Tomislav Sekur
University of Zagreb
Faculty of Economics and Business
10000 Zagreb, Croatia
tsekur@efzg.hr

Tamara Slišković
University of Zagreb
Faculty of Economics and Business
10000 Zagreb, Croatia
tboras2@efzg.hr

Marija Beg
University of Zagreb
Faculty of Economics and Business
10000 Zagreb, Croatia
mbeg@efzg.hr

JEL: R11, O10
Original scientific article
https://doi.org/10.51680/ev.38.2.9

Received: February 10, 2025
Revision received: August 5, 2025
Accepted for publishing: September 17, 2025

RELATIONSHIP BETWEEN REGIONAL DISPARITIES AND NATIONAL GROWTH IN CROATIA

Abstract

Purpose*:* This paper analyzes the applicability of Williamson's inverted U-curve hypothesis to Croatian regional development from 2000 to 2021. According to the theories of Kuznets (1955) and Williamson (1965), regional disparities tend to increase initially and then decline as economic development progresses. This phenomenon, known as the Kuznets-Williamson hypothesis, serves as the foundation for this study, which aims to test its validity in the context of the development of the Croatian counties from 2000 to 2021.

Methodology: This paper employs Pearson's correlation coefficient to examine the relationship between regional disparities, measured by the coefficient of variation, and economic growth, measured by the annual growth rate of national GDP per capita.

Results: The results of the analysis confirm the validity of the Kuznets-Williamson hypothesis in the case of Croatia. During the first phase of economic growth (until 2010), regional disparities increased, while in the second phase (from 2010 onwards), they decreased. Evidence of β-convergence (2015-2021) suggests that poorer regions grew faster, reducing the development gap.

Conclusion: Regional disparities in Croatia from 2000 to 2021 follow the Kuznets-Williamson hypothesis, i.e. disparities increased until 2010 and declined thereafter. Additionally, Zagreb's economic dominance played a key role in regional disparities, particularly between 2000 and 2014. However, after 2014, regional disparities decreased despite a slight increase in Zagreb's dominance, an outcome that is somewhat unexpected. The stronger integration of Croatia into the European Union may have played a crucial role in accelerating the growth of poorer counties and reducing regional disparities.

Keywords: Regional disparities, economic growth, Croatia, counties, Kuznets-Williamson hypothesis

1. Introduction

This paper examines Croatia's economic development over the past twenty years, focusing on the trade-off between national growth and regional inequality. Between 2000 and 2021, Croatia experienced several significant events that influenced both overall economic growth and the evolution of regional disparities. Several major events are high-

lighted: the global financial crisis of 2009, Croatia's accession to the European Union in 2013, the pre-pandemic expansion, and the COVID-19 pandemic in 2020. Each of these events had profound implications for Croatia's economic landscape, contributing to shifts in both national economic performance and the balance of regional disparities.

In line with the Kuznets-Williamson hypothesis, three key observations can be made regarding the evolution of regional disparities in Croatia:

1. Less developed counties grew faster than more developed ones, especially in the post-crisis of 2009-2014, indicating evidence of β-convergence;
2. Over the past 20 years of economic development, regional inequalities initially increased (σ-divergence) and subsequently decreased (σ-convergence);
3. Economic activities in Croatia are highly unevenly distributed, with the City of Zagreb holding a dominant position both in absolute and relative terms.

This paper is structured as follows: The introduction is followed by the theoretical background and a literature review highlighting the most significant works addressing regional disparities and examining the Kuznets-Williamson hypothesis. The third section analyzes regional disparities in Croatia, measured by GDP, GDP per capita, and the shares of individual counties in Croatia's total GDP, with a particular focus on the City of Zagreb. The Kuznets-Williamson hypothesis is also tested, exploring the evolution of the relationship between regional disparities and economic growth, along with assessments of beta and sigma convergence. Finally, Section 5 provides key considerations and recommendations for economic policymakers.

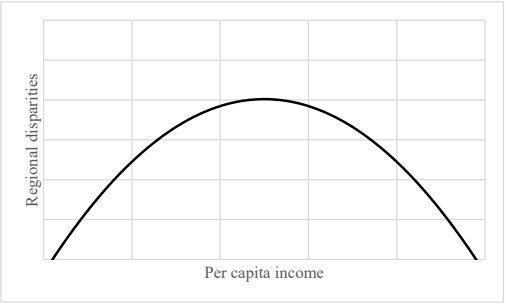
2. Theoretical background and literature review

2.1 Theoretical background

Regional inequalities in income levels and economic development are present in most countries, and their explanation stems from different theoretical approaches. In this paper, the theoretical framework is primarily based on the Kuznets-Williamson hypothesis. The core ideas proposed by Kuznets (1955) and Williamson (1965) suggest that spatial inequalities tend to increase during the early stages of economic development, reach a peak, and then decline. This phenomenon is often described as an inverted U-shaped relationship between regional (spatial) inequalities and economic development. The underlying mechanism is that, in the initial phases of development, economic gains tend to be concentrated among a limited segment of the population, typically those investing in physical capital. As a result, economic disparities widen. However, as development progresses, a structural transformation occurs, with more individuals transitioning from the agricultural sector to the industrial sector, leading to a reduction in inequalities. In a spatial context, this implies that the benefits of economic development are initially confined not only to a select few but also to specific geographic areas. For instance, during the early stages of industrialization, regions rich in natural resources such as coal and iron often experience more rapid development, exacerbating regional inequalities.

As industrialization advances, labor migration from less developed to more developed regions can create balancing effects. The influx of workers into industrial hubs decreases wages in those regions while increasing wages in poorer areas due to labor shortages, narrowing the income gap across the country. Furthermore, government interventions, including public investments and economic assistance, play a crucial role in mitigating regional disparities. These dynamics collectively produce an inverted U-shaped curve of regional inequality over the course of economic development. Figure 1 displays the basic Kuznets-Williamson hypothesis, also known as Williamson's curve of regional disparities.

Figure 1 Williamson's curve of regional disparities



Source: Authors, on the basis of Capello (2016), p. 204

2.2 Literature review

In this section, we review key literature on the Kuznets-Williamson hypothesis and then focus on studies that explore the dynamics of regional inequalities in the context of economic growth in Croatia. As mentioned in the introduction, the theoretical foundation of this paper is based on the works of Kuznets (1955) and Williamson (1965). In his seminal work, Kuznets (1955) examined the nature and causes of personal income inequality in the United States. He proposed that income inequality tends to first increase and then decrease as economic development progresses. He identified the concentration of industrialization in one or a few regions as a key driver of rising inequality, while the subsequent spread of industrial development across the country leads to a reduction in disparities. Building on this hypothesis, Williamson (1965) applied it to regional disparities in both developed and developing countries. By introducing the coefficient of variation as a measure of regional inequality, he concluded that regional disparities also follow an inverted U-shaped pattern during economic development, first increasing, then decreasing. The Kuznets-Williamson hypothesis has been highly influential since its inception, prompting numerous authors to test its validity across different time periods and countries or regions. However, empirical findings remain mixed. The first part of this literature review presents the most significant studies that confirm the existence of the Kuznets-Williamson hypothesis, while the second part focuses on those that fail to confirm it or propose alternative interpretations of the hypothesis.

Kuznets's discovery was soon followed by studies that confirmed the pattern of inequality first increasing and then decreasing with economic growth. For instance, Easterlin (1958) identified the key factors driving the convergence of regional income levels in the United States, providing early empirical support for this relationship. Smolensky (1961) reached a similar conclusion in his analysis of the relationship between national income and per capita income distribution in the United States from 1919 to 1950. He found that income inequality increased during the 1920s and then steadily decreased until the end of World War II. Perin and Semple (1976) confirm that income inequalities in the United States decreased during the period 19531972, but at a decreasing rate. Robinson (1976) developed a simple two-sector model demonstrating that regional inequalities can persist and remain long-lasting if not addressed through appropriate countervailing policies. In more recent years, studies that have empirically confirmed this phenomenon include Kim and Margo (2003), who argued that economic geography is intrinsically tied to the process of economic development. From a historical perspective, regional inequalities in the United States initially increased during the 19th century, as industry dominated the North while agriculture prevailed in the South. By the second half of the 20th century, however, these inequalities diminished due to the widespread industrialization and the shift toward a tertiary-based economy. Ezcurra and Rapún (2006), who analyzed 14 Western European countries during the period 1980-2002, came to the conclusion that regional inequalities are transitory, they increase initially and then decrease during economic development. Barrios and Strobl (2009) use regional data from European countries and conclude that there is an inverted U-shaped relationship between regional inequalities and GDP per capita. Davies and Hallet (2002) only partially confirmed Williamson's hypothesis regarding the evolution of regional inequalities during economic development. Using data from EU-15 countries, they found evidence that regional inequalities increase during the early stages of development but found little support for the notion that these inequalities decrease in the later stages. Petrakos et al. (2003) found that, in the short term, regional inequalities within the EU are pro-cyclical, increasing during periods of economic expansion and decreasing during periods of slower growth. In the long term, however, these inequalities tend to decline. Rusnák et al. (2023) test the Kuznets-Williamson hypothesis on the example of Slovakia. Their analysis confirms that Slovakia has entered the second phase of regional development, characterized by a decline in regional inequalities. However, this comes at the cost of lagging behind the EU's average standard of living. Other studies that have confirmed the existence of an inverted U-shaped relationship between economic development and regional inequalities include Crafts (2005) for the United Kingdom, Combes et al. (2011) for France, Martinez-Galarraga et al. (2015) for Spain, Badia-Miró et al. (2012) for Portugal, and Neszmélyi et al. (2016) for the Visegrad Group.

However, there are also studies that have not found a strong link between inequality and development,

as predicted by the Kuznets-Williamson hypothesis, especially in cases where inequalities increase in the highest stages of development. Therefore, the focus shifted to explaining an N-shaped relationship between development and regional inequalities. Amos (1988) examined the Kuznets-Williamson hypothesis using data from the U.S. states and found that, in the later stages of economic development, regional inequalities tend to increase once again. This finding suggests that the Kuznets curve evolves beyond its traditional inverted U shape, forming a pattern resembling the letter N. This finding is inconsistent with the neoclassical logic underlying the inverted-U hypothesis, which posits that inequalities should not increase once regional convergence is achieved in the later stages of development, as pointed by Fan and Casett (1994), who argue that the inverted-U hypothesis no longer adequately explains the recent rise in regional inequalities. Instead, they suggest that U.S. regional development is now shaped by new factors, such as sectoral shifts and global restructuring, necessitating the adoption of new frameworks and tools to better understand and address regional inequalities. Terrasi (1999) also suggests that regional inequalities tend to increase in the later stages of economic development. Analyzing the period from 1953 to 1993 for Italian regions, the study observes a trend of regional income convergence up until 1975, followed by a period of divergence thereafter. Giannetti (2002) examined the effects of EU integration on both national and regional convergence. Her findings indicate a lack of coexistence between these two processes: while EU countries exhibited convergence at the national level, regions within individual countries did not follow the same pattern. Lessmann (2014) reached a similar conclusion, affirming the relationship between spatial inequalities and economic development using panel data from 56 countries spanning 1980 to 2009. His analysis also revealed that at very high levels of economic development, regional inequalities tend to rise again, further supporting the notion of an N-shaped curve in the development-inequality relationship. Lessmann and Seidel (2017) conducted a similar study using data from 180 countries over the period 1992-2012, employing satellite data on night time illuminance as a proxy for economic activity. Their findings reaffirm the N-shaped relationship between development and regional inequalities. They also emphasize the significant roles played by factors such as trade openness, foreign aid, federalism, and human capital in shaping these dynamics. A similar conclusion is reached by Díez-Minguela et al. (2020), who, based on data on regional and national GDP per capita for France, Italy, Portugal, and Spain covering the period 1860-2010, find that regional inequalities initially increase and then decrease, but have risen again in recent decades.

This section of the literature review highlights key studies that have addressed regional inequalities in Croatia. It is important to note that, to date, no studies in Croatian economic literature have specifically tested the Kuznets-Williamson hypothesis. Therefore, this paper represents a novel contribution to the analysis of regional disparities in Croatia. Nonetheless, several important works have examined regional differences more broadly and are worth mentioning. Sić (2003) analyzes regional disparities through the lens of the center-periphery model, highlighting the dominance of Zagreb and its surrounding areas. He suggests that European economic integration could help bridge the development gap between Croatian regions. Pejnović (2004) explores the increasing polarization of Croatia, emphasizing the strong growth of central Croatia (Zagreb) at the expense of other regions, particularly eastern Croatia. Puljiz and Maleković (2007) assess regional income and unemployment disparities from 2000 to 2005 using various inequality measures. Their findings indicate that while Croatia exhibits moderate income disparities, unemployment inequalities are more pronounced. Bićanić and Pribičević (2013) use the Gini coefficient and the Theil index to demonstrate that inequalities are increasing both within and between regions. Đokić et al. (2016) examine the impact of the economic crisis on regional inequalities from 2008 to 2012. Their analysis indicates that the crisis contributed to increasing regional inequalities and had a negative impact on regional GDP per capita and productivity. However, it also led to a reduction in regional unemployment dispersion. Marošević (2020) focuses on eastern Croatia and provides key recommendations for reducing the development gap between this region and the rest of the country. Marošević (2021, pp. 163-173) also provides an extensive review of empirical studies confirming the persistence of regional inequalities in Croatia. The OECD study (2024) highlights significant regional disparities in Croatia, noting that excessive territorial fragmentation weakens the country's capacity to implement effective regional development policies.

3. Method and data

There are several ways to measure economic growth at the regional level, including GDP per capita, the Human Development Index (HDI), per capita consumption, poverty rate, access to public services, unemployment rate, labor force participation rate, and others (Nijkamp & Abreu, 2009). However, the most important measure for regional development analysis is GDP per capita, which will also be used in this paper. Our paper follows the methodology outlined by Rusnák et al. (2023), which examines Kuznets-Williamson hypothesis in the case of Slovakia. A similar approach has been applied to the analysis of regional disparities in Croatia with the necessary adjustments to fit the scope of this research.

Pearson's correlation coefficient (r) is employed to examine the relationship between regional disparities and economic growth. The standard formula can be written as (Wooldridge, 2002):

$$r = R_{XY} = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{(\sum_{i=1}^{n}(X_i - \bar{X})^2)^{1/2}(\sum_{i=1}^{n}(Y_i - \bar{Y})^2)^{1/2}},$$

where:

X_i and Y_i denote the values of two variables for county i,

$\bar{X}$ and $\bar{Y}$ denote the mean of X and Y, and

n is the sample size (the number of counties).

The Pearson correlation coefficient ranges between -1 and 1. A value close to zero indicates a weak relationship, while values closer to -1 or 1 suggest a stronger correlation (negative or positive, respectively). A coefficient of 1 indicates a perfect positive correlation, meaning both variables move in the same direction. Conversely, a coefficient of -1 signifies a perfect negative correlation, indicating that the variables move in opposite directions. A value of 0 suggests no correlation between the variables. According to the Kuznets-Williamson hypothesis, the Pearson correlation coefficient is expected to be positive in the first phase, indicating that regional disparities increase alongside economic growth. In the second phase, the coefficient should be negative, suggesting that further economic growth leads to a decline in regional disparities.

Regional disparities are measured by the coefficient of variation (CV), which is used as a relative measure of dispersion. It is a normalized form of the standard deviation, where N represents the number of regions, g_i is the GDP per capita of region i, and μ is the national average GDP per capita (i.e. the average across all regions). The formula is as follows (Bartolini et al., 2016):

$$CV = \frac{\sqrt{\frac{1}{N}\sum_{i=1}^{N}(g_i-\mu)^2}}{\mu} = \frac{\sigma}{mean}.$$

A higher value of the coefficient of variation indicates a greater level of regional inequality, while a lower value suggests convergence among regions. An important assumption when using the coefficient of variation as a measure of regional disparities is that the distribution has a non-zero mean and that all values are positive. These conditions are satisfied when using regional GDP per capita. The value of the coefficient of variation is interpreted as a percentage relative to the mean. For example, a CV of 0.03 means that the dispersion in regional income is 3% relative to the average. The main advantage of the coefficient of variation is that it is independent of the mean, which allows for straightforward comparisons across regions. For instance, CV values can be compared between regions with different levels of GDP per capita, unlike other inequality measures such as the Gini coefficient or the Theil index, which are sensitive to the scale of the distribution and the units of measurement (Bartolini et al., 2016).

However, there are two limitations to using the CV. First, it is not invariant to the number of regions in a country, as it can take values from 0 up to $\sqrt{N-1}$. Second, it does not account for the population size of each region. Disparities are calculated without considering how many people live in a given region. This issue can be addressed by calculating a population-weighted coefficient of variation. Nevertheless, using Slovakia as an example, Tvrdon and Skokan (2011) demonstrated that weighted and unweighted coefficients of variation generally follow the same trend, although the weighted version tends to show slightly higher values. Therefore, in this paper, we opted for the unweighted variant of the coefficient of variation. Concerning economic growth, we measure it by using annual GDP per capita growth, with the year 2000 set as the reference year (GDP per capita = 1).

Furthermore, β-convergence is analyzed to determine whether poorer regions grow faster than wealthier ones. This test is also conducted using Pearson's correlation coefficient, assessing the sta-

tistical significance of the relationship between the initial GDP per capita level and GDP per capita growth rates. A negative coefficient indicates β-convergence, meaning poorer regions grow faster, while a positive coefficient signals β-divergence, implying that poorer regions grow more slowly than wealthier ones.

Additionally, the relationship between the dominance of the City of Zagreb (measured by its percentage share in the national GDP) and regional disparities is examined using Pearson's correlation coefficient. A positive coefficient suggests a direct relationship, indicating that as Zagreb's dominance increases, regional disparities also rise.

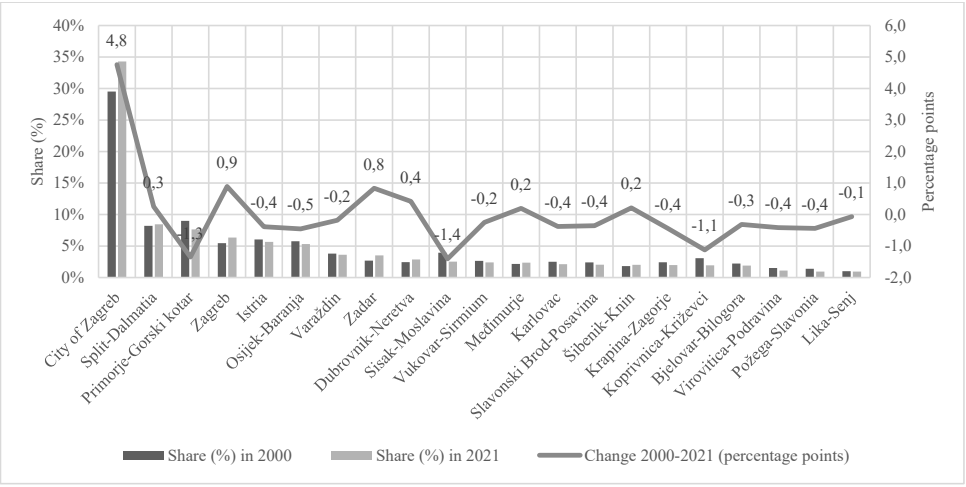
4. Results and discussion

4.1 Recent regional development trends in Croatia

The analysis in this section is based on regional differences at the county level using indicators of GDP, GDP p.c. and the shares of counties in the total GDP of Croatia. The spatial distribution of economic activity in Croatia largely reflects the population distribution across its territory. An analysis of total economic activity, as measured by GDP, reveals the significant dominance of the City of Zagreb, with a GDP of approximately 20 billion EUR, accounting for about 34.3% of Croatia's GDP in 2021. Including the surrounding Zagreb County, which together with the city forms a functional unit and covers only 6.5% of Croatia's territory, this figure rises to 23.8 billion EUR, or about 40.6% of the national GDP. This highlights a pronounced concentration of economic activity in a very narrow geographic area.

In absolute terms, Croatia's GDP increased by 34.8 billion EUR between 2000 and 2021. Of this growth, the City of Zagreb accounted for the largest share, with its GDP increasing by just over 13 billion EUR. Additionally, the City of Zagreb's contribution to Croatia's total GDP increased from 29.5% in 2000 to 34.3% in 2021 (4.8 pp). This is followed by Zagreb County (0.9 pp) and Zadar County (0.8 pp). The largest decreases in share were recorded by Sisak-Moslavina County (-1.4 pp), Primorje-Gorski Kotar County (-1.3 pp), and Koprivnica-Križevci County (-1.1 pp) (Graph 1). Given the largest growth in the share of the City of Zagreb in Croatia's total GDP, we also analyze the connection between the dominance of the City of Zagreb and regional inequalities in Croatia.

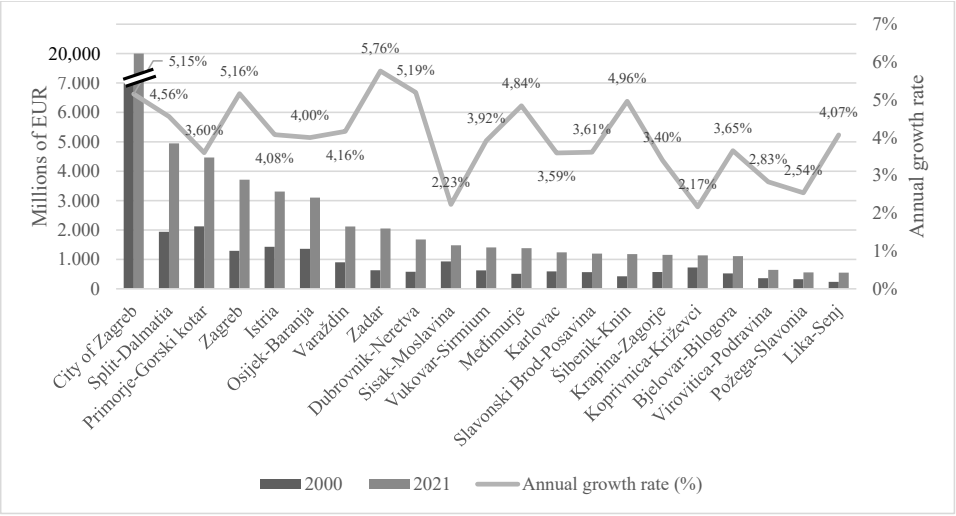
Graph 1 County share (%) in GDP (2000 and 2021) and change in shares (pp)



Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

From 2000 to 2021, Croatia's economy grew at an average annual rate of 4.4%, with GDP increasing approximately 2.5 times over this period. The highest average annual growth rates were observed in Zadar County (5.76%), Dubrovnik-Neretva County (5.19%), and Zagreb County (5.16%). Conversely, the lowest GDP growth rates during this period were recorded in Koprivnica-Križevci County (2.17%), Sisak-Moslavina County (2.23%), and Požega-Slavonia County (2.54%) (Graph 2).

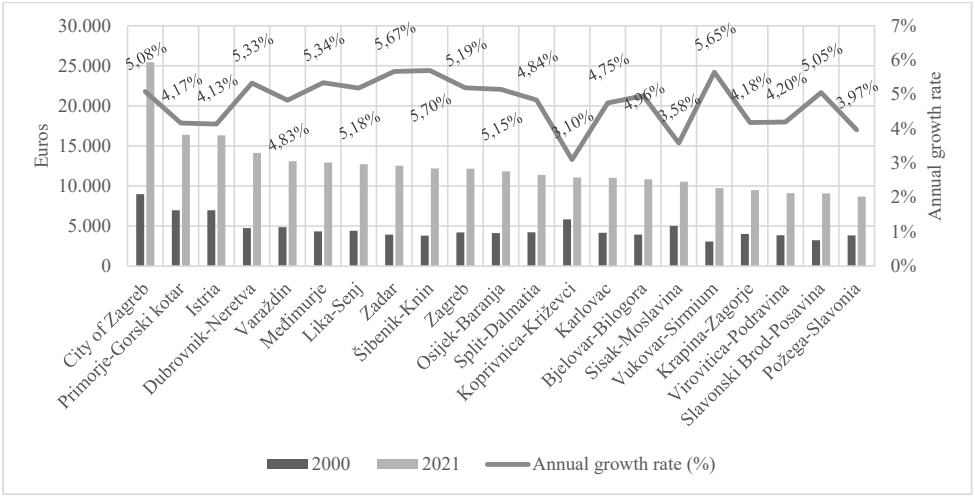
Graph 2 GDP by county (2000 and 2021) and GDP annual growth rate (%)



Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

GDP per capita, used as a measure of living standards, increased in Croatia from EUR 5,342 in 2000 to EUR 14,810 in 2021, or 2.8 times. As with overall GDP growth, the City of Zagreb leads in this regard. Specifically, Zagreb's GDP per capita grew from EUR 8,983 in 2000 to EUR 25,454 in 2021—an increase of EUR 16,471, or 2.8 times. This figure is 1.74 times higher than the national average of EUR 14,810. All other counties recorded an absolute increase in GDP per capita below the national average, with Primorje-Gorski Kotar County and Istria County reaching EUR 9,442 and EUR 9,348, respectively. The smallest absolute increase in GDP per capita was recorded in Požega-Slavonia County, where GDP per capita increased by EUR 4,842 between 2000 and 2021. Meanwhile, the lowest GDP per capita growth rate was recorded in Koprivnica-Križevci County, at 1.9% per year (Graph 3).

Graph 3 GDP per capita by county (2000 and 2021) and GDP per capita annual growth rate (%)



Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

A brief analysis of three economic indicators (county shares in GDP, total GDP, and GDP per capita) highlights the economic dominance of the City of Zagreb within the Croatian economy. Between 2000 and 2021, Zagreb experienced the largest increase in its share of Croatia's GDP and consistently ranked first in both economic size (measured by GDP) and wealth (measured by GDP per capita). Therefore, we can agree with Čavrak (2011) that the Republic of Croatia has increasingly evolved into a monocentric economy, with the City of Zagreb playing a dominant role. This has intensified the centralization of business activities, leading to a relative decline in economic activity across other Croatian regions and an underutilization of available resources. As opportunity costs rise in less developed areas and excess demand for development resources grows in Zagreb, the overall costs of this development model increase, ultimately reducing the competitiveness of the Croatian economy.

4.2 Regional disparities and economic growth in Croatia

The evolution of regional disparities in Croatia shows two distinct phases: an increase from 2000 to 2010, followed by a decline until 2021. The observed period can also be divided into three phases: post-transition growth (2000-2008), the economic stagnation (2009-2014), and economic integration (2015-2021). Three key phenomena are analyzed for each phase:

1. β-convergence, which tests whether less developed counties in Croatia experienced faster growth compared to more developed counties;
2. σ-convergence, which examines whether regional disparities in Croatia have decreased over the past 20 years of economic progress;
3. The dominance of the City of Zagreb, reflecting the highly uneven distribution of economic activities across Croatia, with a significant concentration in Zagreb.

β-convergence examines whether poorer regions grow faster than wealthier ones, as indicated by a negative relationship between the initial income level and the growth rate. A positive relationship would indicate β-divergence, meaning poorer regions grow more slowly, widening the development gap. During the post-transition growth period (2000-2008), the Pearson correlation coefficient was not statistically significant, either for individual years or the entire period, indicating no evidence of beta β-convergence or divergence (see columns a) and b) in Table 1, respectively). During the phase of economic stagnation (2009-2014), there was similarly no statistically significant relationship between initial income levels and growth rates, except in 2010/2009, when the Pearson correlation coefficient was 0.49, indicating β-divergence. This suggests that poorer regions grew more slowly than richer ones, widening the development gap during the crisis. During the period of economic integration (2015-2021), the Pearson correlation coefficient was statistically significant at -0.65, pointing to β-convergence. This means that during Croatia's deeper integration into the European Union, poorer counties recorded higher growth rates than wealthier ones, narrowing the development gap. On a yearly basis, β-convergence was observed for the periods 2015/2014, 2018/2017, 2019/2018, and 2020/2019 (column a) in Table 1).

Table 1 Pearson correlation results for β-convergence analysis

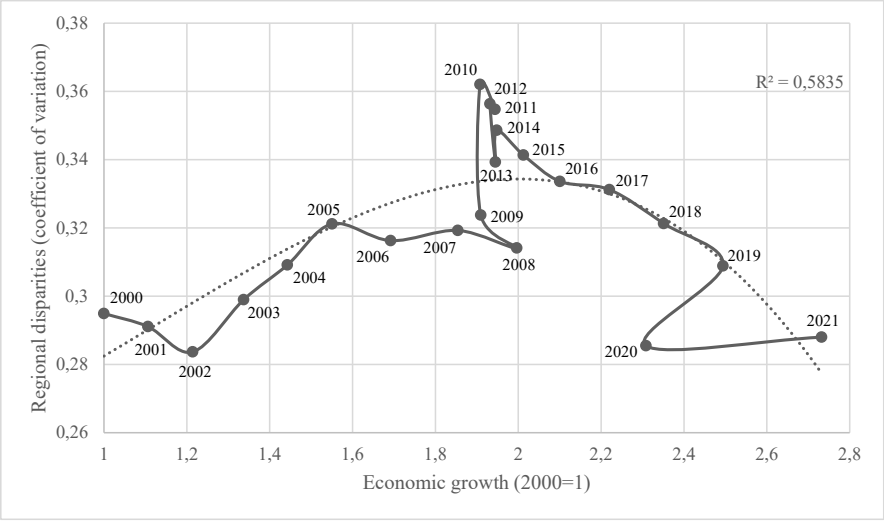
a)			b)		
Year to year growth	**Pearson correlation coefficient**	**p-value**	**Period**	**Pearson correlation coefficient**	**p-value**
2001/2000	-0.21	0.355	2000-2008	-0.12	0.621
2002/2001	-0.19	0.401			
2003/2002	0.12	0.593			
2004/2003	0.06	0.790			
2005/2004	-0.04	0.865			
2006/2005	-0.18	0.424			
2007/2006	0.01	0.955			
2008/2007	-0.19	0.404			
2009/2008	0.18	0.422	2009-2014	0.31	0.171
2010/2009	0.49	0.024			
2011/2010	-0.32	0.162			
2012/2011	0.13	0.569			
2013/2012	-0.26	0.252			
2014/2013	0.19	0.406			
2015/2014	-0.48	0.029	2015-2021	-0.65	0.002
2016/2015	-0.33	0.142			
2017/2016	-0.06	0.783			
2018/2017	-0.38	0.089			
2019/2018	-0.47	0.031			
2020/2019	-0.45	0.041			
2021/2020	0.11	0.639			

Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

The second phenomenon is related to σ-convergence, which investigates whether regional disparities diminish over time. When economic growth is included in the analysis, the Kuznets-Williamson hypothesis is tested. This hypothesis suggests that regional inequalities initially increase and later decrease as economic growth progresses. A positive Pearson correlation coefficient between regional disparities (measured by the coefficient of variation) and economic growth (measured by GDP per capita) indicates σ-divergence. Conversely, a negative Pearson correlation coefficient signifies σ-convergence.

Regional inequalities in Croatia exhibit a pattern of both increase and decrease over time. However, their evolution does not follow the smooth transformation during economic growth predicted by the Kuznets-Williamson hypothesis. Graph 4 illustrates the relationship between regional disparities, measured by the coefficient of variation, and economic growth, measured by the growth of GDP per capita. As shown in Graph 4, regional disparities underwent significant oscillations during the observed period from 2000 to 2021.

Graph 4 Regional disparities vs national growth 2000-2021



Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

In the midst of democratic changes from 2000 to 2002, the coefficient of variation decreased, reaching its lowest point in 2002. This was followed by an increase in regional disparities until 2005. Between 2005 and 2008, the coefficient of variation declined slightly, reaching a new low in 2008. However, the global economic crisis caused Croatia to experience six years (2009-2015) of economic decline and stagnation, during which the coefficient of variation peaked at its highest value in 2010 (0.362). Following this period, the coefficient of variation began to decline, albeit with oscillations. Since 2015, when Croatia resumed positive economic growth, the coefficient of variation has generally been on a downward trend. The exception is 2020, when the economic contraction caused by the COVID-19 pandemic led to an increase in regional disparities, as reflected in the rise of the coefficient of variation in 2021 (Graph 4).

In the case of Croatia, both phases of the Kuznets-Williamson hypothesis are observed. From 2000 to 2010, regional disparities increased, as indicated by the statistically significant positive correlation. This suggests σ-divergence, with the coefficient of variation peaking at 0.36 in 2010. From 2010 to 2021, regional inequalities began to decrease, as demonstrated by the statistically significant negative correlation, pointing to σ-convergence (Table 2).

Table 2 Pearson correlation results for σ-convergence analysis

a)			b)		
Period	**Pearson correlation coefficient**	**p-value**	**Period**	**Pearson correlation coefficient**	**p-value**
2000-2010	0.77	0.006	2000-2008	0.82	0.007
			2009-2014	0.14	0.793
2011-2021	-0.88	0.000	2015-2021	-0.78	0.037

Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

Within the framework of σ-convergence analysis, the overall observed period 2000-2021 can be divided into three phases (column b) in Table 2): during the post-transition growth (2000-2008), the relationship between regional inequality and economic growth is statistically significant and posi-

tive, indicating σ-divergence. During the phase of economic stagnation (2009-2014), no statistically significant relationship exists between regional inequality and economic growth. During the economic integration (2015-2021), the Pearson correlation coefficient is statistically significant and negative (-0.78), confirming σ-convergence. This analysis highlights that regional disparities in Croatia followed the two-phase pattern predicted by the Kuznets-Williamson hypothesis.

The third phenomenon focuses on the relationship between the dominance of the City of Zagreb (measured by its percentage share in the national GDP) and regional disparities (measured by the coefficient of variation). In all three observed periods (economic growth 2000-2008, economic stagnation 2009-2014, and economic integration 2015-2021), the Pearson correlation coefficient is statistically significant, with a positive sign in the first two periods, while in the period 2015-2021, it has a negative sign (-0.79). This trend is similar to that observed in the case of σ-convergence, as regional disparities diminished during the period of economic growth (2015-2021). Even though the City of Zagreb's dominance increased, its effect on regional disparities seemed to decrease, indicating a more balanced growth distribution across Croatia (Table 3).

Table 3 Relationship between the City of Zagreb's economic dominance and regional disparities

Period	Pearson correlation coefficient	p-value
2000-2008	0.90	0.001
2009-2014	0.97	0.001
2015-2021	-0.79	0.035

Source: Authors' calculations, made based on the Croatian Bureau of Statistics data (2024)

This result reveals an unexpected negative relationship between the dominance of the City of Zagreb and regional disparities during the period 2015-2021. In contrast, the relationship was positive in the previous periods (2000-2008 and 2009-2014), which is in line with expectations. A plausible explanation for this unexpected finding lies in the previously tested and confirmed β-convergence during 2015-2021, when poorer regions experienced faster growth than wealthier ones. This period coincided with the deepening of economic integration into the European Union, particularly during the 2014-2020 EU budget cycle, when Croatia had access to 12.19 billion EUR from the European Structural and Investment Programmes (ESIF), rising to 14.2 billion EUR with national contributions (European Commission, 2025).

4.3 Discussion

This study analyzed regional disparities in Croatia from 2000 to 2021, confirming the two-phase pattern predicted by the Kuznets-Williamson hypothesis. From 2000 to 2010, regional disparities increased as economic growth was concentrated in more developed regions, particularly in the City of Zagreb, and from 2010 onwards, disparities began to decline, suggesting a convergence trend. These findings align with earlier studies on regional inequalities in post-transition economies. For example, Rusnák et al. (2023) observed a similar trend in Slovakia, where regional disparities declined, albeit at the cost of slower overall growth and lagging behind the EU average. Similarly, Sić (2003) predicted that European integration would help reduce disparities, which is partially supported by our results, especially after 2014.

Our research has significant implications for economic theory, as the results confirm the existence of the Kuznets-Williamson hypothesis, particularly after 2014. This underscores the importance of European economic integration for a post-transition country like Croatia. Following the end of economic stagnation and the acceleration of economic integration, Croatia experienced high economic growth rates, which coincided with several key findings of our analysis. First, regional disparities declined, confirming the second phase of the Kuznets-Williamson hypothesis. Second, development convergence occurred among Croatian counties reducing the overall development gap. And third, despite the increasing dominance of the City of Zagreb, regional disparities have decreased, which can be explained with the EU funding programs after Croatia's accession to the EU in 2013.

This finding aligns with the central dilemma in regional economics: the trade-off between equality and efficiency. Should the focus be on promoting balanced development across all regions to reduce regional inequalities, or should priority be given to the unhindered growth of the most developed regions to sustain overall national growth? This decision presents a significant challenge for both policy makers and regional economists.

For policymakers, our findings highlight the importance of maintaining deep integration processes within the European Union and developing strategies for further decentralization, infrastructure investment, and targeted development policies that foster balanced spatial development. From a regional policy perspective, if economic development consistently leads to regional disparities, then effective regional policies must be an integral part of national government strategies to ensure balanced and inclusive growth.

While this paper provides valuable insights, it is important to acknowledge its limitations and suggest directions for future research. First, measuring inequality and development primarily through GDP per capita has its constraints. Although widely used, alternative indicators such as productivity, quality of life, and employment levels should be incorporated to provide a more comprehensive perspective. Second, a more detailed spatial analysis is needed. While this study focuses on inter-regional inequalities, future research could also examine intra-regional disparities to offer deeper insights at the micro level. Third, a comparative analysis of post-transition countries such as Slovakia, Hungary, and Poland would provide a broader perspective and enhance our understanding of regional development trends in countries similar to Croatia.

5. Conclusion

This paper examines the evolution of regional disparities in Croatia between 2000 and 2021, focusing on testing the Kuznets-Williamson hypothesis, which states that regional disparities increase in the initial phase of economic growth and decrease in the later phase. Specifically, from 2000 to 2010, regional disparities in Croatia widened alongside economic growth. However, from 2010 to 2021, during a period of strong economic expansion, regional inequalities declined, confirming both phases of the Kuznets-Williamson hypothesis.

Furthermore, the paper provides evidence of β-convergence in Croatia between 2015 and 2021. During this period, strong economic growth and deeper European integration led poorer Croatian counties to experience faster growth than wealthier ones, thereby reducing the interregional development gap and confirming the presence of σ-convergence.

Finally, the results indicate that the dominance of the City of Zagreb (measured by its share of Croatia's GDP) plays a significant role in shaping regional disparities. This effect is evident in all three examined periods. From 2000 to 2008, the City of Zagreb experienced strong economic growth, which led to an increase in dominance and a rise in regional disparities, creating a core-periphery effect. During the 2009-2014, economic stagnation the City of Zagreb, as an economic center, proved to be more resilient compared to the rest of Croatia and increased its share in national GDP. In the post-crisis period, i.e. 2015-2021, regional disparities declined despite the increase in Zagreb's economic dominance, which can be attributed to deeper economic integration into the European Union and greater utilization of EU funds. These findings highlight the importance of designing cohesive and place-sensitive regional development policies that leverage the opportunities provided by EU integration, with the aim of promoting balanced growth across counties while protecting national economic competitiveness.

References

1. Amos, O. M. (1988). Unbalanced regional growth and regional income inequality in the latter stages of development. *Regional Science and Urban Economics*, *18*(4), 549-566. https://doi.org/10.1016/0166-0462(88)90026-9
2. Badia-Miró, M., Guilera, J. & Lains, P. (2012). Regional Incomes in Portugal: Industrialisation, Integration and Inequality, 1890-1980. *Revista de Historia Económica / Journal of Iberian and Latin American Economic History, 30*(2), 225-244. https://doi.org/10.1017/S0212610912000080
3. Barrios, S. & Strobl, E. (2009). The dynamics of regional inequalities. *Regional Science and Urban Economics*, *39*(5), 575-591. https://doi.org/10.1016/j.regsciurbeco.2009.03.008
4. Bartolini, D., Stossberg, S. & Blöchliger, H. (2016). *Fiscal Decentralisation and Regional Disparities* (OECD Economics Department Working Papers No. 1330). OECD Publishing. https://dx.doi.org/10.1787/5jlpq7v3j237-en
5. Bićanić, I. & Pribičević, V. (2013). A NUTS2 View of Regional Inequality in Croatia, 1968–2008. In: W. Bartlett, S. Maleković, & V. Monastiriotis (Eds.), *Decentralization and Local Development in South East Europe* (pp. 311-336). Palgrave Macmillan. https://doi.org/10.1057/9781137295651_14
6. Capello, R. (2016). *Regional economics* (2nd ed). Routledge. https://doi.org/10.4324/9781315720074
7. Combes, P. P., Lafourcade, M., Thisse, J. F. & Toutain, J. C. (2011). The rise and fall of spatial inequalities in France: A long-run perspective. *Explorations in Economic History*, *48*(2), 243-271. https://doi.org/10.1016/j.eeh.2010.12.004
8. Crafts, N. (2005). Regional GDP in Britain, 1871–1911: Some estimates. *Scottish Journal of Political Economy*, *52*(1), 54-64. https://doi.org/10.1111/j.0036-9292.2005.00334.x
9. Croatian Bureau of Statistics (2024). Available data. https://podaci.dzs.hr/en/
10. Čavrak, V. (2011). Regionalna politika i regionalne nejednakosti u Hrvatskoj. In Čavrak, V. (Ed.), *Gospodarstvo Hrvatske* (pp. 321-348). Politička kultura.
11. Davies, S. & Hallet, M. (2002). *Interactions between national and regional development* (HWWA Discussion Paper 207). Hamburg Institute of International Economics. https://doi.org/10.2139/ssrn.357343
12. Díez-Minguela, A., et al. (2020). The long-term relationship between economic development and regional inequality: South-West Europe, 1860–2010. *Papers in Regional Science*, *99*(3), 479-508. https://doi.org/10.1111/pirs.12489
13. Đokić, I., Fröhlich, Z. & Rašić Bakarić, I. (2016). The impact of the economic crisis on regional disparities in Croatia. *Cambridge Journal of Regions, Economy and Society*, *9*(1), 179-195. https://doi.org/10.1093/cjres/rsv030
14. Easterlin, R. A. (1958). Long term regional income changes: Some suggested factors. *Papers in Regional Science*, *4*(1), 313-325. https://doi.org/10.1111/j.1435-5597.1958.tb01637.x
15. European Commission (2025). *Cohesion Open Data Platform*. https://cohesiondata.ec.europa.eu/countries/HR/14-20
16. Ezcurra, R. & Rapún, M. (2006). Regional Disparities and National Development Revisited: the Case of Western Europe. *European Urban and Regional Studies*, *13*(4), 355-369. https://doi.org/10.1177/0969776406068590
17. Fan, C. C. & Casetti, E. (1994). The spatial and temporal dynamics of US regional income inequality, 1950-1989. *The Annals of Regional Science*, *28*, 177-196. https://doi.org/10.1007/BF01581768
18. Giannetti, M. (2002). The effects of integration on regional disparities: Convergence, divergence or both? *European Economic Review*, *46*(3), 539-567. https://doi.org/10.1016/S0014-2921(01)00166-0
19. Kim, S. & Margo, R. A. (2003). Historical perspectives on U.S. economic geography. In J. V. Henderson & J.-F. Thisse (Eds.), *Handbook of Regional and Urban Economics* (Vol. 4, pp. 2981-3019). Elsevier. https://doi.org/10.1016/S1574-0080(04)80023-3

20. Kuznets, S. S. (1955). Economic Growth and Income Inequality. *American Economic Review, 45*(1), 1-28.
21. Lessmann, C. (2014). Spatial inequality and development - Is there an inverted-U relationship? *Journal of Development Economics*, *106*, 35-51. https://doi.org/10.1016/j.jdeveco.2013.08.011
22. Lessmann, C. & Seidel, A. (2017). Regional inequality, convergence, and its determinants - A view from outer space. *European Economic Review*, *92*, 110-132. https://doi.org/10.1016/j.euroecorev.2016.11.009
23. Marošević, K. (2020). Lagging Regions: the Case of Eastern Croatia, *Ekonomski vjesnik*, *33*(1), 255-271.
24. Marošević, K. (2021). *Regionalni razvoj i neravnoteže u Republici Hrvatskoj*. Faculty of Law Osijek
25. Martínez-Galarraga, J., Rosés, J. R. & Tirado, D. A. (2013). The Long-Term Patterns of Regional Income Inequality in Spain, 1860–2000. *Regional Studies*, *49*(4), 502-517. https://doi.org/10.1080/00343404.2013.783692
26. Neszmelyi, G. I., Akócsi, I. L. & Prihoda, E. (2016). The evolution of the regional disparities in the Visegrad Group in the years 1995-2014. *Geografický časopis/Geographical Journal, 68*(4), 283-299.
27. Nijkamp, P. & Abreu, M. (2009). Regional Development Theory. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 202-207). Elsevier. https://doi.org/10.1016/B978-008044910-4.00869-5
28. OECD (2024). *Towards balanced regional development in Croatia: From strategy design to implementation*. OECD Publishing. https://doi.org/10.1787/3c0779cf-en
29. Pejnović, D. (2004). Depopulacija županija i disparitet u regionalnom razvoju Hrvatske. *Društvena istraživanja: časopis za opća društvena pitanja*, *13*(4-5), 72-73.
30. Perin, D. E. & Semple, R. K. (1976). Recent Trends in Regional Income Inequalities in the United States. *Journal of Regional Analysis and Policy*, *6*(1), 65-85.
31. Petrakos, G., Rodríguez-Pose, A. & Rovolis, A. (2003). Growth, Integration and Regional Inequality in Europe. *ERSA Conference Papers*, European Regional Science Association.
32. Puljiz, J. & Maleković, S. (2007). Regional income and unemployment disparities in Croatia. In Z. Reić & M. Fredotović (Eds.), Enterprise in Transition: *Proceedings of the Seventh International EIT Conference* (pp. 89-102). Faculty of Economics, University of Split.
33. Robinson, S. (1976). A note on the U hypothesis relating income inequality and economic development. *The American Economic Review*, *66*(3), 437-440. http://www.jstor.org/stable/1828182
34. Rusnák, J., Korec, P. & Plešivčák, M. (2023). The trade-off between national growth and interregional inequality: Three decades of regional development in Slovakia. *Geografický Časopis / Geographical Journal, 75*(3), 291-311. https://doi.org/10.31577/geogrcas.2023.75.3.15
35. Sić, M. (2003). Regional disparities in Croatia. *Hrvatski geografski glasnik, 65*(2), 5-28. https://doi.org/10.21861/HGG.2003.65.02.01
36. Smolensky, E. (1961). Industrialization and income inequality: Recent United States experience. *Papers of the Regional Science Association, 7*, 67-88. https://doi.org/10.1007/BF01969073
37. Terrasi, M. (1999). Convergence and divergence across Italian regions. *The Annals of Regional Science, 33*, 491-510. https://doi.org/10.1007/s001680050117
38. Tvrdon, M. & Skokan, K. (2011). Regional disparities and the ways of their measurement: The case of the Visegrad four countries. *Technological and Economic Development of Economy, 17*(3), 501-518. https://doi.org/10.3846/20294913.2011.603485
39. Williamson, J. G. (1965). Regional inequality and the process of national development: A description of the patterns. *Economic Development and Cultural Change, 13*(4), 3-45. https://doi.org/10.1086/450136
40. Wooldridge, J. M. (2002). *Introductory econometrics: A modern approach* (2nd ed) South-Western College Publishing.