# REGIONAL DISPARITIES IN BULGARIA TODAY: ECONOMIC, SOCIAL, AND DEMOGRAPHIC CHALLENGES

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Abstract: To accelerate Bulgaria's economic development taking into account the specific characteristics of their regions is a serious challenge for the local governments in the country. The ongoing political and economic changes require a reassessment of the country's economic development. The aim of this study was to analyse the disparities among Bulgaria's regions (defined in accordance with the Nomenclature of Territorial Units for Statistics (NUTS)) by assessing the degree of economic, social and demographic challenges they face and performing a multivariate comparative analysis with sets of statistically significant indicators. The analysis clearly outlines the boundaries of the regional disparities and the need to improve the country's regional and cohesion policies.

**Key words:** regional policy, differences, NUTS, taxonomic development measure.

**JEL:** J11, O18, R11.

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owadays inter-regional social and economic disparities are the main problem tackled by various regional development initiatives and programmes in many countries around the world. The high levels of social, economic, and demographic disparity among its regions is one of the main issues in Bulgaria today as well. Despite the country's active implementation of policies in line with the European Union's policy for economic, social and territorial cohesion, regional disparities increasingly hinder its economic development.

The **object** of this study are the main indicators of Bulgaria's social and economic development. The **subject** of the study is the practical applicability of economic indicators for measuring and modeling economic dynamics on a regional scale. The research **thesis** is that although today Bulgaria is a member of the European Union, the significant social and economic disparity among its regions is increasing. The **aim** of the study is to determine and measure the disparities in the socio-economic development of Bulgaria's regions in terms of their demographic potential, social development, economic development and infrastructure. The main **tasks** of the study are to analyse and evaluate the disparities among Bulgaria's regions by means of hierarchical ranking and grouping them according to their demographic and socio-economic development and to put forward recommendations for their mitigation. The **methods** used in the study are multivariate comparative analysis and in particular Z. Hellwig's taxonomic development measure as well as the standard deviation method.

# 1. Theoretical aspects of Bulgaria's socio-economic development today

In recent years regional economic development became the focal point of the policy of our country's local and central governments. Economic development is considered the key concept underlying the global socio-economic objective. Improvement in standard of living is the main development challenge, (The World Bank, 2003) in terms of sustainability, social cohesion and demographic potential. Development is also treated as a whole set of changes, thanks to which a whole social system, social groups and individuals achieve the stage where standard of living is perceived as better. (The World Bank, 2002).

Regional development disparities are tackled by the national strategies for economic development, which aim to improve regional economies in the medium and long run so as to allow proper functioning of market mechanisms. Moreover, they aim to ensure a balanced economic and social development of the various regions on the territory of the country or to ensure fair

interregional cooperation. Bulgaria's regions are referenced according to the European Classification of Territorial Units for Statistics (NUTS) (Zahariev, A., 2012). According to this classification Bulgaria is divided into two main regions (NUTS-1): Northern and Eastern Bulgaria, and Southwestern and South Central Bulgaria (NSI, 2003). The regions are subdivided into six planning regions (NUTS-2) and twenty-eight provinces (NUTS-3): Southwestern (Sofia Province, Sofia City, Kyustendil Province, Blagoevgrad Province, and Pernik Province), Southern Central (Pazardjik Province, Plovdiv Province, Smolyan Province, Haskovo Province, and Kardzhali Province), Southeastern (Stara Zagora Province, Sliven Province, Yambol Province, and Burgas Province), Northeastern (Varna Province, Dobrich Province, Targovishte Province, and Shumen Province), Northern Central (Veliko Tarnovo Province, Gabrovo Province, Rousse Province, Razgrad Province, and Silistra Province), and Northwestern (Vidin Province, Vratsa Province, Montana Province, Pleven Province, and Lovech Province).

Bulgaria's membership in the European Union created new environment for the county's regional development based the country's policy for social and economic cohesion of its regions. The country aims to achieve balanced regional development and convergence and to prevention potential disparities among its regions with the support of EU's Structural and Cohesion Funds through a number of Operational Programs (Lilova, R., Radulova, A., Simeonov, S., 2016) implemented in two programming periods: **First Programming Period**<sup>2</sup> (EC, 2007) (2007–2013) and **Second Programming Period**<sup>3</sup> (Economix, 2014) (2014–2020). It is important to note that some operational programmes have been implemented on the national level, while others have been deployed on the regional level. Regional programmes have made it possible to take into account considerable disparities in overall socioeconomic situation among the 28 Bulgarian provinces.

#### 2. Methodological framework of Z. Hellwig's development model

The research was conducted applying Z. Hellwig's method of taxonomic measure of development (Pawlas, I.) - a multivariate comparative analysis which results in a hierarchical classification of Bulgaria's provinces in terms of demographic potential, level of economic development, level of

<sup>&</sup>lt;sup>2</sup> OP Regional Development, OP Developing the Competitiveness of Bulgaria's Economy, OP Human Resource Development, OP Transport, OP Administrative Capacity, OP Technical Assistance.

<sup>&</sup>lt;sup>3</sup> OP Regions in Growth, OP Innovation and Competitiveness, OP Human Resources Development, OP Good Governance, OP Science and Education, OP Environment, OP Transport.

social and economic development and technical infrastructure. The analysis covers a period of 5 years (2012 through 2016) and was performed separately for the years 2012, 2014, and 2016. The analysis was undertaken with three groups of indicators included in the database published by the NSI: **Group One** – demographic potential<sup>4</sup>, **Group Two** – social and economic development<sup>5</sup>, and **Group Three** - technological infrastructure.<sup>6</sup> The selected indicators are essential for the analysis of the regional development represent objectively the demographic, social and economic, and infrastructural potential of the country. All variables were considered *stimuli* and a development model was constructed – a model unit, where diagnostic of variables were determined according to the rule, where:  $z_io=max(zij)$ .

The distance of *i-unit* from the development model was calculated using Euclid's (a.k.a. Euclidean space) (Pawlas, I.):

using Euclid's (a.k.a. Euclidean space) (Pawlas, I.): 
$$d_{j0} = \sqrt{\sum_{j=1}^{m} (z_{ij} - z_{j0})^2}$$

Taxonomic measure of development (TMD) was calculated according to the formula (Jarocka, 2012):

(2) 
$$TMD_{i} = 1 - \frac{d_{i0}}{d_{0}}, i = 1, 2, ..., n, where: d_{0} = \overline{d_{0}} + 2S_{0}$$

$$\overline{d_{0}} = \frac{1}{n} \sum_{i=1}^{n} d_{i0}, (4) \quad S_{0} = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (d_{i0} - \overline{d_{0}})^{2}},$$
(3) : TMD  $i \in [0: 1], i=1, 2, ..., n$ .

At first each indicator from the three groups of indicators (demographic potential, social and economic development, and technological infrastructure) was assessed in terms of its level of development expressed by taxonomic measure of development (TMD). Then, a synthetic measure was constructed taking into consideration the aggregate average values of each

<sup>&</sup>lt;sup>4</sup> This group includes the following variables: age dependency ratio (the ratio of the number of persons under 15 years of age and number of persons 65 and more per 100 persons aged 15 to 64 years calculated in percentage); old-age dependency ratio (the ratio of the number of persons aged 65 and more per 100 persons aged 15-64 years calculated in percentage); residence structure (urban residence calculated in percentage); population density by settlement territory and other urban areas (number of residents per sq.m.); natural increase rate and migration growth (in ‰).

<sup>&</sup>lt;sup>5</sup> This group includes: number of hospital beds per 1000 population; inpatients in health establishments for hospital aid; crimes against the person and the property (per 1000 population; GDP per capita in BGN; average annual income per household member (in BGN); aggregated foreign direct investment in non-financial enterprises as of 31 Dec. (in EUR thousand).

<sup>&</sup>lt;sup>6</sup> This group includes: road pavement quality (percentage of good-quality roads); road network density (total length per 100 sq. m. of territory); relative share of households with Internet access (percentage of the total number of households).

combination of indicators within each of the three groups. This made it possible to make a hierarchy in terms of demographic potential, social and economic potential, and technological infrastructure measured by synthetic measure of development (TMD). Such a plan of research made it possible to arrange the studied provinces in order according to the level of development expressed by taxonomic measure of development (TMD). The implementation of cluster analysis for the research resulted in grouping of the analysed Bulgarian provinces into four clusters according to the level of socioeconomic development in 2012, 2014 and 2016 using the method of standard deviation and according to the following rule:

- 
$$G_1$$
:  $s_i < \bar{s} - S(s)$  -  $G_2$ :  $\bar{s} > \bar{s}_i \ge \bar{s} - S(s)$   
-  $G_3$ :  $\bar{s} + S(s) > s_i \ge \bar{s}$  -  $G_4$ :  $s_i \ge \bar{s} + S(s)$ ,

where:

 $\bar{s}$  – arithmetic mean of TMD; S(s) – standard deviation of TMD;  $s_i$  –TMD value in i province.

## 3. Results from the multivariate comparative analysis

This section presents the TMD values obtained through numerous calculations using statistical data published by the NSI. Tables 1 to 3 present the achieved results of multivariate comparative analysis conducted by applying Z. Hellwig's method of taxonomic measure of development for each of the 28 provinces. In 2012, the provinces of Gabrovo, Pernik, and Varna have the highest values of demographic potential due to the high values of two indicators: the old-age dependency ratio (the ratio of the number of persons aged 65 and more per 100 persons aged 15–64 years) and the migration growth. The worst results in this field were observed in the provinces of Smolyan, Sofia City, and Blagoevgrad due to the low values of their migration growth indicators. In 2014 and 2016 the trend for some of the regions changed and provinces with the best demographic potentials were: Sofia City, Gabrovo, Plovdiv, and Varna while those with lowest TMD values were: Razgrad, Targovishte, Vratsa, Silistra, and Smolyan. These observations are shown in Table 1 below.

In terms of social and economic development in 2012 Pleven Province was a leader, followed by the provinces of Plovdiv and Pazardzhik. The lowest values were calculated for Sofia City, Burgas, and Varna. In 2014 and 2016 the trend changed drastically and the leading positions were held by So-

<sup>&</sup>lt;sup>7</sup> Since the overall model could not be approbated within this study, the primary data and their dynamics by individual groups are not included in this article. The tables in this section show only the final results of the analysis.

fia City, Pleven, Sofia, and Plovdiv as shown in Table 2. Objective indicators in this group were the GDP per capita, the average annual income per household member, and the aggregated foreign direct investment in non-financial enterprises. The lowest values were calculated for Kardzhali, Shumen, Dobrich, and Silistra due to the low number of hospital beds per 1000 population.

Table 1
Ranking of Bulgarian provinces in terms of demographic potential

pos	2012		2014		2016	
	Province	TMD	Province	TMD	Province	TMD
1.	Gabrovo	0.883	Sofia City	0.867	Sofia City	0.876
2.	Pernik	0.847	Gabrovo	0.837	Gabrovo	0.842
3.	Varna	0.834	Plovdiv	0.813	Plovdiv	0.826
4.	Ruse	0.833	Ruse	0.809	Varna	0.819
5.	Sofia	0.827	Varna	0.805	Ruse	0.816
6.	Lovech	0.825	Pernik	0.805	Pernik	0.813
7.	Haskovo	0.823	Burgas	0.798	Burgas	0.806
8.	Shumen	0.821	Kyustendil	0.798	Stara Zagora	0.802
9.	V. Tarnovo	0.820	Vidin	0.795	V. Tarnovo	0.794
10.	Stara Zagora	0.820	Stara Zagora	0.793	Pleven	0.790
11.	Vidin	0.820	Pleven	0.792	Kyustendil	0.790
12.	Montana	0.812	Haskovo	0.789	Lovech	0.785
13.	Dobrich	0.811	Lovech	0.789	Yambol	0.784
14.	Kyustendil	0.810	Yambol	0.786	Vidin	0.779
15.	Plovdiv	0.808	Kardzhali	0.786	Sliven	0.778
16	Yambol	0.807	V. Tarnovo	0.783	Haskovo	0.776
17	Pleven	0.807	Montana	0.781	Montana	0.774
18.	Burgas	0.806	Sliven	0.781	Shumen	0.773
19.	Silistra	0.795	Pazardzhik	0.766	Sofia	0.770
20.	Targovishte	0.784	Sofia	0.765	Kardzhali	0.766
21	Pazardzhik	0.768	Shumen	0.762	Blagoevgrad	0.766
22.	Vratsa	0.766	Blagoevgrad	0.761	Pazardzhik	0.766
23.	Kardzhali	0.764	Dobrich	0.761	Dobrich	0.763
24.	Razgrad	0.750	Vratsa	0.750	Silistra	0.758
25.	Sliven	0.746	Smolyan	0.750	Smolyan	0.751
26.	Blagoevgrad	0.741	Silistra	0.748	Vratsa	0.745
27.	Sofia City	0.731	Targovishte	0.747	Targovishte	0.740
28.	Smolyan	0.724	Razgrad	0.727	Razgrad	0.720
20.	Billoryan	0.724	Ruzgrad	0.727	Razgrad	0.72

**Source:** Author's calculations based on NSI data.

Table 2
Ranking of Bulgarian provinces in terms of social and economic potential

	2012		2014		2016	
pos	Province	TMD	Province	TMD	Province	TMD
1.	Pleven	0.885	Sofia City	0.942	Sofia City	0.914
2.	Plovdiv	0.863	Pleven	0.863	Pleven	0.856
3.	Pazardzhik	0.856	Sofia	0.852	Plovdiv	0.842
4.	Montana	0.843	Plovdiv	0.847	Sofia	0.821
5.	Smolyan	0.838	Gabrovo	0.842	Gabrovo	0.811
6.	Kyustendil	0.837	Varna	0.835	Stara Zagora	0.807
7.	Silistra	0.829	Stara Zagora	0.824	Pazardzhik	0.794
8.	Kardzhali	0.827	Montana	0.813	Montana	0.793
9.	Targovishte	0.826	Vratsa	0.812	Varna	0.781
10.	Sliven	0.822	Kyustendil	0.802	Burgas	0.780
11.	Razgrad	0.821	Targovishte	0.796	Kyustendil	0.779
12.	Gabrovo	0.816	Burgas	0.789	Vratsa	0.775
13.	Haskovo	0.813	Ruse	0.788	Ruse	0.761
14.	Lovech	0.811	Razgrad	0.787	Smolyan	0.750
15.	Vidin	0.799	Smolyan	0.787	Targovishte	0.749
16.	Yambol	0.794	Vidin	0.782	Razgrad	0.747
17.	V. Tarnovo	0.794	Pazardzhik	0.782	Lovech	0.746
18.	Vratsa	0.794	Lovech	0.778	Sliven	0.735
19.	Shumen	0.785	Sliven	0.775	Haskovo	0.730
20.	Ruse	0.784	Pernik	0.773	Pernik	0.727
21.	Blagoevgrad	0.780	Haskovo	0.766	Vidin	0.726
22.	Dobrich	0.777	Blagoevgrad	0.760	Yambol	0.724
23.	Stara Zagora	0.774	Dobrich			0.724
24.	Pernik	0.762	V. Tarnovo	0.758	V. Tarnovo	0.720
25.	Sofia	0.742	Yambol	0.753	Blagoevgrad	0.719
26.	Varna	0.739	Silistra	0.752	Dobrich	0.713
27.	Burgas	0.692	Shumen	0.751	Shumen	0.698
28.	Sofia City	0.661	Kardzhali	0.742	Kardzhali	0.692

Source: Author's calculations based on NSI data.

The leading positions in the technical infrastructure group in 2012 were held by Pernik, Gabrovo, and Targovishte due to their high road pavement quality and road network density indicators. The lowest TMD values were calculated for Blagoevgrad, Burgas, and Shumen. In 2014 and 2016 the leading positions were held by Gabrovo, Varna, Sofia Capital, Pernik, and Vidin due to the high values of their relative share of households with Internet access and road network density indicators. The lowest values (27th and 28th position in Table 3) were calculated for Vratsa, Pleven, Blagoevgrad, and Montana.

Table 3
Ranking of Bulgarian provinces in terms of technical infrastructure development

	2012		2014		2016	
pos	Province	TMD	Province	TMD	Province	TMD
1.	Pernik	0.865	Gabrovo	0.907	Varna	0.886
2.	Gabrovo	0.856	Sofia City	0.867	Sofia City	0.878
3.	Targovishte	0.849	Pernik	0.864	Vidin	0.865
4.	Sliven	0.847	Kardzhali	0.844	Pernik	0.865
5.	Kyustendil	0.827	Yambol	0.831	Haskovo	0.855
6.	Yambol	0.804	Sliven	0.828	Stara Zagora	0.855
7.	Lovech	0.802	Silistra	0.821	Plovdiv	0.845
8.	Vidin	0.801	Varna	0.821	Gabrovo	0.838
9.	Sofia	0.799	Ruse	0.813	Ruse	0.829
10.	Haskovo	0.797	Razgrad	0.807	Targovishte	0.829
11.	Stara Zagora	0.788	Stara Zagora	0.801	Vratsa	0.827
12.	V. Tarnovo	0.779	Haskovo	0.798	Dobrich	0.827
13.	Pazardzhik	0.777	Smolyan	0.796	Kyustendil	0.826
14.	Dobrich	0.775	V. Tarnovo	0.789	Shumen	0.817
15.	Varna	0.772	Targovishte	0.777	Razgrad	0.815
16.	Sofia City	0.771	Sofia	0.771	Smolyan	0.812
17.	Smolyan	0.767	Pazardzhik	0.770	Sliven	0.806
18.	Plovdiv	0.765	Lovech	0.766	Pazardzhik	0.799
19.	Pleven	0.764	Vidin	0.764	Yambol	0.797
20.	Kardzhali	0.759	Dobrich	0.761	Kardzhali	0.796
21.	Razgrad	0.755	Kyustendil	0.753	Silistra	0.794
22.	Silistra	0.754	Shumen	0.753	V. Tarnovo	0.783
23.	Vratsa	0.749	Blagoevgrad	0.751	Burgas	0.773
24.	Ruse	0.746	Plovdiv	0.747	Sofia	0.766
25.	Montana	0.744	Burgas	0.736	Lovech	0.762
26.	Shumen	0.740	Pleven	0.731	Montana	0.758
27.	Burgas	0.713	Montana	0.729	Blagoevgrad	0.746
28.	Blagoevgrad	0.703	Vratsa	0.684	Pleven	0.740

Source: Author's calculations based on NSI data.

The differences among the three fields in different years resulted from a number of objective and subjective reasons. The differences should be viewed as an effect of a combination of changes of individual variables in each field.

In order to define the disparities among the provinces in terms of their social and economic development, demographic development, and technical infrastructure in 2012, 2014, and 2016, the provinces were grouped into four classes (see Table 4) by applying the standard deviation method for classifica-

tion of linearly ordered subjects. Class G4 comprises the provinces with the highest, and class G1 – with the lowest TMD.

Table 4
Division of Bulgarian provinces into classes according to their social and economic development, demographic development, and technical infrastructure in 2012, 2014, and 2016

	2012		2014		2016	
	Province	Group	Province	Group	Province	Group
1.	Gabrovo	G4	Sofia City	G4	Sofia City	G4
2.	Pleven	G4	Gabrovo	G4	Plovdiv	G4
3.	Kyustendil	G4	Varna	G3	Gabrovo	G4
4.	Plovdiv	G4	Plovdiv	G3	Varna	G4
5.	Pernik	G4	Pleven	G3	Stara Zagora	G3
6.	Lovech	G4	Stara Zagora	G3	Pleven	G3
7.	Haskovo	G4	Pernik	G3	Ruse	G3
8.	Targovishte	G4	Ruse	G3	Kyustendil	G3
9.	Montana	G4	Sofia	G3	Sofia	G3
10.	Vidin	G3	Kyustendil	G3	Burgas	G3
11.	Pazardzhik	G3	Sliven	G2	Pernik	G3
12.	V. Tarnovo	G3	Vidin	G2	Pazardzhik	G3
13.	Yambol	G3	Montana	G2	Montana	G2
14.	Silistra	G3	Burgas	G2	Vidin	G2
15.	Sliven	G3	Yambol	G2	Haskovo	G2
16.	Ruse	G3	Haskovo	G2	Vratsa	G2
17.	Stara Zagora	G3	Kardzhali	G2	Sliven	G2
18.	Shumen	G2	Lovech	G2	Lovech	G2
19.	Dobrich	G2	В.Търново	G2	Smolyan	G2
20.	Kardzhali	G2	Smolyan	G2	Yambol	G2
21.	Sofia	G2	Pazardzhik	G2	V. Tarnovo	G2
22.	Varna	G2	Targovishte	G2	Targovishte	G2
23.	Razgrad	G2	Razgrad	G2	Dobrich	G2
24.	Smolyan	G1	Silistra	G2	Shumen	G2
25.	Vratsa	G1	Vratsa	G2	Silistra	G2
26.	Blagoevgrad	G1	Dobrich	G1	Razgrad	G1
27.	Burgas	G1	Blagoevgrad	G1	Blagoevgrad	G1
28.	Sofia City	G1	Shumen	G1	Kardzhali	G1

The analysis applying standard deviation method for classification of linearly ordered subjects yielded the following results: In 2012 there were nine provinces in class G4 (Gabrovo, Pleven, Kyustendil, Plovdiv, Pernik, Lovech, Haskovo, Targovishte, and Montana) and five provinces in class G1 (Sofia City, Burgas, Blagoevgrad, Vratsa, and Smolyan.) In 2014 Sofia City shifted from class G1 to class G4 (the only province other than Gabrovo in this class) while Dobrich, Blagoevgrad, and Shumen were included in class

G1. In 2016 there was a clearly defined trend regarding the social and economic development of Bulgaria's regions. Class G4 included Sofia City, Plovdiv, Gabrovo, and Varna while class G1 included Kardzhali, Blagoevgrad, and Razgrad.

The results from the multivariate comparative analysis based on Z. Hellwig's method of taxonomic measure of development and the subsequent grouping of the provinces using a standard deviation method for classification of linearly ordered subjects lead to the following conclusions:

**First,** regional disparity trends within the studied period were clearly outlined in terms of combinations of demographic, socioeconomic and infrastructural factors.

**Second,** the factors that affect most the regional disparities in the country are: demographic factors – population's natural increase rate and migration growth; socioeconomic factors - annual income per household member (in BGN) and aggregated foreign direct investment in non-financial enterprises; technical infrastructure - relative share of households with Internet access and road network density.

**Third**, according to Z. Hellwig's method of taxonomic measure of development, the regions with the highest population density (Sofia City, Plovdiv, and Varna) have the highest development rates since they have the highest concentration of grants from EU's Structural and Cohesion Funds.

#### 4. Conclusion

The results show that there are huge development disparities among Bulgaria's NUTS-3 regions (i.e. provinces.) These disparities were determined using a multivariate comparative analysisq which shows that in recent years thehighest synthetic measure value (TMD) has been observed for Sofia City, which has the highest demographic and socioeconomic potential and ranks second (after Varna Province) only in terms of technical infrastructure. On the other hand, Razgrad was the province with the most volatile demographic potential while Kardzhali has one of the lowest socioeconomic development indicators and Pleven has the lowest TMD value in terms of technical infrastructure.

The above findings clearly show that Bulgaria makes no exception from the general rule that development is usually irregular. On the one hand, the fact that some regions develop faster than others is optimistic, because it allows for faster overall growth on a global scale and generates more resources to address future challenges. On the other hand, regional disparities affect the quality of life in the country and contradict the overall mission and

goal of the European Union for social equality. Structural Funds should be used more efficiently in the less developed regions in order to mitigate the disparities among Bulgaria's provinces, to stimulate their economic growth in the long run, and to increase the rate of their development and their competitiveness. By focusing on the specific areas of the lowest G1 and G2 classes of this study and optimizing Bulgaria's regional and cohesion policy, a higher level of equality may be achieved, thus mitigating the regional disparities and raising the standard of living in the country.

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