019). The second definition of resilience is seen as the ability of an economy to absorb shocks before altering its structure (Holling 1973). This is from ecological science and fits well with the Keynesian view of the economy. This definition does not assume a single equilibrium point but instead assumes a number of equilibrium points (Davoudi 2012), therefore, a shock can push the economy into a lower equilibrium point. The final definition comes from psychological sciences and organisational theory, and sees resilience as “the ability to adapt in anticipation of, or response to, shocks” (Hennebry 2018, p. 100). This can be referred to as “evolutionary resilience” (Davoudi 2012), which lends itself to evolutionary economics in the sense that there are no set equilibrium points; instead equilibrium points change and evolve over time depending on the circumstances. The economy is seen as being “complex, non-linear, and self-organising, permeated by uncertainty and discontinuities” (Berkes & Folke 1998, p. 12).

These definitions have value and have made contributions to the study of resilience within economics, but there is the necessity for a single, comprehensive definition of resilience within the study of regional economics. This paper will use the following definition proposed by Martin and Sunley (2015, p. 13). They define resilience as:

“the capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources.”

Recently there have been a number of empirical studies done on the factors contributing to economic regional resilience to the recent crisis. These studies use a wide variety of methods, from case studies to sophisticated econometric models, and have provided some interesting results. Hennebry (2018), focusing on Ireland, and Dokic et al. (2016), focusing on Croatia, both found that the recession led to increasing regional disparities in their respective countries. Hennebry (2018) provided a case study on Ireland using descriptive statistics to show that the urban regions in Ireland were more resilient. Dokic et al. (2016) used econometric models to show that construction and trade were the most important determinants of resilience. Lapuh (2018), looking at municipalities in Slovenia, also found that the most developed regions were the most resilient. Other factors that helped resilience, included regions being export orientated, densely populated, and having a well-educated work force. Cellini and Cuccia (2019) found that in regions of Italy, cultural behaviours contributed to regional resilience.

There is no doubt that there has been a surge in research regarding the concept of regional economic resilience since the recent economic crisis (Fröhlich & Hassink 2018). There has also been an offshoot of this that looks specifically at urban and city resilience (Simmie 2017; Tan & et al 2017; Martin & Gardiner 2019). Despite the fact that there is some evidence that rural regions are less resilient than urban regions (Hennebry 2018), there is, as yet, a lack of research into the determinants of regional economic resilience in rural regions. One study that did look at the determinants of resilience in rural regions is by Sánchez-Zamora et al (2014). Sánchez-Zamora et al (2014, p. 22) used data envelopment analysis (DEA) to identify successful territorial dynamics for rural areas in the Andalusia region of Spain. The authors specifically looked at successful territorial dynamics as being determinants of resilience in regard to the early stage of resilience, which they describe as “the preparation of territory for changes that could give rise to a situation of shock”.

Sánchez-Zamora et al. (2014, p. 23) identified a number of interesting determinants of resilience. Although they found that economic diversification helps to build resilience, they also found that agriculture was important in rural areas, as the authors saw it as a “haven sector” from the recent crisis. For infrastructure, they found conflicting results. An increase in built-up areas, if resulting in an increase in urban fabric, had a negative effect. However, when the increase in built-up areas led to improvements in access to public services and an overall connectivity of rural areas, then it had a positive impact on resilience. Another factor that they identified, which may favour the resilience of rural areas, is institutional capacity and governance, as they saw that the proper management of rural development funding “facilitates cooperation between people and public institutions, thus building positive synergies, promoting the proper functioning of the system of governance, and contributing to the development of rural areas”.

This paper hopes to build on this existing literature about regional economic resilience by focusing exclusively on the determinants of economic resilience in the rural regions of Portugal, as rural regions are often ignored or treated as being homogenous in the literature. Portugal is an appropriate case to study with respect to rural economic resilience as 70% of the NUTS 3 regions in continental Portugal are considered rural, and, as mentioned in the previous section, it has for a long time faced the issue of regionalisation and a growing urban-rural divide.

### Methodology

There are 23 NUTS 3 regions in continental Portugal (the two autonomous island regions have not been included). Of these regions, 16 are classified as rural by the European Commission; that is to say, these regions have more than 50% of their population living in rural grid cells (Eurostat 2018). The study area of this paper consists of these 16 rural regions.

There are different ways to measure regional economic resilience. Ringwood et al. (2018) proposed comparing expected and actual employment. However, for the purposes of this paper we will measure the regions' economic resilience by using the employment sensitivity index proposed by Martin (2012):

$$\beta = (\Delta E_r / E_r) / (\Delta E_n / E_n); \quad (1.1)$$

where  $E_r$  is regional employment, and  $E_n$  is national employment.

This index compares the changes in regional employment to the change in the national employment, both caused by the recession of 2008. A result of greater than 1 would indicate that a region is more vulnerable to changes in the national economy, while a score of less than 1 would signify that a region is relatively resilient, that is to say, employment in the region would fall by a smaller proportion than the nation's employment as a whole. In contrast to Martin (2012), who used a single year for the peak and trough for all regions, this paper uses a method similar to Sensier and Artis (2014). In their work, Sensier and Artis (2014) used a more flexible method that allows for different start points and end points for the recession in each region. We consider the start point of the recession to be the peak year: this is the year with the highest employment within the region, pre-crisis. The end point of the recession is considered to be the trough year: this is the year with the lowest employment. This is a more appropriate method, as some regions in Portugal entered the recession earlier, while the recession lasted longer in some regions than others.

ESPON ECR2 (2014), which used a mix of case studies and quantitative methods, provides a comprehensive study on the economic resilience of NUTS 2 regions. They found that the factors contributing to resilience can be divided into four broad categories: business and economy, people and population, place-

Table 1. Independent variables.

Broad Category	Variable Code	Variable Information	Source
Business & Economy	GDP per Capita	GDP per Capita (PPP), 2007	Eurostat
	Patents	Average annual EUTM applications per million population, 2004–2008	Eurostat
	Tourism	Number of bed places in short-term accommodation, 2007 (NUTS 2)	Eurostat
	Agriculture	Percentage of workforce employed in agriculture, 2004–2008	Eurostat
	Construction	Percentage of workforce employed in construction, 2004–2008	Eurostat
	Manufacturing	Percentage of workforce employed in manufacturing, 2004–2008	Eurostat
	Services	Percentage of workforce employed in services, 2004–2008	Eurostat
People/Population	Education	Share of Labour Force with Tertiary Education, 2007 (NUTS 2)	OECD Regional Database
	Median Age	Median age of population, (2007)	Eurostat
Place-based	Population Density	Inhabitants per km <sup>2</sup> , (2007)	Eurostat
	Access to Healthcare	Active Physicians Rate (physicians per 1,000 population), (2011)	OECD Regional Database
Community/Society	Voter Turnout	Percentage of registered voters who voted in the 2009 general election	OECD Regional Database
	Crime	Motor Vehicle Theft Rate (vehicle theft per 10,000 population), (2004–2008)	OECD Regional Database

Source: own calculations, using data from Eurostat

based, and society and community. This study will use the ESPON ECR2 (2014) framework, and specifically these four categories. The independent variables that have been chosen are used to indicate regional strength within these four categories.

For “business and economy,” we are interested in the following: the strength of the regions’ economies prior to the recession, for which we use GDP per capita (PPP); the innovativeness of the regions, where we use average annual EUTM applications as a proxy; and the reliance on certain sectors (agriculture, construction, manufacturing, services, and tourism). Services is defined as “[f]inancial and insurance activities; real estate activities; professional, scientific, and technical activities; administrative and support service activities” (Eurostat 2018). For these variables we would expect an innovative region with strong initial economic conditions to be most resilient. We would also expect agriculture to be important, and other sectors to be less resilient.

For “people and population,” we are interested in the demographics of the population and human capital. We use median age as an indication as to whether it is an older population, while education is used as a measure of human capital. From these measures we expect a young, well-educated population to be more resilient.

For “place-based,” we are interested in the extent of rurality and access to services in the regions. We use population density as a measure of rurality, and the number of physicians as both a measure of access to healthcare and as a proxy for access to services more generally. Here we expect more remote and isolated regions to be less resilient.

Finally, for “community and society,” we are interested in the social capital of the regions. We use two measures. First, voter turnout in the general election of 2009 as an indication of trust in institutions and politics; the assumption being that a high

turnout is an indication of trust in the system. Second, we use motor vehicle theft rates as a proxy for local trust; the assumption being that a high rate of crime would be connected with low trust in the area. For these variables, we expect higher voter turnout and lower crime to be beneficial for building resilience.

The variables we have used to measure these four factors are shown in Table 1. In general, we have used data from before the recession to give an indication of the characteristics heading into the recession. However, in some cases it was not possible to gather this data (access to health) and so more recent data was used. In two cases (tourism and education), the data was not available at a NUTS 3 level and therefore the NUTS 2 data were used as a proxy.

To analyse the effects of the independent variables on regional resilience, a bivariate analysis for each variable was performed using the Pearson correlation method. This method “was the first formal correlation measure, and it is still the most widely used measure of relationship” (Rodgers & Nicewander 1988, p. 61). It is suitable for quantitative variables and is a “measure of the strength of the linear relationship between two such variables” (Hauke & Kossowski 2011, p. 88).

## Results

Table 2 and Figure 1 show the results of the Beta sensitivity index outlined in the previous section. As can be seen, three of the regions can be classified as resilient, that is to say, they had a value equal to or less than 1. Those regions are Alto Tamega, Terras de Tras-os-Montes and Beira Baixa.

The region that showed the highest sensitivity was Medio Tejo, with 2.18. That is, for every one percent fall in employment in continental Portugal, Medio Tejo witnessed 2.18% fall in employment. Other regions that had especially high sensitivity included Alentejo Central, Regiao de Leiria, and Leziria de Tejo.

Table 2. Results of sensitivity index for Portuguese rural regions

Region	Sensitivity Index	Resilient (Y/N)
PT111 – Alto Minho	1.02	N
PT11B – Alto Tamega	0.64	Y
PT11D – Douro	1.27	N
PT11E – Terras de Tras-os-Montes	0.79	Y
PT16B – Oeste	1.50	N
PT16E – Regiao de Coimbra	1.53	N
PT16F – Regiao de Leiria	1.76	N
PT16G – Viseu Dao Lafoes	1.17	N
PT16H – Beira Baixa	1.00	Y
PT16I – Medio Tejo	2.18	N
PT16J – Beiras e Serra da Estrela	1.61	N
PT181 – Alentejo Litoral	1.09	N
PT184 – Baixo Alentejo	1.04	N
PT185 – Leziria do Tejo	1.76	N
PT186 – Alto Alentejo	1.63	N
PT187 – Alentejo Central	1.83	N

Source: own calculations, using data from Eurostat

Table 3. Results of the bivariate analyses (\*=significant at 90%; \*\*=significant at 95%; \*\*\*=significant at 99%)

	Pearson Coefficient	P-value
GDP per Capita	0.1785	0.5082
Patents	0.4364*	0.091
Tourism	0.612**	0.0118
Agriculture	-0.4581*	0.0743
Construction	0.2126	0.4293
Manufacturing	0.5694**	0.0213
Services	0.3966	0.1283
Education	-0.2155	0.4228
Median Age	-0.4814*	0.0591
Population Density	0.2903	0.2754
Access to Healthcare	0.0324	0.9051
Voter Turnout	0.7421***	0.001
Crime	0.5132**	0.042

Source: own calculations, using data from Eurostat and OECD Regional Database

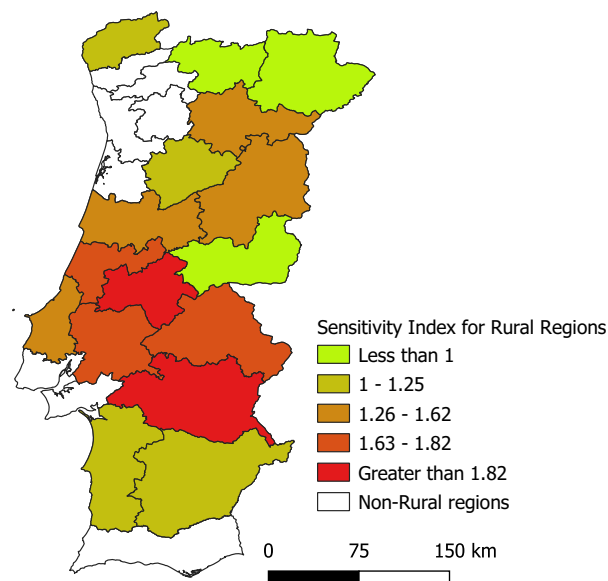


Figure 1. Results of sensitivity index for Portuguese rural regions

Source: own calculations, using data from Eurostat

The results for the bivariate analysis are reported in Table 3. As can be seen, seven of the thirteen variables are statistically significant: median age, number of patents, tourism, agricultural employment, manufacturing employment, voter turnout, and crime. However, some of these variables have the opposite effect to what we would expect.

From the category for “people and population,” there was only one variable that was statistically significant. That was the median age of the population, and this was demonstrated to have the opposite effect to what we would have predicted. The result shows that the regions with a higher median age were more resilient to the crisis. Four of the variables for the category “business and economy” were statistically significant. The number of patents, reliance on tourism, and employment in manufacturing had a negative impact on the resilience of regions; while employment in agriculture had a positive impact on resilience. For “community and society,” two variables were statistically significant. As would be expected, crime had a negative impact on resilience; however, unexpectedly, higher voter turnout also had a negative impact on resilience.

### Conclusion

From the above analysis it is possible to draw a number of conclusions regarding the characteristics that determine the economic resilience of rural regions in Portugal following the recent crisis. However, there are two shortcomings of this study that need to be considered. First, resilience has two stages: the downturn and the recovery. This research only deals with the former. It is still too early to study recovery as some rural regions in Portugal have yet to show signs of recovery. Perhaps some of the determinants that are statistically significant in terms of the downturn will prove not to be significant for the recovery or vice versa. Second, the results above only show the determinants of rural regional resilience for the most recent crisis. That is not to say that the same determinants will be important for any future recessions.



As has been found in other studies (Sánchez-Zamora et al. 2014; Dokić et al. 2016; Lapuh 2018), the structure of the regional economy proves to be particularly important. Similar to the above-mentioned study by Sánchez-Zamora et al. (2014), agriculture proves to be a strong determinant of resilience. As stated in their study, agriculture was likely a “haven sector” during the crisis; this also appears to be the situation in Portugal. Reliance on other sectors, for example, tourism and manufacturing, is detrimental to resilience. This highlights the global aspect of the crisis, as manufacturing is mainly an export sector and the tourism sector relies on foreigners, and so these were evidently hurt by the recession. Interestingly, innovativeness had a negative effect on resilience. This may be due to the fact that this study only looks at the downturn. It is likely that innovativeness is more important for recovery.

Median age had the opposite effect to what was expected: the results show that an older population is more resilient. Also, it is surprising that population density and access to healthcare are not statistically significant. This is in contrast to studies from other countries. Lapuh (2018) found that more densely populated areas are more resilient, and Sánchez-Zamora (2014) found access to public services important for resilience, however, this does not seem to be the case in Portugal.

The most surprising results from this study, and perhaps the element most worthy of further research, is the effects of social capital on resilience. Crime, here used as a proxy for trust in the community, has a negative impact on resilience. This result is to be expected. Somewhat contradictory to this is the finding that political participation has a negative impact on resilience. That is to say, regions with higher voter turnout were more vulnerable to the recent recession. Measurements of social capital are difficult to achieve, but it is important that the effects that social capital has on resilience be further researched, particularly in light of the above results. Perhaps further research focusing on a smaller scale, and making use of data available through Eurobarometer or the European Social Survey, would be better able to explain such phenomena.

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#### ORCID

Barraí Henneby  <https://orcid.org/0000-0001-7150-7691>

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