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# The impact of the economic crisis on regional disparities in Croatia

Irena Đokić<sup>a</sup>, Zlatan Fröhlich<sup>b</sup> and Ivana Rašić Bakarić<sup>b</sup>

<sup>a</sup>*Institute of Economics, Zagreb, Trg J.F.Kennedyja 7, 10000 Zagreb, Croatia, [idojic@eizg.hr](mailto:idojic@eizg.hr); [irasic@eizg.hr](mailto:irasic@eizg.hr)*

<sup>b</sup>*Zagreb Chamber of Economy, Draškovićeva 45, 10000 Zagreb, Croatia, [zfrohlich@hgk.hr](mailto:zfrohlich@hgk.hr)*

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**The economic crisis has affected EU regions differently. In some countries, downturns can lead to narrower interregional disparities, while in others, they can trigger regional divergence. The crisis in Croatia has had a negative effect on national and regional development indicators, leading to significant regional disparities. The aim of this article is to discuss whether regional imbalances in Croatia have been more exposed by the current crisis, to analyse the disparities between economic developments in Croatian counties over the period of recession (2008–2012), to discover the main determinants of regional resilience to recessionary impacts and to make recommendations for improvements in Croatian regional economic policy.**

*Keywords:* economic crisis, regional disparities, resilience

*JEL Classifications:* R11, O18, J21

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## Introduction

Some researchers claim that growth and development result in territorial disparities and inequalities, while others consider that growth and development lead to territorial equality. Solow (1956) and neoclassic economists claim that regional differences disappear with growth because of the diminishing returns to capital. According to Myrdal (1990) and post-Keynesian theory, growth results in increasing inequalities (Bradley et al., 2005; Kangasharju and Pekkala, 2004). The reduction of economic disparities is one of the key policy objectives of the European Union, set in the goals of the Rome Treaty and the Single European Act.

Studies have shown that periods of economic growth can be connected with regional convergence, while periods of economic downturn can trigger regional divergence (Dunford and Perron, 1994; Dunford and Smith, 2009; Evans and McCormic, 1994). The financial crisis that began in August 2007 and the subsequent severe recession had a significant negative impact on cross-country convergence in the EU (European Investment Bank (EIB), 2012). Unemployment in poorer regions increased more than it did in richer regions, especially for low-skilled labour, which suggests that regional convergence in the EU followed a cross-country pattern. Regional economic convergence

slowed substantially in 2008–2009 after nearly a decade of rapid convergence (EIB, 2012).

The aim of this article is to analyse the disparities between the economic development of regions in Croatia at the end of 2008 (before the recession) compared to 2011. Bakker and Klingen (2012) analysed the economies of crisis-affected countries characterised by deteriorating public finances, high unemployment and increased nonperforming loans and concluded that by 2011, the recovery had broadened from exports to domestic demand (which remained more subdued in Southeast Europe), and that all crisis-affected countries had emerged from recession. Despite the economic recovery, large differences in cyclical positions and growth rates remained, with GDP flat in Croatia. According to the results of the analysis, pre-crisis overheating had been less pronounced in Croatia as its economy was less integrated with the rest of the world, so that the immediate pressures were less intense. The Bakker and Klingen Report indicates that Croatia was the least insulated country owing to its extensive reliance on the foreign bank financing of its domestic financial system. Moreover, its stable exchange rate policy and limited fiscal space ruled out a countercyclical crisis response.

In order to study the disparities in the economic development of Croatian regions, the current analysis is based on data at NUTS2 and NUTS3 level, using various variables reflecting the Croatian economic structure (Croatian Bureau of Statistics (CBS), the Financial Agency and the Ministry for Regional Development and EU Funds (MRDEUF)). Croatia is an exceptionally heterogeneous country, with great regional differences in economic and social development. This is confirmed in the work of Puljiz and Maleković (2007) where they measured the regional disparities of Croatia through regional income and unemployment indicators. For inequality, the coefficient of variations, the Gini coefficient and the Theil index in relation to regional

(county) and local units are applied to assess the extent and dynamics of regional income and unemployment disparities in the period 2000–2005. The results show that Croatia faces moderate regional income (in terms of personal income) and significant unemployment disparities (compared to EU Member States), where total inequality is becoming driven more by between-region inequality than by within-region inequality (based on the Theil index). With regard to within-county inequalities, there are significant differences among quite homogeneous counties and counties faced with high internal disparities.

The entire territory of the Republic of Croatia is divided into 556 local self-government units (128 towns and 428 municipalities) and 21 counties (including Zagreb, with the status of city and county).<sup>1</sup> Counties (*županije*) represent the third level of the NUTS system (NUTS3), while the entire national territory represents the first level (NUTS1). Croatian counties are units of regional self-government comprising towns and municipalities; they are responsible for education, health care, economic development, traffic and road infrastructure, scientific, social and cultural development, physical planning and a number of other activities. At the second level (NUTS2), there are two units: Adriatic Croatia (7 counties) and Continental Croatia (14 counties). Our analysis was conducted for each, to better reflect regional differences. The differences between these two regions are significant in many (developmental) aspects and therefore require a more in-depth analysis to reveal from where these differences mainly derive. In their recent work, Kersan Škabić and Tijanić (2014) conducted panel data analysis at the NUTS3 level (21 Croatian counties) to determine the influence of foreign direct investments on regional development. The results proved to be significant and indicate that domestic and foreign direct investments, labour productivity and exports in Croatia have a positive and significant influence on regional development, while absorptive capacity to

create a favourable investment environment has a negative influence.

[Puljiz and Maleković \(2007\)](#) proposed forming several groups of counties according to levels of income and unemployment from the geographic point of view. According to the figures obtained, the counties included in these groups mainly correspond to those found in the groupings proposed in our work (as presented below), with the City of Zagreb as a special (successful) case with especially high income values, and with the counties most lagging behind (with a worsened relative position in income levels and unemployment) situated in the eastern part of the country. The authors conclude that unemployment represents the most significant regional development problem and that policy-makers will have to increase efforts in order to have any substantial impact on reducing regional unemployment disparities.

Across the developing world, the rise in within-country regional disparities has accelerated sharply since the early 1990s ([Rodríguez-Pose, 2014](#)), while property rights and the rule of law have been identified as playing the most relevant role in generating sustainable growth ([Acemoglu et al., 2005](#); [Rodrik, 2004](#)).

Changes in regional disparities could be influenced by many factors. These include, among others, available natural resources and the sound management of these resources which leads to sustainable and smart growth. This is mainly achieved in combination with various types of capital. [Camagni \(2002, 2398\)](#) holds that human, social and relational capital, as sources of the competitiveness of territories, are necessary conditions to secure employment stability, benefits from external integration and the continuing growth of local well-being and wealth. According to Camagni, therefore, weak territories that lag behind others—in terms of competitiveness of the economic fabric, internal/external accessibility, quality of human and environmental factors,

internal synergy and learning capacity—risk exclusion and decline to a larger extent than in the past. Camagni's view on the importance of various types of capital and the competitiveness of territories, in a broader sense, can be considered as a starting point to determine resilience factors. This is an issue that we seek to tackle in our work, when analysing the impact of crisis on Croatian regions and their capacity to respond to such events. Therefore, we include in our discussion the literature referring to the notion of resilience, as we believe that it could improve understanding of the causes of the economic shocks and responses to them, rather than concentrating on the consequences. This is all the more important in order to provide recommendations on how to prevent potential future negative influences on the economy and on development in general.

[Christopherson et al. \(2010\)](#) find that in economics 'resilience' has been defined in terms of a return to a fixed and narrowly defined equilibrium (as measured by employment, for example) or, in the more liberal version, multiple equilibria. They also state that the fashionable use of the concept of resilience may derive both from an increased sense of risk and from the perception that processes associated with globalisation have made places and regions more permeable to the effects of what were once thought to be external processes. The intersection of an economic crisis and an environmental crisis has heightened the perceived sense of vulnerability and, hence, stimulated the search for new paths towards 'resilience' ([Hudson, 2010](#); [Pike et al., 2010](#)). The question of regional resilience and the ability of some regions to overcome short-term or long-term negative economic impacts is fraught with both methodological and philosophical difficulties but remains a subject of interest because of its significance and because of the multiple variables at play in the region, as described by [Hassink \(2010, 4\)](#). Most of the authors contributing to the issue of regional resilience hold

that space is constructed via human action and social relations, where regions are manifestations of those actions and in a constant process of transition (Christopherson et al., 2010; Smith, 2012). Political and economic processes, leading to investment in one neighbourhood or region and disinvestment in another, are at the core of regional resilience, as mentioned by these authors. The challenges in identifying the determinants of resilience are also found in our research. This primarily refers to the methodological issues on how to apply the concept of resilient regions in Croatia or to define resilience in the context of Croatian regional development. The secondary challenge is how to translate available raw ('non-resilient') data into a comprehensive response to whether or not regions are resilient and how it is possible to measure this.

According to Simmie and Martin (2010, 28), a regional economy that is hardly affected by a shock is much more likely to recover, and more quickly, than a regional economy that is severely weakened or disrupted by the shock. If a previous growth path disappears for whatever reason, through industrial restructuring and repositioning, another or alternative growth path or paths may be generated for the region (Christopherson et al., 2010). Viewing the concept of resilience through the perspective of regional competitiveness leads to a narrow and perhaps limited view of what resilience may have to offer as a way of understanding the forces shaping regional change and in guiding the formulation of policy (Bristow, 2010). Some authors aim to provide a response to address the causalities (and consequences) of regional disparity patterns and resilience in an integrated manner. Simmie and Martin (2010) argue that regional and local economic development is subject to all sorts of interruptions and disruptions. How regional and local economies respond and adjust to such disturbances and disruptions may well exert a formative influence on how they develop and evolve (Simmie and Martin, 2010, 27). Foster (2007,

14) defines regional resilience as "the ability of a region to anticipate, prepare for, respond to, and recover from a disturbance", while Hill et al. (2008, 4) see resilience as "the ability of a region to recover successfully from shocks to its economy that either throw it off its growth path or have the potential to throw it off its growth path."

Cellini and Torrisi (2014, 1793) conducted a study of Italian regions over a 120-year period that included six shocks. They concluded that "Shocks have permanent effects and such effects differ across areas, but there is limited heterogeneity in the way in which different regions react to, and recover from, major, common, recessionary shocks. Specifically, a very limited number of significantly heterogeneous impact effects have been counted, even though huge differences characterize Italian regions and their long-run economic performances." Although the Italian regional structure and economy differ considerably from those in Croatia, this finding has nonetheless additionally motivated us to search for explanations for the causes and effects of the crisis in Croatian regions.

The influence of institutions on regional development patterns has been fundamentally neglected by mainstream economic theory (Silva-Ochoa, 2009). Regional development intervention over the last thirty years has aimed to deliver development strategies that have frequently tended to mimic one another, from Andalusia to Attica, from Alentejo to Saxony or from Chihuahua to Oaxaca (Silva-Ochoa, 2009). This is what Chien (2008) has called an isomorphic approach to development. Dokić and Sumpor (2013) analysed the process of strategic planning at the regional level<sup>2</sup> in Croatia and concluded that even with a new planning approach and institutional set-up, the gap between the City of Zagreb (the capital) and the rest of Croatia widened in the observed 10-year period, compared to both Croatian NUTS2 regions.<sup>3</sup> For policy-makers, the widening gap should signal that changes are necessary

in the approach to regional development. Regions lagging behind tend to lag behind even more if a coherent regional policy framework is not in place. When it comes to the sphere of regional development, the formulation of measures and the identification of instruments used in one particular NUTS2 region, the City of Zagreb can hardly be put in the same basket as other counties, as the envisaged impacts will fail to manifest themselves throughout the whole territory.

Consequently, due to all the previously-mentioned findings in literature, and as the discussion indicates that the issues related to the impacts of crisis and resilience are interwoven, we focus in our research on the following research questions:

1. How did Croatian regions respond to the crisis? Is it possible to find any particular pattern that regional disparities follow?
2. What are the determinants of resilience and their key characteristics? Do they reflect the convergence or divergence of regional development paths?

Obviously, the approach to regional development has to be tailor-made to address specific regional issues within a country and with regard to the country's relationship with neighbouring and other countries. Identification of the determinants of resilience could help to achieve balanced regional development and a reduction of regional disparities, especially in turbulent times and in the context of uncertainty in mid- and long-term periods. To explain the effect of the changes in the decline of regional GDP per capita and to highlight the determinants of regional resilience over the recent economic crisis, we set up a model of conditional convergence employing the Generalised Least Squares (GLS) method for panel data applied to a period of 5 years (2008–2012). The possible determinants of regional resilience to recession could be the regions' underlying growth dynamics, sectoral composition, the

openness of the regional economy (in terms of participation in international trade), human capital, level of technology, investments and productivity (Martin, 2012). We could expect that regions with higher productivity, investments and a higher level of international trade are likely to be more resilient, in terms of being less vulnerable to and quicker in recovery from recessionary shocks than regions without these features.

### **The impact of the crisis on regional disparities**

A basic overview of theories, policies and practices in spatial economic development in contemporary Croatia are provided in the work of Kordej-De Villa et al. (2014). This article addresses the internal impediments to good governance in terms of their horizontal dimensions—policy confusion, the proliferation of institutions and strategic bodies, and tensions and inconsistencies of legal, political and administrative dimensions that combined contribute to uneven regional development in Croatia. Fröhlich (2013) describes Croatia's macroeconomic performance as being severely affected since the start of the global financial crisis: the stagnation of the economy, a negative growth rate, an average registered unemployment rate of 20.4%, a 5.7% decrease in active Small and Medium Enterprises (SMEs) from 2010 to 2011 and a stagnating or declining number of entrepreneurs (compared to 2010) who see an opportunity for starting a venture in the following 6 months. SMEs constitute 99.7% of all enterprises, representing an important part of the Croatian economy in terms of employment, in the creation of GDP and exports, and therefore contributing considerably to the (dis)balance of regional development.

The aim of this section is to analyse the regional impact of the economic crisis on Croatian NUTS3 regions. It analyses changes in the regional variability of the Regional Composite Development Index (CDI), of



GDP per capita, the unemployment rate and GDP per employee (productivity) resulting from the global crisis at NUTS3 level in Croatia. Variability is measured using the basic measures, including the standard deviation, the interquartile ratio, the ratio of the 90th to 10th percentile and the highest/lowest value ratio.

In terms of level of development, Croatian counties are officially ranked according to the CDI calculated as a weighted average deviation from the national average of the five indicators.<sup>4</sup> County units are divided into four different categories in accordance to their relative positions compared to the national average, as presented in [Table 1](#).

The 2010 CDIs are calculated on the basis of data measured in the pre-crisis period (2001–2008) and the 2013 CDI is calculated on the basis of indicators measured in 2008–2011, reflecting the state of the economy during the crisis. The CDI has a dynamic nature and is sensitive to minor changes in indicators, thus providing some relevant information for steering regional development policy. Standard regional GDP shows the achievements of the economy in one particular year and it is one static indicator of economic activity in a selected administrative-territorial unit; it is therefore not suitable for measuring economic development in a wider sense. Since the time and content dimension of data is crucial in determining the most appropriate development measures

to achieve the planned objectives in the long run, the combined use of both indicators should be carefully taken into consideration to better (more realistically) reflect the current development level ([Đokić and Sumpor, 2013](#)).

Compared to the period before the recession, it can be noted that the development gap is widening ([Table 2](#)). Both values of CDI (2010 and 2013) indicate high rates of polarisation, where in 2013 the most developed county (the City of Zagreb) had a 33 times higher value of CDI than the least developed one (the county of Virovitica-Podravina). In comparison, the ratio in 2010 was 9.1. Six out of seven coastal counties increased their relative advantage in the examined period (2010–2013). Such developments can be linked to the impact of tourism, since Croatia was one of the few destinations that registered growth in international tourist arrivals despite the 2008 crisis. The main characteristics of Croatian tourism are its seasonality and the unequal spatial distribution of tourist-related activities, which is evident from the data on tourist arrivals and the number of nights spent at the transfer or arrival destination. In Adriatic Croatia, on a yearly average (2008–2013), there are 78 times more tourists than in Continental Croatia, or almost 90% of tourist arrivals are concentrated in the counties of the Adriatic region. In 2009 (after the crisis began) in all EU-27 countries (for which EUROSTAT 2015 data are available), negative percentage changes compared to the preceding period were registered except in Greece, Sweden and the UK (in Italy no changes were recorded). In 2010 and 2011, the EU countries (the majority) registered positive trends. The escalation of the financial and economic crisis in Greece, and similar problems in Italy and Spain, led to a significant fall in tourist arrivals in these countries in 2012. Thanks to these, seen from the outside, unfavourable conditions, Croatia recorded significant growth in the number of tourists in 2012 ([Starč et al., 2015](#)). One might have expected the negative trends in the tourism sector of neighbouring countries to

**Table 1.** Categorisation of county units on the basis of the CDI.

1st group	Counties with a development index below 75% of the national average
2nd group	Counties with an index value between 75 and 100% of the national average
3rd group	Counties with an index value between 100 and 125% of national average
4th group	Counties with an index value above 125% of the national average

Source: Ministry of Regional Development and EU Funds (MRDEUF), 2010.

**Table 2.** CDI, 21 counties (NUTS3), 2010 and 2013.

County	2010	Development category	2013	Development category	Development index change 2013–2010
City of Zagreb	187.5	IV	186.4	IV	-1.1
<b>County of Istria</b>	<b>156.1</b>	<b>IV</b>	<b>156.8</b>	<b>IV</b>	<b>0.7</b>
<b>County of Primorje-Gorski Kotar</b>	<b>142.3</b>	<b>IV</b>	<b>139.2</b>	<b>IV</b>	<b>-3.1</b>
County of Zagreb	123.2	III	124.2	III	1.0
<b>County of Dubrovnik-Neretva</b>	<b>107.9</b>	<b>III</b>	<b>120.8</b>	<b>III</b>	<b>12.9</b>
<b>County of Zadar</b>	<b>75.6</b>	<b>II</b>	<b>106.4</b>	<b>III</b>	<b>30.8</b>
<b>County of Split-Dalmatia</b>	<b>89.1</b>	<b>II</b>	<b>93.8</b>	<b>II</b>	<b>4.7</b>
County of Varazdin	96.3	II	86.3	II	-10.0
<b>County of Šibenik-Knin</b>	<b>63.3</b>	<b>I</b>	<b>80.9</b>	<b>II</b>	<b>17.6</b>
County of Krapina-Zagorje	87.7	II	73.2	I	-14.5
County of Medimurje	75.1	II	69.7	I	-5.5
<b>County of Lika-Senj</b>	<b>55.5</b>	<b>I</b>	<b>64.8</b>	<b>I</b>	<b>9.3</b>
County of Koprivnica-Krizevci	64.3	I	59.2	I	-5.1
County of Karlovac	54.5	I	56.3	I	1.8
County of Osijek-Baranja	52.9	I	46.1	I	-6.8
County of Sisak-Moslavina	48.5	I	38.7	I	-9.8
County of Požega-Slavonia	44.0	I	33.8	I	-10.1
County of Bjelovar-Bilogora	35.2	I	23.3	I	-11.9
County of Vukovar-Sirmium	33.4	I	18.7	I	-14.6
County of Brod-Posavina	20.6	I	18.4	I	-2.1
County of Virovitica-Podravina	20.5	I	5.6	I	-15.0
Range	167.0		180.9		13.9
Standard deviation	44.87		48.81		
90th/10th percentile	4.26		7.44		
75th/25th percentile	1.99		2.75		
Highest/lowest ratio	9.1		33.1		

Coastal counties are shown in bold.

Source: MRDEUF, 2014.

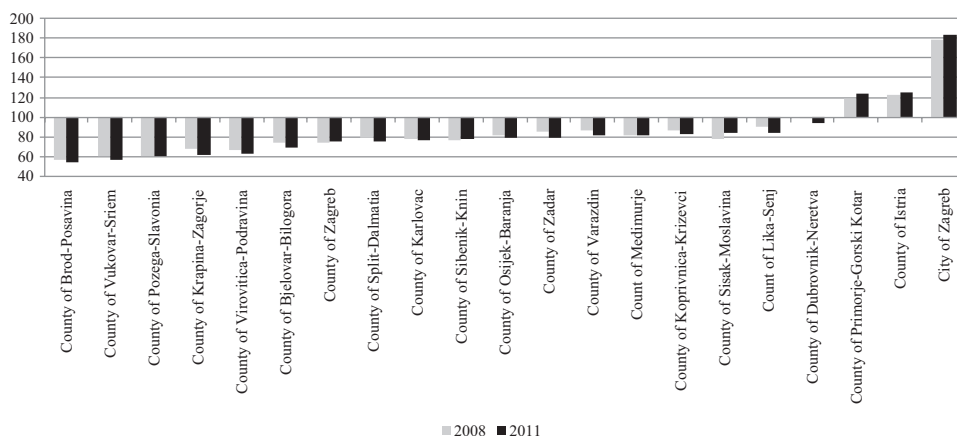
have had negative spill-over effects in Croatia. However, the growth in Croatian tourism seems to be a positive consequence, contrary to the commonly expected negative impact of global trends.

The following section analyses the extent of convergence or divergence in regional GDP per capita in the period before the crisis (2001–2008) and since the onset of the 2008 economic crisis. For each county (NUTS3 region), the GDP per capita is normalised relative to the national level GDP per capita (in EUR per inhabitant) for the 2000–2011 period. GDP per inhabitant (in EUR) in 2011 measured for the NUTS3 regions ranged from 54.4% of the national average (compared to 58.6 in 2001) to

183.4% of the national average (compared to 166.5% in 2001).

The basic pattern of disparities, with high-income regions in the central and western part of the country (around the City of Zagreb) and lower income regions in the east, combined with other forms of the urban–rural divide, is evident in Croatia. There is a marked disparity between the region of the capital city and the remainder of the country.

The scale of these disparities in three years, 2001, 2008 and 2011, is presented in Figure 1, where regional GDP per capita is plotted relative to the national average for the NUTS3 regions (counties) in Croatia. In each of the observed years, GDP per capita above the national level



**Figure 1.** GDP per capita, counties (Croatia = 100), 2008 and 2011. Source: Authors' calculation based on CBS data, 2001–2011.

was recorded in only three NUTS3 regions: the City of Zagreb and the western coastal counties of Istria and Primorje-Gorski Kotar.

All the counties recorded steady growth in their GDP per capita until 2008, when the values peaked. Since the onset of the economic crisis, counties recorded a fall in their GDP per capita. Such developments resulted in more dispersed GDP per capita across Croatian NUTS3 regions in 2011 relative to 2008 (Table 3 and Figure 2). An analysis of the dispersion of regional GDP per capita shows that there was a process of divergence both in the pre-crisis period and in the period during the recession. However, in the period before the recession, the divergence process occurred at a much slower pace than during the economic crisis. From the data provided, it can be concluded that there was a convergence of GDP per capita among Croatian counties from 2004 to 2008.

Divergence within Croatia is reflected in the economic expansion of the capital city as a growth pole where GDP per capita, due to the concentration of economic activities, grew much faster than the remaining parts of Croatia. There is a considerable gap between the economic development (measured by GDP per capita) of the capital, its surrounding regions

**Table 3.** Regional disparities in GDP per capita (Croatia = 100) in 2001, 2004, 2008 and 2011.

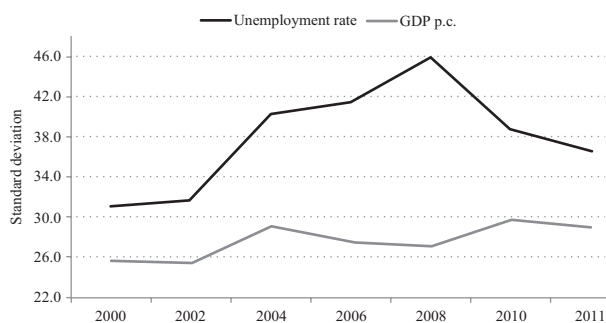
	2001	2004	2008	2011
Standard deviation	1.23	1.21	1.18	1.22
90th/10th percentile	1.80	1.93	1.96	2.04
75th/25th percentile	1.23	1.21	1.18	1.22
Highest/lowest ratio	2.73	2.96	3.16	3.37

Source: Authors' calculation based on CBS data, 2001, 2004, 2008 and 2011.

and a few other counties on the one hand and the rest of the country on the other. This also confirms some post-Keynesian theoretical findings mentioned above, that the growth of some regions within a country will not necessarily lead to overall national growth but, on the contrary, could widen the gap between the developed and less developed regions.

Recent analysis of the net fiscal positions of Croatian counties<sup>5</sup> (Bajo et al., 2015) for the period 2011–2013 show that the majority of Croatian counties (17) registered negative net fiscal positions, while only 4 (out of 21 in total) registered positive positions. Monitoring the fiscal position of counties is important for the implementation of regional policy since it clearly indicates the fiscal capacities (capacities in the





**Figure 2.** Dispersion of regional GDP and regional unemployment rate, 2000–2011.

Source: CBS, Croatian Employment Office (CEO), 2001–2011.

collection of revenues) and needs of local units at county level. Although the net fiscal position at the national level is positive, a great number of counties (17) are net receivers from the general government budget (which encompasses the state budget, local self-government budgets and extra-budgetary funds), i.e. they spend more than they receive and their positions generally worsened in the observed period.

This section provides an analysis of regional disparities in the unemployment rate resulting from the global crisis, at a fine spatial scale (NUTS3). The labour market reacted negatively to the persistent difficulties of the crisis, with the national unemployment rate rising from 14.4% (2008) to 19.2% (2011). Among Croatian counties (NUTS3 regions), the lowest unemployment rates in 2011 were recorded in the City of Zagreb and in the County of Istria, while the highest unemployment rates were recorded in the counties of Brod-Posavina and Virovitica-Podravina. Compared to 2008, the unemployment rate increased in all counties. The question that arises is whether the deteriorating performance of labour markets during the crisis was accompanied by an increase in disparities between regions. As can be seen from Figure 2, the dispersion of the regional unemployment rate narrowed over the 2008–2011 period. However, it can be assumed that the unemployment rate may not fully reflect the extent of the problems in some structurally weaker regions.

Some companies and regions have been slow to lay off workers despite the recession.

Figure 2 illustrates regional GDP per capita and regional unemployment dispersion, i.e. the deviation of regional GDP per capita and the unemployment rate from the national average, where a higher value denotes greater inequality. Regarding GDP per capita, figures rose from 2001 to 2004 and then fell until 2008. From 2008 onwards, this trend reversed. On the other hand, the financial crisis and ensuing global recession pushed up unemployment in all 21 NUTS3 regions and contributed to a change in the trend of regional dispersion. A fall in the measure of unemployment dispersion was caused by unemployment in high-performing counties rising disproportionately to converge with low-employment areas. High employment regions moved towards those with low employment rather than vice versa.

The analysis of trends in productivity for 2001, 2008 and 2011 shows a slight increase in the level of disparity in GDP per employee in the post crisis period as well as in the pre-crisis period (Table 4). However, between 2008 and 2011, the average annual increase in the level of disparity of regional productivity was a bit faster than in the pre-recession period.

There is strong evidence in 12 out of the 21 Croatian counties of a trade-off between productivity and employment rates over the 2008–2011 period, where gains in productivity were

**Table 4.** Changes in productivity and employment, NUTS3, 2001, 2008 and 2011.

	2001	2008	2011
Standard deviation	8.759.0	10.5	11.5
90th/10th percentile	1.25	1.34	1.42
75th/25th percentile	1.12	1.24	1.20
Highest/lowest ratio	1.35	1.42	1.51

Source: Authors' calculation based on CBS data, 2001, 2008 and 2011.

achieved at the expense of employment (the two determinants of output are moving in different directions over time) and production, where employment fell faster than production (GDP in current prices) (see Figure 3). Namely, all counties experienced a decline in employment.

The fall in employment was translated in part in mass unemployment. On the other hand, in nine counties, there was a combined decline in productivity and employment, where production tended to drop at a faster rate than employment. These changes were dramatically underpinned by the widespread collapse of formal economic activity.

### The components of territorial disparities

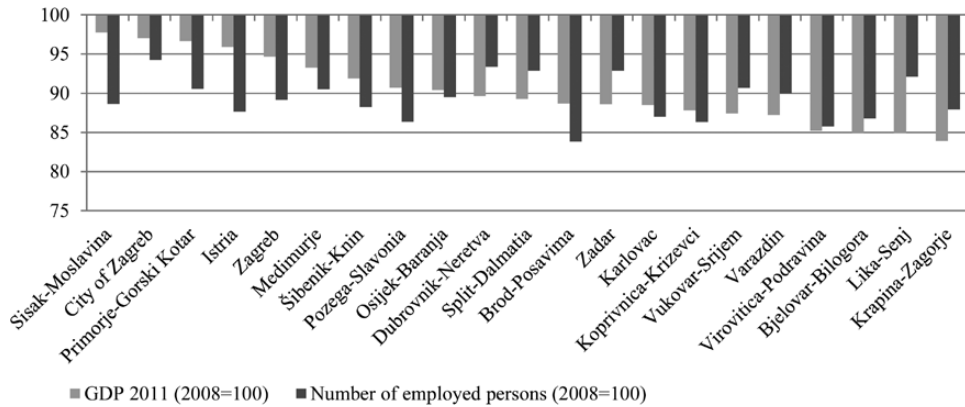
In order to extend the analysis and identify the causes of uneven economic development and disparities, the differentials in development can be divided into two parts: one part that depends on productivity and another that depends on the employment rate (the percentage of the population employed). An examination of these elements can be helpful in identifying the factors that underpin the uneven development in Croatia.

Productivity and employment rates play quite different roles in different counties. Figure 4 plots productivity and employment rates in 2011 for both Continental Croatia counties and Adriatic Croatia counties, by grouping them in four categories. It is evident from Figure 4 that

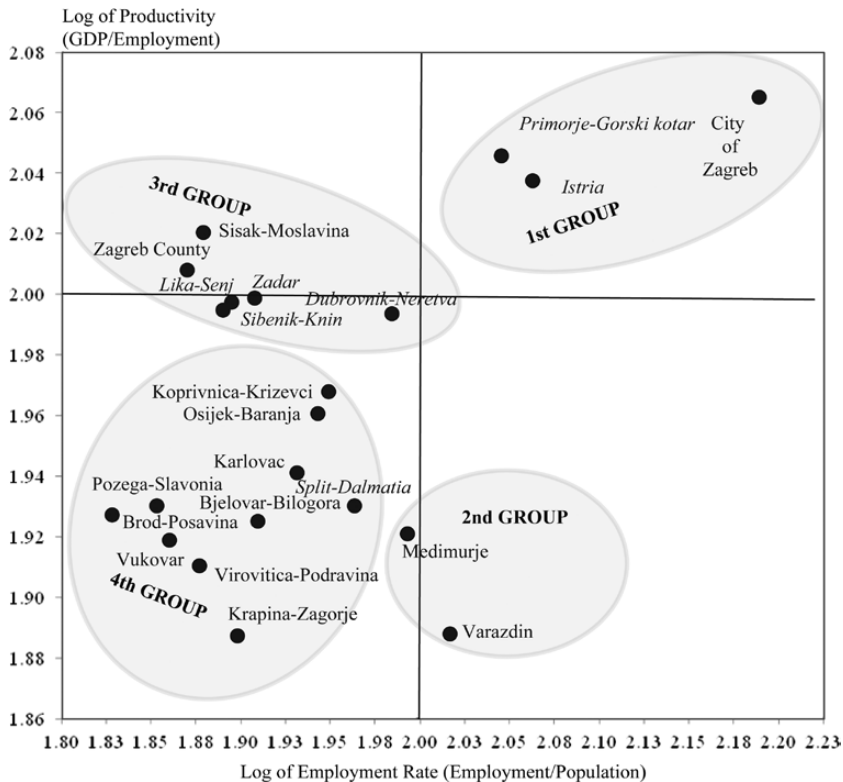
clear divides in productivity and employment rates exist in Croatia. First, there is a profound divide in the employment rates of all counties. Employment rates ranged from 19.7 to 51.0% (the national average is 31%). Productivity rates in Croatia ranged from 77.2% of the national average to 116.2%. In 16 out of 21 counties, productivity rates were below the national average. In 21 counties plotted in Figure 4, four main groups can be identified: the first group consists of the three most developed counties, characterised by relatively higher productivity and employment rates. These counties proved to be the most resilient to external shocks and able to respond to negative influences in the shortest period. The second group comprises only two counties, both in Continental Croatia (the northern part of the country), characterised by relatively lower productivity, while employment tended to be equivalent to the national average. The third group comprises two counties located in Continental Croatia and four in Adriatic Croatia. They are characterised by relatively higher productivity (around the national average) and by lower employment. Higher productivity rates are achieved on the basis of a lower degree of mobility of human potential. The fourth group consists of as many as 10 counties characterised by lower productivity and lower employment. Only one of the nine counties in this group is located in Adriatic Croatia. Poor economic performance in this group could in part be the result of the lower rate of employment. This group proved to be the least resilient to external shocks and requires considerably more time to adapt to the new economy context.

### The determinants of regional resilience over the recent economic crisis

In an attempt to explain the effect of changes in regional GDP per capita growth and to highlight the determinants of GDP developments over the recent economic crisis, we set up a model of conditional convergence. Conditional



**Figure 3.** Nominal change of GDP and change in the number of employed persons by counties, 2011 (2008 = 100). Source: Authors' calculation based on CBS and CEO data, 2008, 2011.



**Figure 4.** Grouping of Croatian counties by productivity and employment rates in Croatian counties, 2011. Note: Counties in italics are located in Adriatic Croatia. Source: Authors' calculation based on CBS and CEO data, 2011.

convergence models usually include a number of structural or demographic characteristics of the regions included in the analysis as

independent variables, and such models estimate the impact of these variables on growth. The models include explanatory variables

additional to that of the initial level of GDP per capita – GDPpc. Since the descriptive statistics presented in ‘The impact of the crisis on regional disparities’ section indicate that the recession that began in 2008 had a significant negative impact on the dispersion of regional GDP per capita, we would not expect to find a positive relationship between GDP growth and the initial level of per capita GDP.

The specification of the model is as follows:

$$\Delta Y_{it} = \beta_0 + \beta_1 Y_{it} + \alpha_j X_{j,ia} + \varepsilon$$

where capital letters indicate variables in the natural logarithms,

$$i = 1, \dots, n, n = 21 \text{ (number of counties)}$$

$$j = 1, \dots, k, k = \text{number of additional independent variables}$$

$$t = 1, \dots, 5.$$

In this model, the dependent variable is the percentage change of GDP per capita over the 2008–2012 period,  $X$  is the vector of  $k$  additional explanatory variables, and  $Y_{it}$  is the independent variable which measures the level of GDP per capita. The structural variables included in the model are: the share of regional GDP produced in the primary sector (agriculture, forestry and fisheries) – PRIMReg; the share of regional GDP produced in the secondary sector – SECRReg; the share of trade, services, tourism and transport in GDP – TradeTransReg; the share of regional GDP produced in construction – CONSTReg; the number of ICT firms per capita – ICTReg; population growth – POPReg; gross fixed capital formation – INVReg and the sum of imports and exports in the regional levels of GDP as a measure of openness of the regional economy and labour productivity – PRODReg.<sup>6</sup> The variables measure change during the observed period. All variables intend to measure the impact on regional GDP per capita performance during the observed period (the main period of the analysis is extended to the 2008–2012 period in order to have a larger sample size).

Various studies carried out in recent years have provided concrete evidence of the positive impact that trade openness has on economic growth (Babula and Anderson, 2008; Dollar, 1992; Krueger, 1990; Romer, 1989; Sachs and Warner, 1995; Sengupta, 1994; Willard, 2000). In line with this, we expect to find a positive impact of international trade on growth. Since economic growth can be stimulated by increasing amounts of capital (fixed capital formation) and human capital (labour) and by combining them in an efficient way, we also expect to find a positive relationship between economic growth on one hand and gross fixed capital formation, population growth and labour productivity on the other hand. As some of the recent empirical studies on the growth performance of countries have focused on the role of innovation and technological progress as the driving force of long-term sustained growth (Aghion and Howitt, 1992; Grossman and Helpman, 1994; Romer, 1990), the variable ICTReg per capita is used as an approximation of regional technological progress, with the expectation of a positive relationship between ICTReg and the economic performance of Croatian counties.

Table 5 shows the results of estimating the model over the sample period using the GLS random effects panel data model. The GLS random effects model requires that we treat the  $u_i$  terms as random variables and assume that there is no correlation between  $u_i$  and  $X$ . The panel data method was used to increase the precision of the estimate by increasing the sample size to improve the efficiency of the parameter estimates. One of the strongest advantages of panel data methods is the ability to control unobserved heterogeneity (Baltagi, 2001). Our sample consists of 21 Croatian counties, which are analysed in the period 2008–2012 through the random effects panel data model. The GDP growth rate, which is always the dependent variable in our models, is explained by a number of indicators that we detail below.

As the equations include the initial level of development, they can be considered as a

**Table 5.** Results of the econometric model using the GLS random effects panel data model (dependent variable: growth of GDP per capita).

Independent variable	Variable code	Specification A	Specification B	Specification C	Specification D
GDPpc	GDP per capita	0.0411***	0.0456***	0.0431***	0.0336***
ICTReg	ICT enterprises per capita	-0.0019	0.0029	0.0043	0.0041
OPENReg	Openness	0.0800***	0.0900***	0.0929***	0.0752***
INVRReg	Investment - GDP Ratio	0.0198	0.0024	-0.0013	-0.0003
PRODReg	Productivity (Employment - GDP Ratio)	-0.0024	-0.0007	-0.0009	-0.0067
POPReg	Population	-0.5993***	-0.6289***	-0.5914***	-0.4523**
PRIMReg	Primary sector - GDP Ratio				-0.1397***
MANFReg	Manufacturing sector - GDP Ratio			-0.0295	-0.017
TRADSERVReg	Trade, Services and Transport - GDP Ratio			0.0638	0.0697
CONSTReg	Construction - GDP Ratio		0.0656***	0.0748***	0.0634***
CONSTANT		6.5211***	6.3225***	5.8625***	6.1509***
	$R^2$	0.3387	0.3965	0.4075	0.4758

Source: Authors' calculation based on CBS and CEO data, 2012.

\*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

conditional convergence/divergence model. To control for spatial correlation and heterogeneity, standard errors are clustered on 21 Croatian counties. In each case, the parameter estimates and their corresponding level of significance as well as  $R^2$  are reported. Columns 3–6 show the estimation results for different sets of explanatory variables. The explanatory power of the models ( $R^2$ ) is relatively good and the independent variable with a statistically significant impact on the development of regional GDP per capita appears in a consistent and robust way. In all four models, the initial level of development measured by GDP per capita is positive and statistically significant, indicating a process of regional divergence for the period 2008–2012. Therefore, the hypothesis of conditional convergence cannot be supported. OPENReg and CONSTReg (share in GDP) have highly significant and positive influences on regional performance, with positive and significant

coefficients in each of the four models, which indicates that regions with a lower decline in international trade/construction activity were more resilient to the economic crisis. On average, Croatian counties reduced their level of openness in the international economy in the 2008–2012 period by 4.4% points. Croatia's volume of exports in 2012 was 10% below its 2008 peak (European Commission, 2014). Such developments were partly a consequence of the reduced activity of the shipbuilding sector, one of Croatia's leading export industries, which was undergoing restructuring, and partly a consequence of Croatia's exit from CEFTA, which meant reduced access to regional markets.

The construction sector in Croatia was hit hard by the economic crisis. From 2008 to 2012, the average share of construction in total GDP decreased by 6.0% points and the Gross Value Added (GVA) of the construction industry between 2008 and 2012

recorded a nominal decline of 38.4%. The share of trade, services and transport in GDP declined by 4.9% points, while the share of manufacturing decreased by 2.6% points. The share of agriculture in GDP declined slowly in the observed period (by 1.7% points), thus reflecting the move to self-employment in agriculture of persons who had lost their jobs in the manufacturing sector.

Since the construction sector was most affected by the recession, it is not surprising that the regions which experienced weaker decline in the construction sector proved to be more resilient to the crisis. We can also conclude that a drop in international trade and construction activities facilitated regional divergence, as the regions with a higher drop in GDP per capita were also experiencing a higher decline in those activities.

In contrast, PRIMReg and POPReg appear to have a negative, significant impact on regional GDP per capita growth over the period in question, suggesting that regions experiencing growth (or a lesser decline) in population/share of the primary sector in GDP are less resilient to the economic crisis than others.

The other economic explanatory variables (ICTReg, INVReg, PRODReg, MANFReg, TRADSERVReg) do not perform well and are never statistically significant. The coefficient on the investment ratio is not statistically significant in any of the four models, suggesting that domestic investment played a small role in regional performance during the observed period. This can partly be explained by ineffective investment planning in Croatia, by the fact that during this period of economic restructuring new investments were accompanied by a great number of disinvestments, and partly by the short time period. According to growth literature theory, investments are engines of growth in the medium to the long run. Contrary to economic theory, neither labour productivity nor ICT per capita had any significant influence on regional performance during the period of recession in the case of Croatia.

## Conclusion

The conducted analysis has provided some answers to our research questions. It has shown that the recession that began in 2008 had a significant negative impact on the dispersion of the regional development index, regional GDP per capita and regional productivity (GDP per employee) in Croatia. On the other hand, the unemployment rate across Croatian counties became less dispersed in 2011 relative to 2008. The increase in the standard deviation of the unemployment rate during the period before the recession crisis (2001–2008) was followed by peak values achieved in 2008. After that, a continuous decrease was recorded. The primary cause for the decline in interregional disparities in the unemployment rate lies in the fact that the crisis led to a convergence in poverty. Regarding productivity changes, it has been found that there is evidence of an increase in productivity, but at the expense of employment. Generally, compared to the period before recession, it can be noted that the productivity gap widened. Tendencies towards increased uneven development are to some extent the result of a trade-off in which productivity gains are achieved at the expense of both employment and production, where in as many as 12 counties increased productivity was the result of a faster decline in employment than in production (GDP in current prices). On the other hand, in nine counties, there was a combined decline in productivity and employment rates (and in production), where production tended to drop at a faster rate than employment. In line with this, it could be claimed that the economically weaker counties were at the same time comparatively unsuccessful in their attempts to redeploy unemployed persons or to provide alternative employment opportunities. The econometric analysis based on the panel growth regressions reported above provides important evidence of the process of regional divergence in Croatia for the 2008–2012 period. The obtained results indicate that on average regional disparities moved anti-cyclically, i.e. increasing during the last recession. This



is in line with some of the conducted studies that have shown that periods of economic downturns can trigger regional divergence (Dunford and Perron, 1994; Dunford and Smith, 2009; Evans and McCormic, 1994). The estimated conditional convergence model has shown that construction activities and trade openness are the most important determinants of regional resilience, having a positive and important role in regional economic performance, which is in accordance with previous papers in the literature (Babula and Anderson, 2008; Caporale, 2009). It can be concluded that counties with a lower decline in international trade/construction activity were more resilient to the economic crisis. Moreover, a deeper drop in international trade and construction activities facilitated regional divergence, as the regions with a deeper drop in GDP per capita were also experiencing a greater decline in those activities. On the other hand, counties experiencing growth (or a lesser decline) in population/share of the primary sector in GDP were less resilient to the economic crisis than others. Contrary to economic theory and our expectations, other explanatory variables did not have a significant influence on regional performance during the recession period in the case of Croatia. Finally, in order to sustain regional growth in the long term and to support regional development in Croatia, international competitiveness needs to be further stimulated by governments as a prerequisite for successful and sustainable regional development. One of the possible policy responses could be a shift to industrial restructuring and repositioning which can generate an alternative growth path or paths that the region may follow, as also explained by Christopherson et al. (2010).

The agricultural sector is more represented in the Continental part of Croatia, and the majority of the counties there (located in the eastern part) still face post-war consequences. Therefore, these counties appear to be less resilient (more vulnerable to the crisis), which requires greater attention at the policy-making level and demands specific (urgent) measures for their recovery.

## Endnotes

<sup>1</sup> The Act on the Territories of Counties, Towns and Municipalities in the Republic of Croatia (Official Gazette, No. 86/06,125/06, 46/10, 145/10, 37/13, 44/13, 45/13).

<sup>2</sup> Refers to the elaboration of county development strategies in all 21 Croatian counties, including the City of Zagreb.

<sup>3</sup> Even though (based on the survey results) county development strategies prove to be a good instrument for managing regional and local development!

<sup>4</sup> CDI is based on five weighted indicators: personal income per capita (30%), county budget revenues per capita (25%), the unemployment rate (15%), the change in the population between censuses (15%) and the educational structure of the population, i.e. educational attainment rate (15%). The categorisation of the counties was introduced by the Act on Regional Development in 2009 (Official Gazette, No. 153/09, 63/10, 158/2013).

<sup>5</sup> Calculations are based on revenues and expenditures from regular county activities and from those activities carried out in its territory, which is a different calculation from that applied for calculating the surplus/deficit of the state budget. A full methodological explanation is provided in the paper mentioned.

<sup>6</sup> Labour productivity is defined as GVA in Euros at basic prices per person employed.

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