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## The Spatial Footprint Of The Ongoing Economic Crisis (2009-...) In Greece: Assessing The Resilience And Development Of The Greek Regions

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# **THE SPATIAL FOOTPRINT OF THE ONGOING ECONOMIC CRISIS (2009-...) IN GREECE: ASSESSING THE RESILIENCE AND DEVELOPMENT OF THE GREEK REGIONS**

(Special Session ZJ: Economic Crisis and Regional Resilience)

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## **Abstract**

The fears of a sovereign debt crisis and the consequent lack of confidence, indicated by a widening of bond yield spreads and risk insurance of credit default swaps, have transformed a financial crisis to an economic crisis in Greece, affecting its productive bases and its income level. Up to the present time, there is no clear empirical evidence about the spatial impact of the economic crisis on Greek territory. Because of the austerity measures imposed in Greece from its lenders (i.e. the IMF and the EU counterparts), inevitably, the main focus of attention has been on national rather than regional level, although the crisis has obvious spatial aspects that should not be neglected: (a) the initial, pre-crisis, conditions (i.e. market size, accessibility, geomorphology, natural resources, productive structure) were, already, strongly differentiated among Greek regions; (b) the anti-crisis, austerity, measures taken may have significantly differentiated implications across space; (c) the implementation of spatial policies may be hindered in countries being in stressful fiscal situation. From this perspective, (further) research should be done; critical issues such as how different places are affected by the economic crisis and why, and which regions will continue to be affected, are still open.

The paper presents the spatial impact of the ongoing (2009-...) economic crisis in Greece, assessing the resilience and development of the Greek regions. To this end, a Composite Indicator of Regional Resilience (CIRR) and a Composite Indicator of Regional Development (CIRD) are constructed. Both Indicators include statistical data referring to a series of economic, structural, demographic and social variables. The data are derived from Hellenic Statistical Authority (EL.STAT.) and cover the period 2008-2010. The CIRR is calculated, for the whole period under consideration, as the average of the standardized growth values. The CIRD is calculated, for each year included in the period under consideration, as the average of the standardized absolute values. The calculations are conducted at the NUTS III spatial level. Both Indicators are concise, yet comprehensive, policy tools, allowing for the study of the spatial footprint of economic crisis. The findings of the paper verify that the pro-cyclical pattern of regional development in Greece, detected in periods of expansion, still exists in the period of recession.

**Key-Words:** economic crisis, Greece, spatial impact, composite indicators

**JEL:** G01, R11, R12

## 1. Introduction

The fears of a sovereign debt crisis and the consequent lack of confidence, indicated by a widening of bond yield spreads and risk insurance of credit default swaps, have transformed a financial crisis to an economic crisis in Greece, affecting its productive bases and its income level. Up to the present time, there is no clear empirical evidence about the spatial impact of the economic crisis on Greek territory. Because of the austerity measures imposed in Greece from its lenders (i.e. the IMF and the EU counterparts), inevitably, the main focus of attention has been on national rather than regional level, although the crisis has obvious spatial aspects that should not be neglected: (a) the initial, pre-crisis, conditions (i.e. market size, accessibility, geomorphology, natural resources, productive structure) were, already, strongly differentiated among Greek regions; (b) the anti-crisis, austerity, measures taken may have significantly differentiated implications across space; (c) the implementation of spatial policies may be hindered in countries being in stressful fiscal situation.

The paper presents the spatial footprint of the ongoing (2009-...) economic crisis in Greece, assessing the resilience and development of the Greek regions. To this end, a Composite Indicator of the Regional Resilience (CIRR) and a Composite Indicator of Regional Development (CIRD) are constructed. Both Indicators include statistical data referring to a series of economic, structural, demographic and social variables. The data are derived from Hellenic Statistical Authority (EL.STAT.) and cover the period 2008-2010. The CIRR is calculated, for the whole period under consideration, as the average of the standardized growth values. The CIRD is calculated, for each year included in the period under consideration, as the average of the standardized absolute values. The calculations are conducted at the NUTS III spatial level. Both Indicators are concise, yet comprehensive, policy tools, allowing for the study of the spatial footprint of economic crisis. The findings of the paper verify that the pro-cyclical pattern of regional development in Greece, detected in periods of expansion, still exists in the period of recession.

The remainder of the paper is as follows: Section 2 discusses the notion of (regional) resilience. Section 3 presents the review of the literature associated with the spatial impact of the economic crises. Section 4 discusses the attempts towards a construction for a composite indicator of development. Section 5 constructs a Composite Index of Regional Resilience (CIRR) and a Composite Index of Regional Development (CIRD) for the Greek regions. Section 6 concludes.

## **2. The notion of (regional) resilience**

Resilience is an interdisciplinary concept that denotes: (a) the capacity of ecosystems, individuals, organizations or material to cope with disruption and stress and retain (regain) functional capacity and form; (b) the capacity of a system to adjust and respond in ways that do no damage or jeopardize effective functioning, remaining on an existing developmental trajectory or making the transition to a new one; (c) the capacity of a system to absorb disturbance and recognize while undergoing change, so as to still retain essentially the same function, structure and feedbacks (Maru, 2010; Simmie and Martin, 2010). Resilience can, thus, be grossly characterized as flexibility (Briguglio et al., 2006; Briguglio et al., 2008). This indicates that examining for resilience requires the consideration of: (a) the amount of change that a system can undergo, while retaining its structure and functions; (b) the degree to which a system can create, sustain or reorganize its capacity to learn and adapt (Christopherson, 2010; Pendall et al., 2010).

As regards the field of regional science, in particular, regional resilience is interwoven with (Davies, 2011): (a) the ability to withstand external pressures; (b) the capacity to respond positively to external changes; (c) the longer term adaptability (or learning capabilities); (d) the capacities of governmental authorities to engage in the appropriate kinds of planning, action and social learning. The former couple of dimensions refer to regional resilience in the short-run, while the latter refers to regional resilience in the long-run.

The “decomposition” of the notion of regional resilience (Foster, 2007; Martin and Sunley, 2007; Bristow, 2010; Longstaff et al., 2010), makes evident that regions should have: (a) diversity in the number of businesses, institutions and sources of energy and food (if outside suppliers are stopped from coming in, the bulk of what is needed can be provided locally); (b) capacity to adapt to changing environmental conditions (and only in cases of failure the system forced to alter the big structures); (c) capacity to reorganize in the event of a shock (supply their core needs without substantial reliance on transport); (d) emphasis on small-scale localized activities embedded in the capacities of the local environment, and cognizant of and adapted to its limits (no one sector becomes locally dominant); (e) a healthy core or supporting economy of family, neighborhood, community and civil society, strong in reciprocity, cooperation, sharing and collaboration in the delivery of essential services. Hence, for leading regions, the issue might be to maintain the existing regional economic structure

and developmental trajectory. In contrast, for lagging-behind regions, the issue might be to effect a transformation to a new structure and trajectory.

Of course, the analysis of regional resilience is still evolving. Certainly, it does not offer a ready-made solution to problems of defining the attributes that regions would need to develop to cope with the vulnerabilities inherent in an uncertain world. However, it opens new perspectives in thinking about regional development.

### **3. Review of the literature on the spatial impact of economic crises**

Up to the present time there is no clear empirical evidence about the spatial impact of the current economic crisis on European territories. Given that the main focus of attention has been on global (European) and national level, partially due to the lack of statistical data at the regional level, it is evident that (further) research should be done. Critical issues such as how different places are affected by the economic crisis and why, and which regions will continue to be affected, are still open (Kunzmann, 2010). Despite the lack of clear empirical evidence, it is unquestionable that the impact of current economic crisis on regional economies is considerably differentiated (Committee of the Regions, 2010).

The empirical evidence from previous crises provides a major support to the aforementioned argument (Rosenbloom and Sundstrom, 1999). However, a generally accepted theoretical framework is missing. As yet, the process underlying the spatial implications of economic crises is inadequately conceptualised and poorly understood. Nevertheless, there are strands of theoretical literature that can be associated, at least partially, with the issue of the spatial impact of economic crises.

There is a strand of literature that has related business cycles with the spatial concentration of economic activities (Berry, 1988). More specifically, waves of economic growth might give rise to regional inequality (spatial concentration), while waves of economic recession may result in decreasing regional inequality (spatial dispersion). In this line of thought, expansion cycles begin at the poles of economic activity, where the interaction of agglomeration effects and market size provides a lead over other regions. In contrast, during a recession period, these poles are more exposed to demand and supply contractions and, therefore, more likely to be negatively affected than the rest of the regions. This position is in line with the argument about the spatially cumulative nature of growth (Myrdal, 1957), as well as with the discussion of the impact of agglomeration economies on the regional allocation of resources (Henderson, 1983; Krugman, 1991; Thisse, 2000).

Another strand of literature implies that one common denominator in accounting for the spatial impact of economic crises can be found in the type and the degree of regional specialization (Thompson, 1956). Trade liberalization allows for greater specialization (since domestic demand for some products can be served by imports), enhancing inherent and acquired comparative advantages to be exploited more intensively (Romer, 1987; Quah and Rauch, 1990). This is especially so in regions specialized in industries associated with increasing returns to scale (Grossman and Helpman, 1991; Paci and Usai, 2000). Excessive specialization, however, involves the danger of rendering regions more dissimilar in terms of production structure making them more vulnerable to a possible industry-specific shock (in an extreme situation, an industry-specific shock might be converted into a region-specific shock), with a negative effect on growth (Wundt, 1992; Kallioras and Petrakos, 2010). A relatively high level of diversification, in contrast, might work as a safeguard as downturn movements in some sectors would not be as harmful to the local economy because human and other resources can be diverted to other existing and more secure alternatives (Acemoglu and Zilibotti, 1997; Feldman, 2000), even though this might not always be possible (Baumol, 1967; Caballero and Hammour, 2000).

The aforementioned strands of literature may provide a foundation for the empirical investigation of the issue the spatial impact of the current economic crisis on European territories.

#### **4. Towards the construction of a composite indicator for the measurement of regional resilience and development**

Statistical indicators are important for designing and assessing policies aiming at advancing the progress of an economy and, consequently, the progress of a society. In particular, in the period of the ongoing economic crisis the accurate measurement of resilience and development comprises an issue of extreme importance. Until now, there is no empirical attempt for the construction of a composite indicator for the measurement of resilience. As for development, there is, still, an open discussion regarding the limitations of per capita Gross Domestic Product (GDP).

Per capita GDP is the most commonly used measure of development, even though, in reality, its weaknesses have, long, been recognized. Indeed, per capita GDP is not an accurate measure of development since it may exhibit increase while incomes for the majority of citizens may change disproportionately (or even decrease) (Galbraith, 1958). However, it is,

often used as such, on the rationale that all citizens would benefit from their country's increased economic activity. The major advantage of per capita GDP as an indicator of welfare and development is its frequent, wide and consistent measurement. The majority of the countries provide regular information on per capita GDP (usually on a quarterly basis), following specific methods of measurement (Kuznets, 1941), allowing comparisons (both between places and across time) to be made.

Though it is often positively correlated with welfare and development (O' Sullivan and Sheffrin, 1996), per capita GDP has come under increasing criticism since its measurements present noticeable difference with widespread perceptions. In February 2008, the President of the French Republic, Nicholas Sarkozy, unsatisfied with the present state of statistical information about the economy and the society, asked Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi to create a "Commission on the Measurement of Economic Performance and Social Progress (CMEPSP)". The aim of CMEPSP has been to identify the limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement; to consider what additional information might be required for the production of more relevant indicators of social progress; to assess the feasibility of alternative measurement tools, and to discuss how to present the statistical information in an appropriate way (Stiglitz et al., 2009). The need for the construction of a composite, more encompassing, index of development is imperious ...

Composite indicators are increasingly recognized as useful tools in an analysis and public communication. This is because they are able to capture and describe complex concepts with a simple measure that can be used to benchmark performance and to assist comparisons. Composite indicators, however, do stir controversy, since their use presents advantages and disadvantages (Saisana and Tarantola, 2002; Nardo et al., 2005; Saisana et al., 2005). Yet, over the recent years a proliferation in their use, in various policy domains, is evident (NEF, 2009; Annoni and Kozovska, 2011; KOF, 2011; UN, 2011).

## **5. Constructing a Composite Indicator of Regional Resilience (CIRR) and a Composite Indicator of Regional Development (CIRD)**

The construction of a CIRR and a CIRD makes possible the assessment of resilience and development of the Greek regions. Both Indicators include statistical data referring to a series of economic, structural, demographic and social variables. The data are derived from HSA and cover the period 2008-2010. The CIRR is calculated once, for the whole period under



consideration, as the average of the standardized growth values of the variables under consideration. The CIRD is calculated annually, for each year included in the period under consideration, as the average of the standardized absolute values. The calculations are conducted at the NUTS III spatial level (i.e. prefectures). Both Indicators are concise, yet comprehensive, policy tools, allowing for the study of the spatial footprint of economic crisis.

The variables that are listed below (the units of measurement are in the parentheses), comprise both the CIRR and the CIRD:

- (a) *population density* (inhabitants/square kilometer);
- (b) *unemployment* (% of labor force);
- (c) *per capita value of exports* (euros / inhabitant);
- (d) *per capita consumption of electric power for industrial and commercial purposes* (MWh/inhabitant);
- (e) *per capita volume of new residences* (cubic meters/inhabitant);
- (f) *per capita foreign tourists nights spent* (foreign tourists night spent/inhabitant);
- (g) *per capita domestic tourists nights spent* (domestic tourists night spent/ inhabitant);
- (h) *per capita savings* (euros / inhabitant);
- (i) *per capita consumption of electric power for household purposes* (MWh / inhabitant);
- (j) *per capita sales of new private cars* (sales of new private cars / inhabitant).

All the aforementioned variables were standardized in order to be able to bear mathematical treatment (otherwise, this would not be feasible since each variable is expressed in its own unit of measurement). All variables were standardized in the interval [0, 100], on the basis of the formula:

$$SX_i = 100(X_i - X_{\min}) / (X_{\max} - X_{\min})$$

where:  $X_i$  is the  $i$  th observation of each variable,

$X_{\max}$  is the maximum observation of each variable,

$X_{\min}$  is the minimum observation of each variable, and

$SX_i$  is the  $i$  th observation of each standardized variable.

At this point, it has to mentioned that, as regards to the construct of the CIRD, in contrast to the usual practices, the maximum and the minimum values of the variables under consideration refer to whole period under consideration and not, separately, to each year. In this way, comparison (in terms of the figures of the CIRD) over time becomes even more meaningful.

CIRR is expressed under the formula:

$$CIRR = \sum_n SGX_n / n$$

where:  $GX_n$  is the growth of the  $n^{\text{th}}$  variable,

$n$  is the number of variables under consideration, and

$\sum$  denotes sum.

CIRD is expressed under the formula:

$$CIRD = \sum_n SX_n / n,$$

where:  $X_n$  is the  $n^{\text{th}}$  variable,

$n$  is the number of variables under consideration, and

$\sum$  denotes sum.

## 6. Exploratory application of methodology in the Greek prefectures (2008-2010)

The values of the CIRD (Figure 1, Table 1) enlighten the picture regarding the spatial “model” of development in Greece. It is evident that despite the spatially differentiated negative impact of the economic crisis (against the relatively developed prefectures), the spatial pattern of development in Greece remains rather unaltered. Indeed, the pre-crisis poles of development in Greece (i.e. metropolitan centers, some urban, medium-sized areas, and some island regions), still holds the top positions in the ranking. This finding has important implications for the implementation of regional policy in Greece and, in particular, for the spatial allocation of the available funds.

The change of the CIRD in period 2008-2010 does not indicate distinguishable spatial pattern and it is not connected straightly with the level of development as this is expressed with the values of the index in annual base. A faint geographic tendency emerges with regard to the negative intensity of phenomenon (reduction of relative level of growth) in combination with the axis North-South in national level.

The values of the CIRR (Figure 2, Table 2) verify that the pro-cyclical pattern of regional development in Greece, detected in periods of expansion (Lyberaki, 1996; Petrakos and Saratsis, 2000), still exists in the period of recession. Prefecture of Attiki – where the capital city of Athens is located – appears to suffer the most negative impact of the economic crisis.

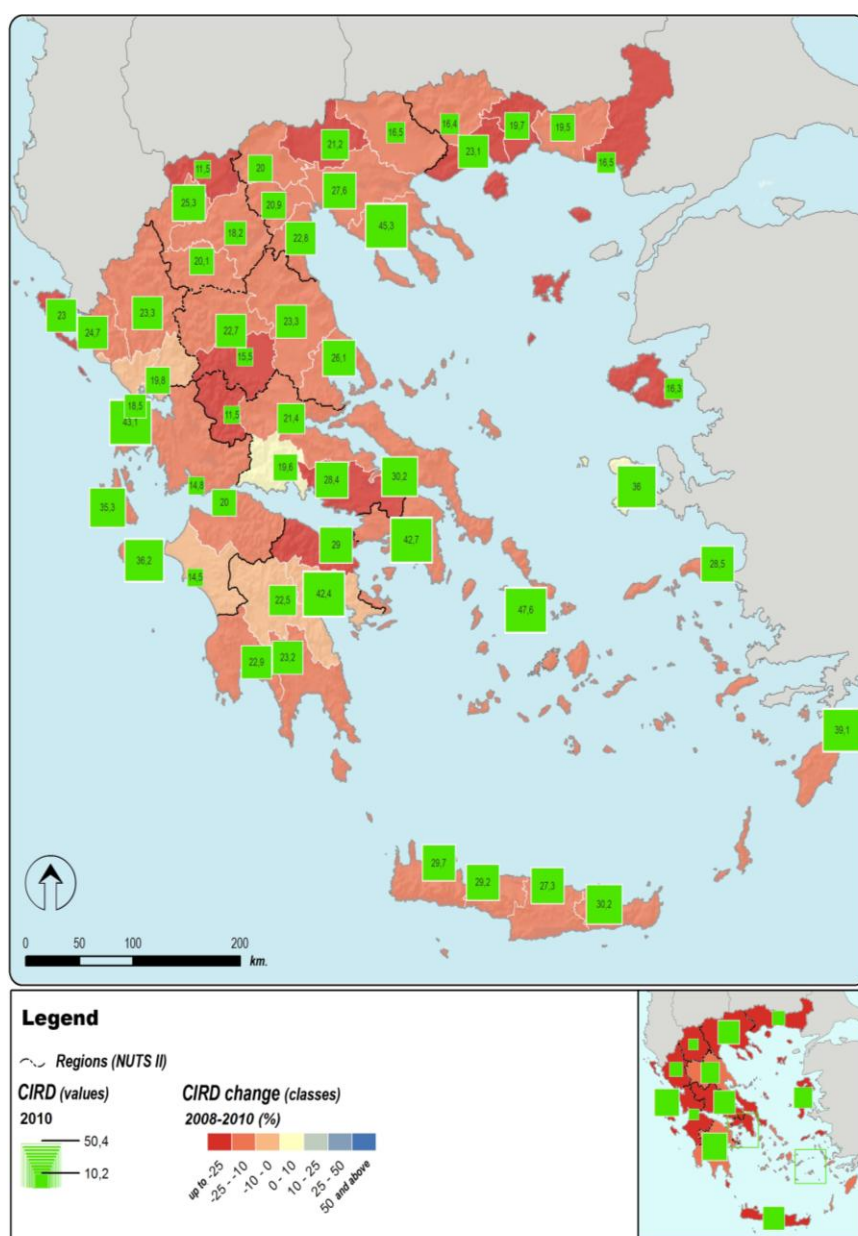
In addition, from the other prefectures which form the axis of development in Greece (i.e. the S or  $\sigma$  axis of development), the Prefectures of Thessaloniki, Voiotia, Imathia and Fthiotida are among the top-15 prefectures that have suffered the most negative impact. Conform with

this tendency it is also the remarkable deterioration of touristic-island prefectures with the exception of Kyklades.

However, the Prefectures of Larissa and Magnesia, which aspire to compete – as a dipole – the metropolitan centers of Athens of Thessaloniki (Metaxas and Kallioras, 2007), are among the top-15 prefectures that have suffered the least negative impact of the economic crisis.

On the contrary, most of the rural-mountainous prefectures (e.g. Arkadia, Ioannina, Fokida, Drama) face the consequences of generalised crisis with smaller fluctuations and their values of CIRR are concentrated in the bottom-10 of the distribution.

**Figure 1.** Diachronic collation CIRD index in Greek NUTSIII units, years 2008 and 2010

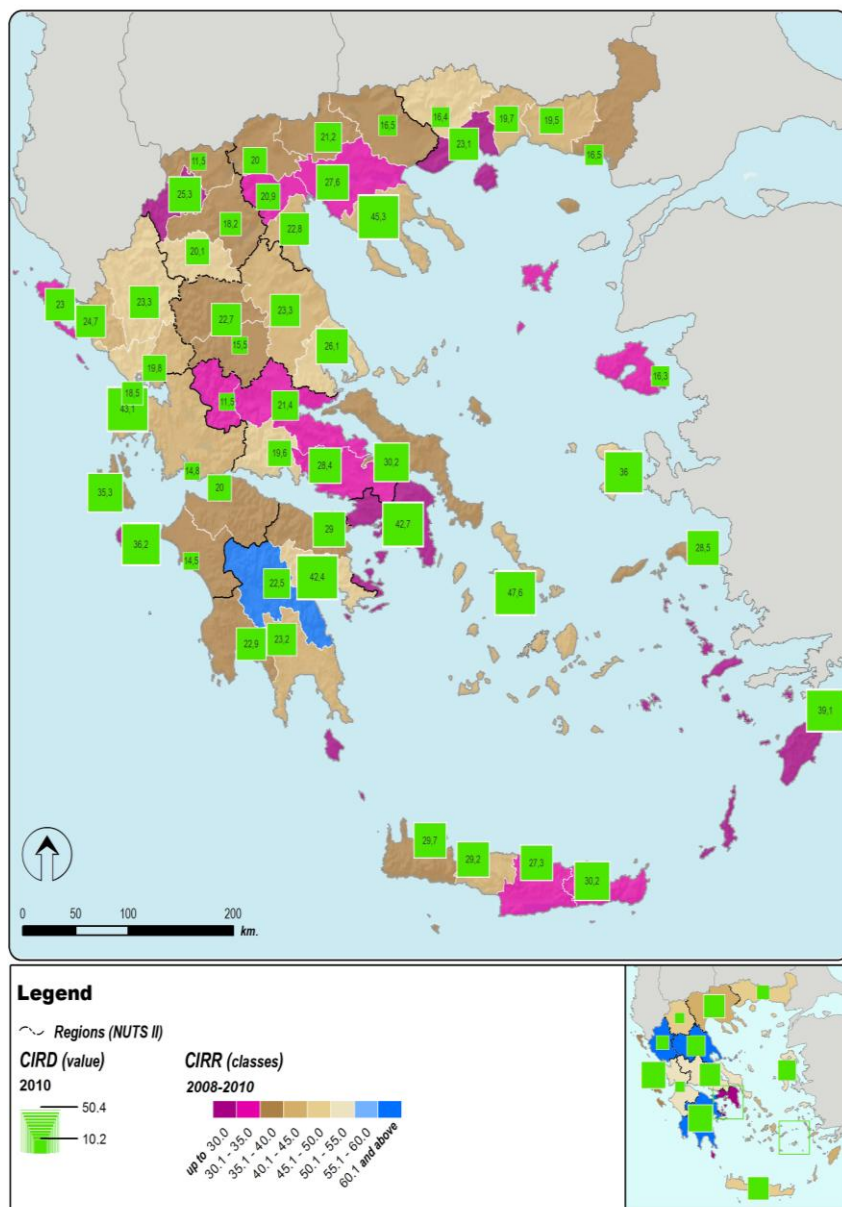


Source: Own elaboration

**Table 1.** Standardized values of the analysis variables and CIRD Index in Greek NUTSIII units, years 2008 & 2010

Prefectures	CIRD						Population Density		Employment rate		Value of exports		Non-Residential energy consumption		Volume of new constructions		Nights spend, foreigners		Nights spend, citizens		Savings		Residential energy consumption		New car sales	
(NUTSIII)	2008	2010	2010/08		2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2009	2008	2009	2008	2010	2008	2010	2008	2009
GR422 Kyklades	54.2	1	47.6	1	87.8	40	3.3	3.3	87.5	53.9	9.0	8.3	75.3	76.7	78.9	65.2	16.5	17.5	45.1	51.1	54.4	51.8	99.3	100.0	73.0	48.2
GR127 Chalkidini	50.5	3	45.3	2	89.7	43	2.1	2.1	79.6	47.8	20.6	18.6	76.0	65.4	81.7	74.2	54.7	50.5	81.9	100.0	11.1	7.4	57.4	62.1	39.5	24.5
GR224 Lefkada	48.9	5	43.1	3	88.1	41	5.1	5.1	80.0	65.0	0.1	0.2	58.5	56.9	100.0	83.9	9.1	8.6	59.2	67.8	39.0	36.9	64.4	73.8	74.1	33.2
GR300 Attiki	52.7	2	42.7	4	81.0	27	98.8	100.0	76.7	52.5	43.5	36.8	36.5	27.4	19.1	4.8	1.9	1.7	3.2	3.3	99.0	76.6	48.6	46.3	100.0	77.1
GR251 Argolida	44.5	7	42.4	5	95.2	48	3.7	3.7	74.2	67.0	79.2	96.6	46.1	43.6	64.1	37.0	4.1	6.0	29.2	35.1	28.0	23.7	64.8	67.9	51.6	43.0
GR421 Dodekanisos	50.4	4	39.1	6	77.7	15	6.0	6.0	61.7	39.1	7.2	3.6	66.9	69.5	72.1	23.7	100.0	98.3	35.1	37.8	32.3	25.0	40.9	38.2	81.6	50.2
GR221 Zakynthos	45.3	6	36.2	7	79.9	22	8.5	8.6	67.5	51.8	3.3	1.6	56.8	43.0	61.3	31.8	84.3	90.7	37.6	48.5	22.4	17.3	42.2	39.9	69.1	29.1
GR413 Chios	35.7	17	36.0	8	100.8	50	4.6	4.6	78.8	87.3	41.8	47.4	16.3	16.8	35.7	20.7	3.2	2.4	18.1	17.4	60.3	58.8	49.7	51.9	48.3	52.5
GR223 Kefflinia	43.9	8	35.3	9	80.4	25	3.2	3.2	96.7	81.7	3.4	3.6	44.4	37.0	80.2	40.3	25.2	21.8	31.9	37.1	45.4	43.9	50.7	49.5	57.5	34.7
GR242 Evia	37.8	12	30.2	10	79.9	21	3.9	3.9	60.8	31.9	13.2	12.7	100.0	83.2	55.0	34.4	2.1	2.6	21.4	22.8	22.1	16.2	54.2	56.1	45.3	37.9
GR432 Lasithi	38.6	11	30.2	11	78.2	16	3.1	3.1	87.9	68.2	11.7	7.3	40.2	40.4	56.8	28.6	43.3	44.8	19.2	22.7	29.7	21.9	36.9	34.7	57.0	29.8
GR434 Chania	37.7	13	29.7	12	79.0	19	5.2	5.2	84.6	65.0	3.4	3.2	39.1	38.2	67.1	28.4	31.7	32.9	18.0	22.3	25.0	22.9	39.2	38.0	63.3	41.2
GR433 Rethimno	36.9	14	29.2	13	78.9	18	4.3	4.4	60.8	47.2	4.7	5.2	42.8	42.0	71.5	33.9	56.9	54.0	14.2	26.6	18.2	12.4	22.6	22.1	73.3	43.8
GR253 Korinthia	39.4	10	29.0	14	73.7	8	5.2	5.2	72.1	52.3	27.3	12.8	53.1	47.3	84.9	26.7	3.3	3.2	23.9	24.7	21.4	20.1	58.0	60.8	44.8	37.2
GR412 Samos	33.9	18	28.5	15	84.0	30	4.4	4.4	92.9	92.5	3.0	3.4	25.1	24.6	25.0	11.3	22.9	22.8	29.0	32.1	26.6	21.9	39.4	39.9	70.9	32.0
GR241 Votia	39.6	9	28.4	16	71.8	5	3.2	3.2	62.1	53.6	97.0	71.3	85.2	60.2	67.4	30.9	0.3	0.3	3.1	3.5	14.5	9.0	26.6	27.4	36.4	24.8
GR122 Thessaloniki	36.2	16	27.6	17	76.3	13	28.3	28.8	68.3	41.6	49.2	41.5	39.5	29.1	34.9	12.3	0.8	0.9	7.2	7.5	38.2	31.5	39.8	37.3	55.5	45.0
GR431 Iraklio	36.2	15	27.3	18	75.5	12	9.9	10.0	75.8	49.6	18.7	16.0	44.9	42.6	46.3	22.6	38.2	35.4	8.1	9.0	25.6	19.8	28.5	27.3	65.9	40.7
GR143 Magnisia	30.6	24	26.1	19	85.3	34	3.1	3.1	70.0	47.7	33.1	31.8	44.0	36.0	34.7	15.6	3.7	4.2	27.2	29.6	16.8	16.0	32.9	42.0	40.3	35.0
GR132 Kastoria	31.6	21	25.3	20	80.2	24	2.2	2.2	26.3	25.6	100.0	96.7	11.8	8.2	40.2	5.9	0.5	0.4	15.1	15.0	30.0	24.4	21.1	21.8	68.8	53.3
GR212 Thesprotia	32.1	19	24.7	21	77.1	14	0.0	0.0	81.3	61.3	8.3	7.9	31.1	29.4	74.7	32.5	2.0	1.9	11.2	13.0	42.2	36.1	25.6	30.6	44.1	34.5
GR213 Ioannina	27.2	27	23.3	22	85.7	36	5.7	6.0	62.9	56.4	11.7	11.0	37.9	33.3	36.6	15.8	0.4	0.4	12.4	14.6	25.2	21.4	14.2	12.2	64.8	61.9
GR142 Larisa	26.9	29	23.3	23	86.6	38	16.9	17.0	63.3	49.3	26.2	28.8	38.5	34.5	35.7	19.4	0.1	0.1	3.3	4.1	17.1	14.8	22.2	22.7	45.5	41.9
GR254 Lakonia	25.8	33	23.2	24	89.9	44	1.6	1.6	81.3	73.5	5.4	5.9	13.4	13.6	38.1	30.0	1.4	1.6	16.3	17.4	33.4	26.9	35.8	37.3	30.9	23.9
GR115 Kavala	30.8	23	23.1	25	74.8	11	5.4	5.4	65.4	49.4	32.2	17.4	26.6	23.8	43.0	13.7	6.3	6.2	18.5	17.9	28.4	22.3	33.0	36.5	49.5	38.3
GR222 Kerkyra	31.2	22	23.0	26	73.6	7	17.9	18.7	60.0	31.7	1.3	0.5	35.8	24.2	23.1	12.0	44.4	40.9	35.1	39.3	15.9	9.2	31.0	24.5	47.2	28.5
GR255 Messinia	28.6	25	22.9	27	80.0	23	4.4	4.4	78.3	70.4	20.2	18.6	16.7	16.5	52.8	19.0	2.5	2.4	15.8	18.1	27.6	22.7	31.5	33.0	36.6	24.1
GR125 Pieria	27.1	28	22.8	28	84.1	31	7.2	7.2	62.1	46.9	13.4	16.2	31.6	30.7	45.4	21.7	8.8	7.2	21.9	23.5	10.7	10.0	27.5	29.7	42.2	34.7
GR144 Trikala	26.4	30	22.7	29	86.1	37	11.0	11.0	74.2	67.5	11.0	11.2	24.1	20.5	36.8	12.2	2.2	1.9	10.8	10.5	18.7	18.0	24.9	25.8	50.6	48.9
GR252 Arkadia	23.1	38	22.5	30	97.5	49	1.1	1.1	59.6	45.9	0.2	0.9	19.5	30.3	36.7	35.6	0.3	0.4	11.0	11.0	42.7	40.6	36.3	38.2	23.5	21.2
GR244 Fthiotida	26.3	31	21.4	31	81.3	28	2.8	2.7	91.7	69.7	14.2	13.4	35.9	30.0	29.7	15.6	0.5	0.2	8.5	9.4	14.6	13.3	23.6	24.9	41.7	34.7
GR123 Kilis	31.7	20	21.2	32	66.9	2	2.5	2.4	54.2	50.3	66.1	42.6	73.5	73.7	77.1	11.0	0.1	0.1	0.0	0.8	3.1	0.0	16.3	17.5	24.1	13.6
GR121 Imathia	25.9	32	20.9	33	80.8	26	7.2	7.2	65.4	56.6	42.5	43.3	32.0	27.6	30.6	5.2	0.1	0.1	4.2	4.0	9.4	7.8	26.1	27.4	41.6	30.2
GR131 Gevena	23.6	36	20.1	34	84.8	33	0.5	0.5	83.8	77.1	5.8	6.6	37.7	47.9	46.7	4.0	0.1	0.1	12.0	11.3	23.6	23.4	15.3	18.2	11.0	11.5
GR124 Pella	24.4	35	20.0	35	82.1	29	4.7	4.7	77.9	66.8	30.8	26.3	30.9	26.6	32.3	12.6	0.1	0.0	3.4	4.0	7.5	5.8	18.3	21.1	37.8	32.2
GR232 Achaia	25.5	34	20.0	36	78.3	17	9.0	9.2	61.3	47.4	14.0	12.0	30.2	27.3	42.8	18.5	1.4	1.3	8.5	9.1	18.0	12.6	32.4	30.0	37.8	32.5
GR211 Arta	21.3	41	19.8	37	93.2	47	1.8	1.7	58.3	49.9	3.1	4.0	17.4	17.3	25.3	23.9	0.1	0.1	6.0	6.5	14.9	12.5	43.0	43.5	42.7	38.8
GR112 Xanthi	28.0	26	19.7	38	70.3	4	4.8	4.9	76.3	35.6	30.7	22.1	50.6	39.5	38.7	24.3	0.2	0.2	10.0	9.6	9.2	4.8	17.1	19.2	42.4	36.7
GR245 Fokida	18.0	49	19.6	39	108.7	51	0.9	0.9	42.9	69.9	18.8	13.8	15.5	12.8	37.3	28.8	6.7	6.7	19.4	23.0	7.7	7.6	29.2	30.7	1.4	1.3
GR113 Rodopi	22.7	39	19.5	40	85.7	35	3.3	3.3	77.9	64.7	18.2	18.6	64.6	49.6	17.0	4.6	0.2	0.2	9.8	11.9	0.8	2.7	9.5	13.0	25.8	26.1
GR214 Preveza	19.9	44	18.5	41	93.2	46	0.8	0.8	55.4	47.6	6.8	5.3	2.9	1.8	38.2	32.9	3.5	3.4	22.7	29.3	24.1	22.3	0.0	2.1	44.4	39.6
GR133 Kozani	20.9	42	18.2	42	87.0	39	3.4	3.4	50.4	44.1	9.2	6.9	9.7	6.6	23.0	8.4	0.1	0.1	3.9	3.6	20.9	17.9	32.7	31.3	55.6	59.6
GR111 Evros	22.1	40	16.5	43	74.4	9	2.5	2.5	70.4	31.2	9.2	8.7	23.5	17.9	18.3	7.1	0.5	0.6	15.6	15.3	20.8	18.7	18.8	22.0	41.5	40.8
GR126 Serres	19.4	4																								

**Figure 2.** Collation CIRD and CIRR in Greek NUTSIII units, year 2010 and period 2008-2010, respectively



Source: Own elaboration

**Table 2.** Standardized change of the analysis variables and CIRR Index in Greek NUTSIII units, period 2008-2010

Prefectures	CIRR											
		Population Density	Employment rate	Value of exports	Non-Residential energy consumption	Volume of new constructions	Nights spend, foreigners	Nights spend, citizens	Savings	Residential energy consumption	New car sales	
(NUTSIII)	2008-10	2008_10	2008_10	2008_10	2008_10	2008_10	2008_09	2008_09	2008_10	2008_10	2008_09	
GR132 Kastoria	26.4	1	15.0	6.6	24.6	24.7	9.3	39.5	6.1	36.4	47.4	54.0
GR300 Attiki	28.1	2	41.3	32.2	21.6	15.3	34.9	44.1	10.4	0.0	30.2	51.4
GR221 Zakynthos	29.0	3	31.7	22.4	12.5	11.4	46.7	60.9	39.7	35.5	29.2	0.0
GR115 Kavala	29.8	4	16.3	0.0	13.7	34.9	27.3	50.7	2.8	31.8	64.7	56.1
GR421 Dodekanisos	30.0	5	38.1	25.8	12.6	52.8	23.0	51.0	15.6	26.3	26.5	28.0
GR222 Kerkyra	30.0	6	98.7	14.7	10.8	5.9	56.4	44.4	20.5	16.1	0.0	32.5
GR243 Evrytania	30.4	7	6.7	23.3	0.0	22.9	64.3	0.6	24.1	29.4	59.0	73.4
GR241 Viotia	31.0	8	19.6	44.9	18.7	0.0	38.9	51.6	16.4	25.1	48.0	46.8
GR432 Lasithi	32.0	9	22.2	36.9	15.9	47.4	45.6	56.5	26.5	21.1	29.3	18.4
GR431 Iraklio	32.5	10	40.6	16.1	21.8	39.8	45.6	45.1	18.1	33.1	34.1	30.6
GR121 Imathia	32.6	11	25.8	33.4	25.9	30.1	16.8	29.3	3.3	59.3	51.2	51.3
GR122 Thessaloniki	33.5	12	51.4	26.1	21.4	12.7	35.6	55.3	10.1	33.9	27.3	60.7
GR244 Fthiotida	33.8	13	15.2	21.7	24.1	25.9	54.0	0.0	16.9	64.1	51.0	65.5
GR411 Lesvos	34.9	14	15.1	6.5	20.6	45.3	18.9	51.0	8.7	65.9	48.5	68.9
GR134 Florina	35.6	15	17.7	27.4	26.4	34.7	10.7	32.1	11.1	84.3	49.5	62.2
GR232 Achaia	35.7	16	58.5	14.0	21.8	35.4	40.2	48.0	13.7	29.4	27.0	69.5
GR123 Kilikis	36.2	17	12.1	18.7	16.4	47.2	0.0	75.1	63.9	38.1	51.8	38.6
GR253 Korinthia	36.5	18	23.8	33.2	12.0	31.2	19.9	49.0	10.0	65.1	55.8	64.8
GR126 Serres	37.0	19	1.9	40.1	30.8	16.8	26.4	28.9	26.2	53.7	62.4	82.6
GR223 Kefflinia	37.1	20	22.0	58.4	26.8	24.1	43.1	38.7	25.0	67.1	35.6	30.1
GR255 Messinia	37.3	21	11.5	56.6	23.3	46.1	29.7	48.5	22.4	39.6	51.5	43.4
GR242 Evia	37.3	22	22.8	11.1	24.5	19.3	59.9	75.3	14.2	28.5	51.9	65.7
GR144 Trikala	37.4	23	10.4	35.0	26.1	31.0	31.0	36.0	2.8	70.0	48.7	83.5
GR141 Karditsa	37.9	24	5.8	26.3	25.1	29.5	11.1	67.1	7.3	70.6	52.7	83.9
GR124 Pella	38.3	25	18.2	43.2	21.7	30.0	38.9	20.5	19.8	57.5	64.0	68.8
GR434 Chania	38.4	26	33.0	27.3	23.6	43.8	34.8	56.9	33.2	60.1	34.9	36.0
GR133 Kozani	38.5	27	21.8	22.5	19.0	25.9	41.9	70.7	0.0	50.9	33.4	98.8
GR233 Ilia	38.9	28	13.7	53.6	37.6	23.3	67.9	35.3	22.4	39.2	50.5	45.2
GR111 Evros	39.7	29	18.6	6.2	24.0	21.4	48.2	64.2	3.9	58.5	66.2	85.9
GR412 Samos	39.7	30	13.4	100.0	28.5	44.7	49.0	52.3	18.8	40.8	45.2	4.3
GR112 Xanthi	40.1	31	39.2	57.3	18.3	15.9	62.6	46.4	1.8	30.9	58.9	69.8
GR125 Pieria	40.1	32	26.1	18.0	30.8	43.3	44.4	33.3	14.7	68.8	57.5	64.1
GR433 Rethimno	40.9	33	39.6	17.9	27.8	44.3	40.4	47.5	100.0	26.0	38.8	26.3
GR231 Etoloakamania	41.9	34	17.7	43.2	27.1	19.8	39.6	62.0	16.3	84.5	45.6	62.7
GR422 Kyklades	44.0	35	31.4	28.8	23.5	49.8	82.3	59.6	22.0	62.5	44.5	36.1
GR127 Chalkidini	44.1	36	26.3	56.2	22.9	25.0	92.1	44.7	32.6	38.8	65.3	37.3
GR254 Lakonia	44.2	37	5.4	58.4	27.6	48.0	80.1	64.2	13.8	32.3	51.6	60.2
GR224 Lefkada	44.5	38	10.5	37.8	48.3	42.8	83.4	47.4	23.5	62.5	85.6	3.1
GR211 Arta	44.5	39	4.5	14.2	32.9	45.9	97.7	60.8	14.1	53.9	45.3	75.9
GR142 Larisa	44.6	40	30.1	33.8	28.0	33.5	54.2	60.6	26.7	55.8	45.9	77.5
GR212 Thesprotia	45.0	41	18.0	86.2	24.3	39.9	35.4	47.7	23.1	39.8	76.9	58.3
GR113 Rodopi	45.0	42	17.8	17.0	26.0	12.0	38.7	47.1	28.3	100.0	73.3	89.5
GR143 Magnisia	45.1	43	20.8	15.8	24.5	22.2	44.4	68.2	16.2	68.7	100.0	70.5
GR114 Drama	45.6	44	11.2	92.0	28.8	31.0	22.6	60.3	3.4	70.4	62.2	74.1
GR131 Gevena	45.9	45	0.0	58.6	29.0	81.3	0.2	57.3	0.7	73.6	66.0	92.0
GR245 Fokida	46.4	46	3.4	37.0	18.7	31.8	78.5	53.6	26.8	74.3	52.3	87.3
GR413 Chios	46.6	47	17.5	59.7	28.8	49.8	58.0	27.8	2.2	68.5	53.4	100.0
GR213 Ioannina	47.0	48	100.0	53.1	24.0	31.0	41.8	39.6	25.5	47.1	25.9	81.7
GR214 Preveza	47.6	49	14.7	26.0	20.1	36.8	88.3	51.0	39.1	61.9	64.6	73.5
GR251 Argolida	48.5	50	18.2	48.0	31.1	39.5	53.4	100.0	29.6	44.6	56.5	64.2
GR252 Arkadia	61.7	51	5.1	31.1	100.0	100.0	100.0	79.5	6.8	63.2	53.8	77.2

0 - 20
20 - 40
40 - 60
60 - 80
80 - 100

Source: EL.STAT (2011), own elaboration

## 6. Conclusions

The fears of a sovereign debt crisis and the consequent lack of confidence, indicated by a widening of bond yield spreads and risk insurance of credit default swaps, have transformed a financial crisis to an economic crisis in Greece, affecting its productive bases and its income level. The paper reveals that, in an, overall, stressful fiscal environment, the economic crisis has a distinct spatial footprint, affecting different places in a different way. The construction of a CIRR and a CIRD, which include a series of economic, structural, demographic and social variables, makes possible the assessment of resilience and development of the Greek regions. The findings of the paper verify that the pro-cyclical pattern of regional development in Greece, detected in periods of expansion, still exists in the period of recession. The Prefectures of Attiki and Thessaloniki and some major development areas in Greece appear to suffer the most negative impact of the economic crisis. However, the spatial pattern of development in Greece, still, remains rather unaltered since the pre-crisis poles of development continue to hold the top positions in the ranking.

The complexity of the regional problem in Greece indicates that a critical perspective towards the “classical” regional policy means is needed. The implementation of the regional policy cannot be based on transfer planning resources. This is because, firstly, the effects of the previously implemented national programs on regional development have been assessed as feeble, and secondly, the available funds became scarcer due to the financial crisis.

For this reason, a vigorous and targeted regional policy is deemed to be more appropriate, as it should be redefined and reformed according with the circularity of the economic crisis and also it should concern and reinforce specific and of competitive advantage sectors of the country.

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