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DIVERGENCE OR CONVERGENCE? THE CASE OF THE FORMER YUGOSLAV AREA

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Abstract: Europe is differentiated socio-economically, both at the global and state level. The former Yugoslav republics are no exception. Due to cultural, religious, and developmental diversity, the area of the former Socialist Federal Republic of Yugoslavia can be considered a microcosm of Europe as a whole. The decision to research in this area was taken because this group of independent states, formed part of a larger territory for nearly 70 years. The study covers the territory of former Yugoslavia and the period from 2000 to 2019. The coefficient of variation of Gross Domestic Product (GDP) per capita and Purchasing Power Parity (PPP; constant 2017 international \$) showed the persistence of significant polarization of the relative measure of the regional differentiation. Using 21 statistical variables and applying the taxonomic method, we made a comparative assessment of the level of socio-economic development of individual countries. It is noteworthy that the value of the taxonomic measure of the regional socio-economic development of Slovenia is nearly forty times higher than that of Bosnia and Herzegovina. The comparison of the values of taxonomic measures of socio-economic development consistently points to a significant differentiation in the level of development in former Yugoslavia. It seems that a review of current actions and strategies in the area of sustainable development of this region is necessary.

Keywords: regional disparities; socio-economic development; Hellwig's method; former Yugoslav republics

Introduction

The socio-economic development of Europe suggests that it is differentiated both at the global and state level. The European Union's efforts to boost socio-economic development and cohesion have so far failed to lift the weaker regions to a higher socio-economic level. These regions have become stuck on the economic periphery of Europe and as such have become dependent on subsidies and fiscal transfers (Rodríguez-Pose & Fratesi, 2007). Once highly industrialized regions, in the era of dynamic development of technological innovations, undergoing a development crisis, are looking for a new identity and a comparative advantage (Hassink, 2010). Former Yugoslavia seems to be one such case. Slovenia and Croatia benefitted from their geographic location and technological diffusion for many years (Crescenzi, Rodríguez-Pose, & Storper, 2007). The other former republics, being farther away from this central agglomeration, have lost revenues from subsidies and fiscal transfers since the collapse of Yugoslavia. Raw material regions (Bosnia and Herzegovina, Serbia, and

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Montenegro) and the typically agricultural region of North Macedonia have struggled socio-economically. The accession of Slovenia (2004) and Croatia (2013) into the European Union has also contributed to development inequalities in former Yugoslavia.

Moreover, the collapse of the communist and socialist ideologies in Central and Eastern Europe has created new challenges for the political elites. The republics of former Yugoslavia, affected by military conflict in the 1990s and its consequences, have found themselves in a particularly difficult situation. For some of them, the first phase of transformation (1991–2000) was particularly destructive (Lazić & Vuletić, 2009). Furthermore, because it was thought that slow reforms would lead to impoverishment and social inequality, and to avoid a dramatic explosion of poverty as seen in other post-communist countries, radical economic measures were introduced (Kolodko, 2000; Lavigne, 2000). Thus, both internal and external conditions have led to a stagnation in socio-economic development within this region over the years (Stiperski & Lončar, 2008; Zienkiewicz, 2015). The break-up of Yugoslavia, and particularly the political and social events that followed, has had a significant impact on the economy of the former republics. In addition, the system of extensive and multi-faceted connections that have shaped the global economy, especially relating to the open market, has caused an increase in risk of negative events happening. The area of former Yugoslavia is no exception. The global financial crisis has left its mark on the post-Yugoslav countries (Antevski, 2010; Vaubel, 2009), although the severity of the impact on individual countries in the area was unexpected. The dynamic changes caused by the financial crisis affected the sustainable development of the regions, changing their previous convergence achievements. Convergence is defined as the relatively faster development of poorer regions in relation to wealthier ones, and the reduction of differences between them. The opposite phenomenon—the widening of differences—is called divergence.

There are two main concepts of convergence in the literature: sigma and beta convergence (Barro & Sala-i-Martin, 2003; Durlauf & Quah, 1999). The first, sigma convergence, occurs when the dispersion of per capita income (or another studied phenomenon) between regions decreases over time. The concept of beta convergence concerns the relationship between the average growth rate of per capita income versus the initial level of income. In the literature, it appears in two variants (Halmai & Vásáry, 2010; Miller & Upadhyay, 2002; Pfaffermayr, 2007). Absolute convergence assumes that regions become similar to each other regardless of the initial conditions. This means that poorer regions develop faster than wealthier ones, and the increase in their real Gross Domestic Product (GDP) per capita is higher when the initial level is lower. As a result, poorer countries or regions can catch up in their development. Conditional convergence on the other hand, means that regions with similar structural parameters (e.g., average level of education, income structure) become similar. Thus, regions with different characteristics converge to different income levels.

Sigma convergence deals with changes in the distribution of income over time, while beta convergence deals with income mobility between regions within the same distribution. Beta convergence is necessary but not sufficient for sigma convergence to occur. The purpose of this paper is to:

- examine the occurrence of regional sigma and beta convergence and to determine the level of differentiation in the socio-economic development of the former Socialist Federal Republic of Yugoslavia (Yugoslavia) in relation to GDP per capita in the period 2000–2019 at the countries' level, and
- make a comparative assessment and group objects according to the level of socio-economic development of individual countries using the Hellwig's taxonomic measure.

Materials and methods

The choice of the research area was determined by the fact that the independent former Yugoslav republics were part of one political and economic system, Yugoslavia, for nearly 70 years. Despite the broken political and economic relations brought about by the armed conflict in the 1990s, these countries now have quite strong economic ties. The study covered the period from 2000 until 2019. Due to the availability of data and the importance of the impact of the global financial crisis on the socio-economic situation of the world, the selected period was divided into two subperiods. The first covers the period 2000–2009 and the second one relates to the years 2010–2019. Sometimes a wider time frame is referenced to explain further background. The study covered the states that constituted Yugoslavia until 1991, i.e., Bosnia and Herzegovina (BiH), Croatia (CRO), Montenegro (MNE), North Macedonia (MKD), Serbia (SRB), and Slovenia (SLO). The territory of Kosovo and Metohija was excluded from the study due to its unregulated international status as well as the absence of data (the territory is under United Nations Security Council Resolution, No. 1244/99). Twenty-one statistical variables were identified: X1—GDP per capita; Purchasing Power Parity (PPP) (constant 2017 international \$); X2—Imports of goods and services (% of GDP); X3—Inflation, consumer prices (annual %); X4—Exports of goods and services (% of GDP); X5—High-technology exports (current US\$); X6—Individuals using the Internet (% of population); X7—Industry (including construction) value added (% of GDP); X8—Agriculture, forestry, and fishing, value added (% of GDP); X9—Services, value added (% of GDP); X10—Gross fixed capital formation (constant 2010 US\$); X11—Fixed-line telephone subscriptions (per 100 people); X12—Employment to population ratio; 15+ (in %, national estimate); X13—Unemployment, total (% of total labor force) (national estimate); X14—Population density (people per sq. km of land area); X15—Life expectancy at birth, total (years); X16—Birth rate, crude (per 1,000 people); X17—Death rate, crude (per 1,000 people); X18—Physicians (per 1,000 people); X19—Hospital beds (per 1,000 people); X20—New business density (new registrations per 1,000 people ages 15–64); and X21—Research and development expenditure (% of GDP). Statistical data were taken from Data Bank (The World Bank Group, 2021). Characteristics were selected on the basis of the available data. The authors are aware that the proposed data set was narrow, which may subsequently affect the final classification of individual countries of the studied area. However, taking into account the research conducted so far (Stiperski & Lončar, 2008; Zienkiewicz, 2015) that suggests a significant inequality in the socio-economic development of the studied area, and by using the chosen methodology, it should be possible to clearly identify countries that appear at opposite poles of socio-economic development.

To explore the existence and to determine the level of spatial differentiation of socio-economic development, the variability of GDP per capita, PPP (constant 2017 international \$) over time was investigated. The relative measure of regional differentiation was determined using the coefficient of variation, defined by the following formula:

$$\vartheta = \frac{S}{\bar{x}} \quad (1)$$

where, S is standard deviation, and \bar{x} is average value of the indicator.

On the basis of GDP per capita, PPP (constant 2017 international \$) alone, it is difficult to determine which of the countries is the most developed and which is characterized by a low level of socio-economic development. Therefore, the chosen measures were subjected to further analysis.

Using an adaptation of Hellwig's taxonomic method (Bielak & Kowerski, 2018; Grabiński, Wydymus, & Zeliaś, 1989; Omiotek & Wójcik, 2014), a comparative assessment of the level of socio-economic development of individual objects was made. Two types of classification were chosen. The first was used to explain which of the countries in the period 2010–2019 were characterized by the highest dynamics of changes in the selected measures. The second was used to identify countries with the highest level of socio-economic development in 2019. The classification according to the rate of change in the years 2010–2019 was made using the basic indexes for the adopted characteristics. The values of the measures in 2010 were used as the basis. Selected descriptive features were used to classify the level of socio-economic development of the studied countries. After establishing the pattern of economic development $y_{0j} = \max y_{ij}$, where j is a stimulant or $y_{0j} = \min y_{ij}$, where j is a de-stimulant, taxonomic distances between individual objects and the reference object were established. A synthetic measure for each object is described by the formula:

$$d_i = 1 - c_i / c_0 \quad (2)$$

where, d_i is measure of development; c_i is taxonomic distance of each z_{ij} to the development pattern z_{0j} ; c_0 is critical distance of a given unit from the pattern. The taxonomic distance is expressed as:

$$c_{i0} = \sqrt{\sum_{j=1}^n (z_{ij} - z_{0j})^2} \quad (3)$$

where

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j} \quad (4)$$

and

$$c_0 = \bar{c}_0 + 2S_d \quad (5)$$

and standard deviation

$$S_d = \sqrt{\frac{1}{n} \sum_{j=1}^n (c_{i0} - c_0)^2} \quad (6)$$

The classification was made according to the following principle: the higher the value of the Hellwig's taxonomic measure, the higher the level of development of the examined object. The objects were then grouped accordingly as presented in Table 1.

Table 1

The basis for the grouping of objects

Group No.	Value of taxonomic measure	The level of development description
Group 1	$d_i \geq \bar{c}_0 + S_d$	Very high level of socio-economic development
Group 2	$\bar{c}_0 \leq d_i < \bar{c}_0 + S_d$	High level of socio-economic development
Group 3	$\bar{c}_0 - S_d \leq d_i < \bar{c}_0$	Moderate level of socio-economic development
Group 4	$d_i < \bar{c}_0 - S_d$	Low level of socio-economic development

Results

The decomposition of the value of GDP per capita, PPP (constant 2017 international \$) in the dynamic layout is presented below (Figure 1). The graph shows the development of this measure for each individual country of former Yugoslavia.

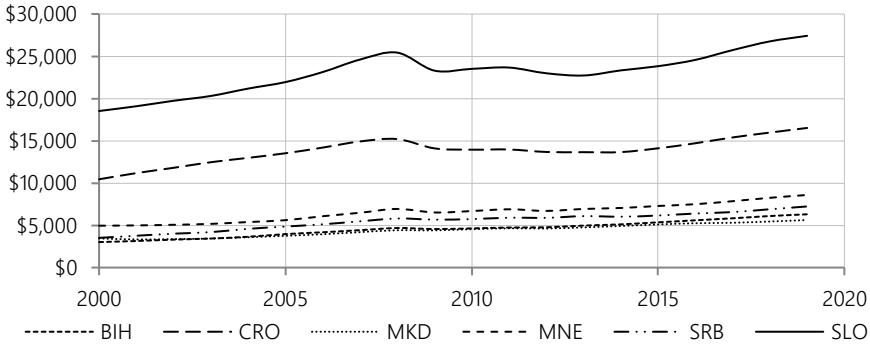


Figure 1. Decomposition of GDP per capita, PPP (constant 2017 international \$). The data in the charts are calculated based on *World Development Indicators*, by The World Bank Group, 2021 (<https://databank.worldbank.org/source/world-development-indicators#>). In public domain.

An analysis of the graph shows that Slovenia and Croatia still exhibit the highest value of the tested indicator. These countries are also characterized by a significant growth rate of GDP per capita, PPP (constant 2017 international \$). A noticeable decrease in this indicator was also observed for these two countries between 2008–2009, which then increased in 2013 for Slovenia and in 2014 for Croatia. The remaining countries in the area of study exhibited a rather stable, slight increase in GDP per capita, PPP (constant 2017 international \$) in the period 2000–2019. At the same time, significant differences persist between the member countries of former Yugoslavia in terms of the discussed feature. A very clear difference can be seen between Slovenia and North Macedonia, where GDP per capita, PPP (constant 2017 international \$) in Slovenia is nearly five times higher than in North Macedonia.

The graph of the measure of relative regional disparity, presents the sigma convergence in respect of GDP per capita, PPP (constant 2017 international \$) and confirms the above observations, highlighting the scale of development differences (Figure 2).

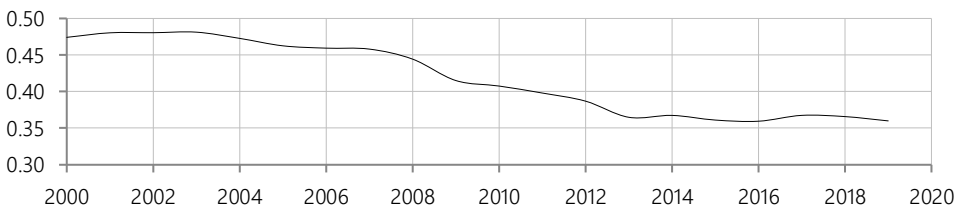


Figure 2. The sigma convergence according to GDP per capita, PPP (constant 2017 international \$) in the period 2000–2019.

The analysis of the presence of beta convergence, divided into the subperiods 2000–2009 and 2010–2019, was conducted (Figure 3).

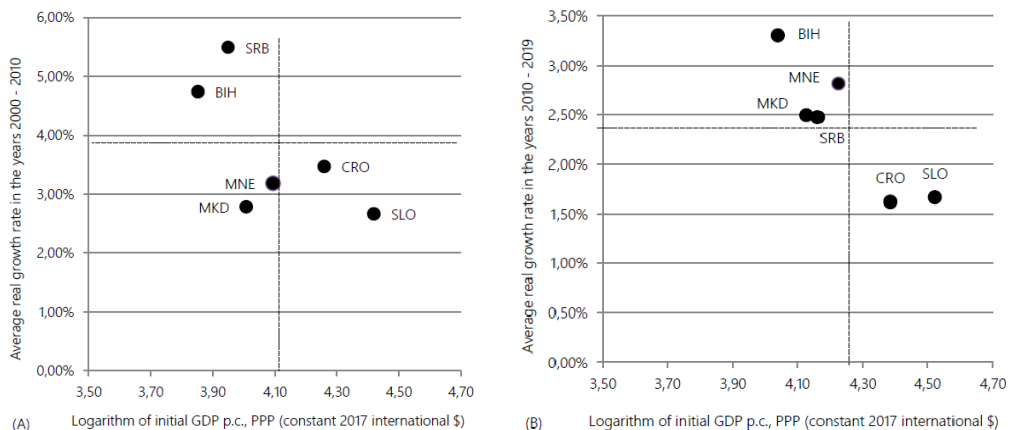


Figure 3. The beta convergence according to GDP per capita, PPP (constant 2017 international \$) in the period 2000–2019.

An analysis of changes in socio-economic development in the period 2010–2019 indicated that Serbia experienced the most dynamic change. Next were North Macedonia, Montenegro, Bosnia and Herzegovina, Slovenia, and Croatia (Table 2).

Table 2

Taxonomic measure of the regional socio-economic development growth (2010–2019)

Description	SRB	MKD	MNE	BiH	SLO	CRO
Distance from the model	7.521	8.004	8.794	8.912	8.953	9.412
Taxonomic development measure (Hellwig's method)	0.238	0.189	0.109	0.097	0.093	0.047
Rank	1	2	3	4	5	6

A classification of the countries under study according to the taxonomic measure of regional growth of socio-economic development (2010–2019) is presented in Table 3.

Table 3

Classification of countries according to the taxonomic measure of the regional growth of socio-economic development (2010–2019)

Group No.	Value of taxonomic measure	Country
Group 1	$di > 0.194$	SRB
Group 2	$0.129 < di \leq 0.194$	MKD
Group 3	$0.065 < di \leq 0.129$	BiH, MNE, SLO
Group 4	$di \leq 0.065$	CRO

The above classification of countries within former Yugoslavia according to the level of socio-economic development in 2019, clearly indicates Slovenia as the country within the region that has

the highest level of socio-economic development. Next are Serbia, Croatia, North Macedonia, Montenegro, and Bosnia and Herzegovina (Table 4).

Table 4

Taxonomic measure of the regional socio-economic development (2019)

Description	SLO	SRB	CRO	MKD	MNE	BiH
Distance from the model	6.024	6.983	7.597	7.649	8.400	10.561
Taxonomic development measure (Hellwig's method)	0.436	0.346	0.289	0.284	0.213	0.011
Rank	1	2	3	4	5	6

The classification of the countries according to the taxonomic measure of the regional social and economic development growth (2010–2019) is presented in Table 5.

Table 5

Classification of countries according to the taxonomic measure of the regional socioeconomic development in 2019

Group No.	Value of taxonomic measure	Country
Group 1	$di > 0.395$	SLO
Group 2	$0.263 < di \leq 0.395$	SRB, CRO, MKD
Group 3	$0.132 < di \leq 0.263$	MNE
Group 4	$di \leq 0.132$	BiH

It is noteworthy that the value of the taxonomic measure of the regional socio-economic development of Slovenia in 2019 is almost forty times higher than that of Bosnia and Herzegovina regarding Figure 1 and Table 1.

Discussion

The study showed the existence of sigma convergence. This phenomenon was particularly visible in the period 2007–2013. After 2013, the observed curve of regional development differences stabilized at the level of 0.36–0.37. The country with the highest average annual GDP growth in the period 2000–2009 was Serbia (5.45%). The financial crisis caused the GDP growth in Serbia to decline in the following period (2010–2019) to 2.48% annually. The remaining countries under study also recorded declines of this indicator.

From the analysis, it appears that North Macedonia and Montenegro have suffered the least from the financial crisis. The GDP growth dynamics for North Macedonia was 3.47% in the period 2000–2009 and 2.50% in the period 2010–2019, whereas for Montenegro it was 3.18% in the period 2000–2009 and 2.82% in the period 2010–2019. The most developed countries in the region, Slovenia and Croatia, did not escape the financial crisis either. In the case of Slovenia, the average annual GDP growth decreased from 2.67% in the period 2000–2009 to 1.67% in the period 2010–2019, whereas for Croatia the decline observed was from 3.47% to 1.62%. In general, it can be said that during the financial crisis, the region's economy "shrank" on an annual basis from an average 3.7% in the period 2000–2009 to 2.40% in the period 2010–2019. During the entire period 2000–2019, the average annual GDP growth for the area was 3.03%, which, in comparison with the European Union (1.40%), is a good result. The results obtained correspond with the studies of other scholars (Bićanić, Deskar-Škrbić & Zrnc, 2016; Siljak & Nagy, 2019).

The analysis of the measure of regional development relative disparity indicates the presence of sigma convergence. The graph of the measure of relative regional disparity (Figure 2) particularly reflects the economic situation of former Yugoslavia and can be explained by earlier political events and armed conflict (Bideleux & Jeffries, 2007; Pavković, 2000). After 2003, the curve of the measure of relative regional disparity began to decline. Since the year 2007, which is considered the beginning of the financial crisis in Europe, the decline was more dynamic. The decline of GDP per capita PPP (constant 2017 international \$) ceased in 2013 and, with slight changes, remained at a level of 0.36. This suggests a sustained significant diversification of socio-economic development in the region despite a reduction in development differences.

The analysis of the presence of beta convergence, divided into the subperiods 2000–2009 and 2010–2019, reveals an interesting phenomenon. In the first subperiod (Figure 3A), the region is divided into three groups of countries. The first consists of those countries with high initial GDP values and average GDP growth rates below the average for the entire region (Slovenia, Croatia). The second consists of those countries with low values of the initial GDP and average GDP growth rates below the average (Montenegro, North Macedonia). The third consists of those countries with low values of the initial GDP per capita and average GDP per capita growth rates above the average (Bosnia and Herzegovina, Serbia). In the case of the first and second groups, the presence of divergence can be considered, while a comparison of the first and third groups would indicate the existence of unconditional beta convergence. In the second sub-period, an existence of two groups is noticeable (Figure 3). The group, comprised of the least developed countries (Bosnia and Herzegovina, North Macedonia, Montenegro, and Serbia), with a low initial GDP per capita value, shows higher socio-economic development growth than countries with a high initial GDP per capita (Croatia and Slovenia). As a result, both groups have become similar to one another regardless of the initial conditions, with the weaker regions building on their lower socio-economic starting point. In this case, we see a case of classic absolute beta convergence.

A taxonomic analysis of the growth of socioeconomic development identified Serbia as the country where the socio-economic changes in 2010–2019 took place most intensively (Table 1). It should be noted that one of the main consequences of the more or less successful reforms undertaken in Serbia in 1991–2010 is the complete destruction of the previous economic system, with a significant redistribution of social wealth and the emergence of new interest groups (Vujošević, Zeković, & Maričić, 2012). Furthermore, Serbia entered the financial crisis with unfinished reforms and its transformation was mainly described in negative terms, e.g., "a process of transition from one disaster to another" (Vujošević, Zeković, & Marić, 2010, p. 61). However, the results of this study indicate that Serbia experienced the most dynamic development during the analyzed period. The average annual GDP growth in Serbia during the period of 2000–2009 reached 5.49% and was the highest in the region.

It is significant that regions experiencing socio-economic transition and which historically have been burdened with a very low level of socio-economic development, have also achieved good results. Although the taxonomic analysis of socio-economic development in 2019 indicates Slovenia as being the most developed country, Serbia follows in the second place. It seems that the phenomenon of faster development of underdeveloped countries in socio-economic terms is related to their transitional nature (Nazarczuk, 2013). Their diversified structure of residence, employment, and production leads to higher growth dynamics compared to regions characterized by greater production specialization (Jednak, Makajić-Nikolić, Kragulj, & Vujošević, 2014; Mičić, Savić, & Radičić, 2018). It is possible that this observation is the result of a low base effect, i.e., starting from a very low

initial value of GDP. The classification of countries according to the taxonomic measure of regional socio-economic development (2010–2019) given in Table 4Error! Reference source not found. places Slovenia in the first group. Serbia, Croatia, and North Macedonia are in the second group. It seems that the new strategy adopted by Serbia was changed from consumer-oriented model to pro-investment and export-oriented economic growth. This action had a positive effect. In the case of North Macedonia, it is possible that its grow is tied with the adopted Regional development strategy 2009–2019 and the low initial base (European Center for Peace and Development, 2020). One may also consider if we are dealing with faster development within these countries or maybe with a significant economic recession in more developed countries. Considering the scale effect and the significant level of differentiation of socio-economic development in relation to GDP, such a concept cannot be rejected.

The value of the taxonomic measure relating to the regional socio-economic development of Slovenia in 2019 is nearly forty times higher than that of Bosnia and Herzegovina. The ratio of these measures unambiguously points to the socio-economic development gap between these countries, and thus the disparities in the development of the post-Yugoslav region.

Conclusion

The area of former Yugoslavia remains very diverse in terms of the level of socio-economic development. There is a persistent significant polarization on a per capita income basis. There also exists a particularly visible differentiation between Slovenia and North Macedonia, and between Slovenia and Bosnia and Herzegovina. The occurrence of sigma convergence, noticeable after 2007, may have been caused by the global financial crisis. Beta convergence would confirm this hypothesis, while supporting the grouping of countries. It seems that the phenomenon of faster development of less developed countries in socio-economic terms is related to a lower level of initial GDP of these countries, their transitional nature and the economic recession experienced by more developed countries during the financial crisis.

The comparison of the taxonomic values of the measures of regional socio-economic development unequivocally indicates a development gap and significant socio-economic development diversification in the region of former Yugoslavia. Considering the facts that: a) thirty years have passed since the break-up of Yugoslavia; b) the region has been supported by various Stability Pacts for over twenty years; c) Slovenia and Croatia are the members of the European Union, it is necessary to consider whether the current implemented sustainable development strategy is appropriate.

Too large a disparity in socio-economic development may negatively affect the stabilization and economic security of the entire region. Conducting additional research, including a detailed study of the factors that have led to the current situation, may expand our knowledge about their impact on the socio-economic situation in individual countries of former Yugoslavia and establish the building blocks for the development of new strategies.

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