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**Conference Paper**

## RELEVANCE OF DEMOGRAPHIC CRITERION AT ESTABLISHING STATISTIC REGIONS IN CONTEXT PROBLEMS AND PROSPECTS OF EUROPEAN INTEGRATION

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**PROBLEMS AND PROSPECTS**  
**- RELEVANCE OF DEMOGRAPHIC CRITERION AT ESTABLISHING**  
**STATISTIC REGIONS IN CONTEXT PROBLEMS AND PROSPECTS OF**  
**EUROPEAN INTEGRATION -**  
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***Abstract***

This paper described problems and prospects according establishment statistic regions based only on demographic criterion as mainly criterion in context establish the Regulation (EC) No 1959/2003 of the European Parliament and of the Council. We try to open question of potential conflict first and second criterion on Regulation on the establishing common classification of territorial units for the statistics. This question we based on results testing follow hypothesis.

Within the process of defining statistic regionalization in the countries being candidates and the potential candidates, a demographic criterion is pointed out as the key one. It is a reason why we, in this work, concentrate on the criterion of demographic size while determining statistic (NUTS) regions in the European Union within the context of implementation of the Regulation on the establishing common classification of territorial units for the statistics. Regulation (EC) No 1059/2003 of the European Parliament and of the Council from May 26<sup>th</sup>, 2003 related to the establishment of common classification of territorial units for statistics.

Within the work, we verify the hypothesis: that there is significant deviation from the criterion of demographic size at statistic (NUTS) regions in European Union. We verify the hypothesis by applying relevant statistic methods. Data basis for testing hypothesis is overtaken from the relevant tables of the Eurostat official website [http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search\\_database](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). Testing was performed in two steps. In the first step, 317 statistic regions of the second level (NUTS II) were analyzed. The second step analyzed 1,327 statistic regions of the third level (NUTS III). Both steps specifically analyzed deviation from minimal and maximal

demographic size of statistic region belonging to corresponding level. The results are presented in tables and graphs.

Actuality of research is determined by the Bosnia and Herzegovina obligation to define statistic regions (NUTS regions) so as by the fact that in the Bosnia and Herzegovina case non critical application of this criterion as the eliminatory one, may be in the conflict with the first criterion, or, existing administrative units and other criterions being relevant for the formation of regional structure.

We research statistical regionalization or implementation on Regulation EC last three years and public more papers about different aspects this problems.

**Key words:** demographic criterion, statistic regions, problems, prospects

## **Introduction**

This paper described problems and prospects according establishment statistic regions based only on demographic criterion as mainly criterion in context establish the Regulation (EC) No 1959/2003 of the European Parliament and of the Council. We try to open question of potential conflict first and second criterion on Regulation on the establishing common classification of territorial units for the statistics. This question we based on results testing follow hypothesis. The subject of this paper is an analysis of the relevance of the criteria for determining the size of the demographic statistics (NUTS) regions in the European Union in the process of implementing regulations on the establishment of a common classification of territorial units for statistics. The main hypothesis verifies that there are significant deviations from the criteria of demographic size of the statistical (NUTS) regions the European Union. The test hypotheses using the following methods: graphical comparative presentation and t test for arithmetic means.

The database is taken from the table: Total average population, by NUTS 2 regions - (1,000 inhabitants) Eurostat, Statistics, Regional Statistics, available <http://epp.eurostat.ec.europa.eu/tgm/table.do?tabtable=&init=1&language=en&pcode=tps0001&plugin=1> (Annex 1). Results from this paper can be used in the process of negotiations between Bosnia and Herzegovina and EUROSTAT in the process of defining the statistical regions, as well as for further research, in the area of statistical methods of regionalization.

Decree from the Regulation (EC) No 1059/2003 of The European Parliament and of The Council May, 26<sup>th</sup>, 2003 on the establishment of a common classification of territorial units for statistics (NUTS) and the provision from the Agreement on Stabilization and Association of Bosnia and Herzegovina to EU, actualize statistic (NUTS) regionalization of Bosnia and Herzegovina.

Within the process of defining statistic regionalization in the countries being candidates and the potential candidates, a demographic criterion is pointed out as the key one. It was

especially stressed in the projects of the Delegation of European Commission in Bosnia and Herzegovina which supported regional development during the years 2003 and 2004.

It is a reason why we, in this work, concentrate on the criterion of demographic size while determining statistic (NUTS) regions in the European Union is within the context of implementation of the Regulation on the establishing common classification of territorial units for the statistics. Regulation (EC) No 1059/2003 of the European Parliament and of the Council from May 26<sup>th</sup>, 2003 is related to the establishment of common classification of territorial units for statistics.

Within the work, we verify the hypothesis: that there is significant deviation from the criterion of demographic size at statistic (NUTS) regions in European Union. We verify the hypothesis by applying relevant statistic methods. Data basis for testing hypothesis is overtaken from the relevant tables of the Eurostat official website

[http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search\\_database](http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database). Testing was performed in two steps. In the first step, 317 statistic regions of the second level (NUTS II) were analyzed. The second step 1,327 statistic regions of the third level (NUTS III) were analyzed. Both steps specifically analyzed deviation from minimal and maximal demographic size of statistic region belonging to corresponding level. The results are presented in seven tables and eight graphs.

Actuality of research is determined by the Bosnia and Herzegovina obligation to define statistic regions (NUTS regions) so as by the fact that in the case of Bosnia and Herzegovina case non critical application of this criterion as the eliminatory one, may be in the conflict with the first criterion, or, existing administrative units and other criterions being relevant for the formation of regional structure.

Paper consists: Regulation, different of BH regionalization compared with only demographic criterion, relevance of demographic criterion in old and new EU countries, and problems and prospects.

## **Regulation**

Eurostat established The Nomenclature of Territorial Units for Statistics (NUTS) more than 30 years ago. The NUTS classification has been used in Community since 1988 (Council Regulation No 2052/88). European Parliament and The Council adopted Regulation on NUTS No 1059/2003 and established common classification of territorial units for statistics (NUTS) (Official Journal L 154, 21/06/2003). The regions from the ten new Member States are added from 2004, and the regions from Bulgaria and Romania are added from 2007. Important goal of the Regulation is to manage the process of change in the administrative structures of Member States in the smoothest possible way, so as to minimize the impact of such changes to the availability and comparability of regional statistics. The NUTS nomenclature serves as a reference: for the collection, development and harmonization of Community regional statistics: for the socio-economic analyses of the regions: and for the framing of Community regional policies. The NUTS nomenclature was created and developed according to the following principles: the

NUTS favors institutional breakdowns, regional units of a general character and three level hierarchical classifications.

The second<sup>1</sup> criterion for defining NUTS classification is a demographic size of the NUTS level. Article 3. paragraph 2. of the Regulation (EC) number 1059/2003 defines demographic size of certain NUTS regions. “In order to establish adequate NUTS level in which specific class of administrative units of the member states will be classified, the average size of this class of administrative unit in the member state will be within the range of the following thresholds of the population.

Table 1. Criterion of demographic size for the levels of NUTS classification<sup>2</sup>

Level	Minimum	Maximum
NUTS 1	3,000,000	7,000,000
NUTS 2	800,000	3,000,000
NUTS 3	150,000	800,000

Given the population for the whole member country is under the minimal threshold for the given NUTS level, the whole member state will be one NUTS territorial unit for that level. For the purpose of this Regulation, the population of one territorial unit will be composed from those people who have their usual residence in that region. And “ if for the given NUTS level there is no administrative unit for the corresponding level in the member state, in accordance to the criterion from paragraph 2, that NUTS level will be constituted by addition of the corresponding number of existing smaller administrative units. This addition will take into consideration these criterions as the geographic ones”. We do the testing procedure in two steps or two iterations. In the first step we test deviation from the criterion of demographic size for the statistic region the second level, and in the second, we test deviation for the statistic region the third level.

### **Different of BH regionalization compared with only demographic criterion**

According the Census population 1991, Bosnia and Herzegovina had 4.365 thousand people 1991. Institute for statistics estimated that Bosnia and Herzegovina has about 3,8 million people (2009): Federation Bosnia and Herzegovina 2,3 million people; Republic Srpska 1,4 million people and District Brčko 75 thousands people. It is administrative regionalization of Bosnia and Herzegovina from 1995 till now. In context new constitution of Bosnia and Herzegovina there are possibilities changing this administrative regionalization. If this demographic value for official administrative regions we compare with demographics criterion, results could see on the fellow table:

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<sup>1</sup> „Existing administrative units in the member states will be the first criterion that will be used in defining territorial units. Administrative units mean a geographic region with the administrative bodies that have the authorities to bring administrative or political decisions which are within legal and institutional framework of the member states.“

<sup>2</sup> Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003, Official Journal of the European Union, 21.6.2003., L 154/3.

Table 2: Population of Administrative regions B&H

Entities	Number of people <sup>3</sup> Million	NUTS regions	Demographic criterion According Regulation <sup>4</sup>
Federation B&H	2,3	II	800.000-3.000.000
Republic Srpska	1,4	II	800.000-3.000.000
District Brčko	0,0 <sup>5</sup>	IV	Less than 150.000
Bosnia and Herzegovina	3,8	I	3.000.000-7.000.000

Source: Bilten 4/2009, Central Bank of Bosnia and Herzegovina, Sarajevo, 2010, p146, and Institute of Statistics Federation of Bosnia and Herzegovina and Institute of Statistics Republic Srpska

Delegation EC established five regions 2004. According this project, Macroregion Sarajevo (center Sarajevo) had 0,7 millions people, East west region (center Tuzla) had 1,0 millions people, Central region (center Zenica) had 0,6 millions people, Northwest (center Banjaluka) region had 1,3 millions people and Herzegovina region (center Mostar) had 0,5 millions people. If this demographic value for five regions we compare with demographics criterion, results could see on the fellow table:

Table 3: Population of five regions

Regions	Number of people <sup>6</sup> Million	NUTS regions	Demographic criterion According Regulation <sup>7</sup>
Macro region Sarajevo	0,7	III	150.000-800.000
Region Banjaluka	1,3	II	800.000-3.000.000
Region Tuzla	1,0	II	800.000-3.000.000
Region Zenica	0,6	III	150.000-800.000
Region Mostar	0,5	III	150.000-800.000
Bosnia and Herzegovina	4,1	I	3.000.000-7.000.000

Source: Project EURED, EURED, Sarajevo, 2004.

Thread case could be proposals of more science research of Economic Institute. Team of Economic Institute prepared proposal regionalization of Bosnia and Herzegovina on four regions: Bosanska krajina (Region Banjaluka), Northeast regions (Region Tuzla), Sarajevo region and Herzegovina (Region Mostar)<sup>8</sup>. If this demographic value for four regions we compare with demographics criterion, results could see on the fellow table:

Table 4: Population of five regions

Regions	Number of people <sup>9</sup> Million	NUTS regions	Demographic criterion According Regulation <sup>10</sup>
Region Sarajevo	1,3	II	800.000-3.000.000

<sup>3</sup> EURED project

<sup>4</sup> Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003, Official Journal of the European Union, 21.6.2003., L 154/3.

<sup>5</sup> 75.000 people District Brčko

<sup>6</sup> EURED project

<sup>7</sup> Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003, Official Journal of the European Union, 21.6.2003., L 154/3.

<sup>8</sup> Osmanković & Pejanović (2009): Euroregije and B&H. Faculty of political science, Sarajevo; Bošnjović, I. (1969): Regionalisation B&H, Economic Institute, Sarajevo; Bošnjović, I. (1992): Regionalizacija BiH. Ekonomski institut, Sarajevo

<sup>9</sup> EURED project

<sup>10</sup> Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003, Official Journal of the European Union, 21.6.2003., L 154/3.

Region Banjaluka	1,2	II	800.000-3.000.000
Region Tuzla	1,4	II	800.000-3.000.000
Region Mostar	0,5	III	150.000-800.000
Bosnia and Herzegovina	4,4	I	3.000.000-7.000.000

Source: Bošnjoviće et al. (1992): Regionalisazicija Bosne I Hercegovine. Ekonomski institute Sarajevo, Sarajevo, p 110

If we strictly establish demographic criterion according to Regulation No 1059/2003 on this three cases: first, official administrative divided of Bosnia and Herzegovina, and second, Delegation EC proposal on five regions, and third, proposal of team of Economic Institute, first and third cases more correct than second case. In first case, open question is District Brčko with 75 thousands people.

We ask what happened in the old and new EU countries according demographic criterion in establishing NUTS regions.

### Relevance of demographic criterion in old and new EU countries

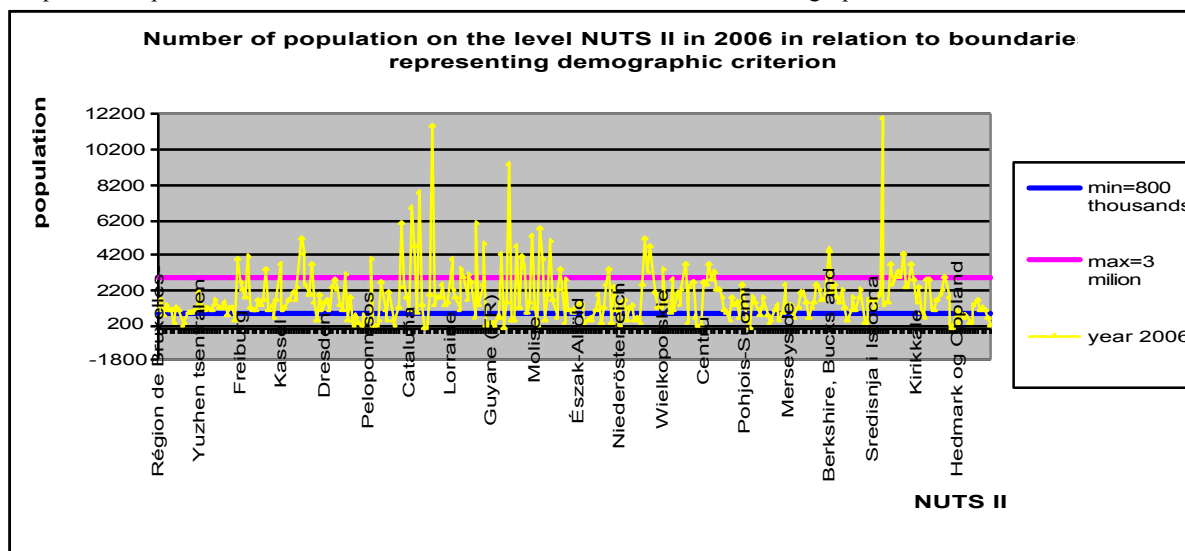
On the basis of data from Eurostat we analyze a variable the population number within NUTS II level for the EU members in 2006. According to the available data basis 3 we come to the elementary parameters which describe analyzed variable and which are presented in table 2.

Table 5. Descriptive statistics for the analyzed variable number of population within NUTS II level for the European Union members in 2006

Variable	Number of population within NUTS II level in the EU members for 2006
N	317
Average	1,844,580
standard deviation	1,558,520
medium	1,449,300
minimum	26,800
maximum	12,025,600

317 statistic regions of the second level were analyzed. As it may be seen from the table 2, there are units (statistic regions) where you may notice deviations from the real situation on the NUTS II level and given demographic criterions, taking into consideration the fact that the minimal value for the analyzed variable is lower than the lower criterion limit for NUTS II and the maximal value for the analyzed variable is higher than the higher criterion limit for the NUTS II. The Graph 1 clearly shows deviations per certain units of NUTS II.

Graph 1. Comparison of the situation in 2006 on the level NUTS II and demographic criterion



On the x-axis the number of population in 2006 is presented while the y-axis represents statistic regions at the II level. The graph 1 gives the distribution of statistic regions according to demographic size in comparison to minimal and maximum criterion of demographic size from paragraph two articles three of the Resolution. In order to analyze these deviations in details, we specifically follow units (statistic regions) where deviations are lower from the minimal value which is determined per demographic criterion and the units at which deviations higher than the maximal value per demographic criterion recorded. The results of the analysis, i.e. determined parameters, are presented in tables 3 and 4.

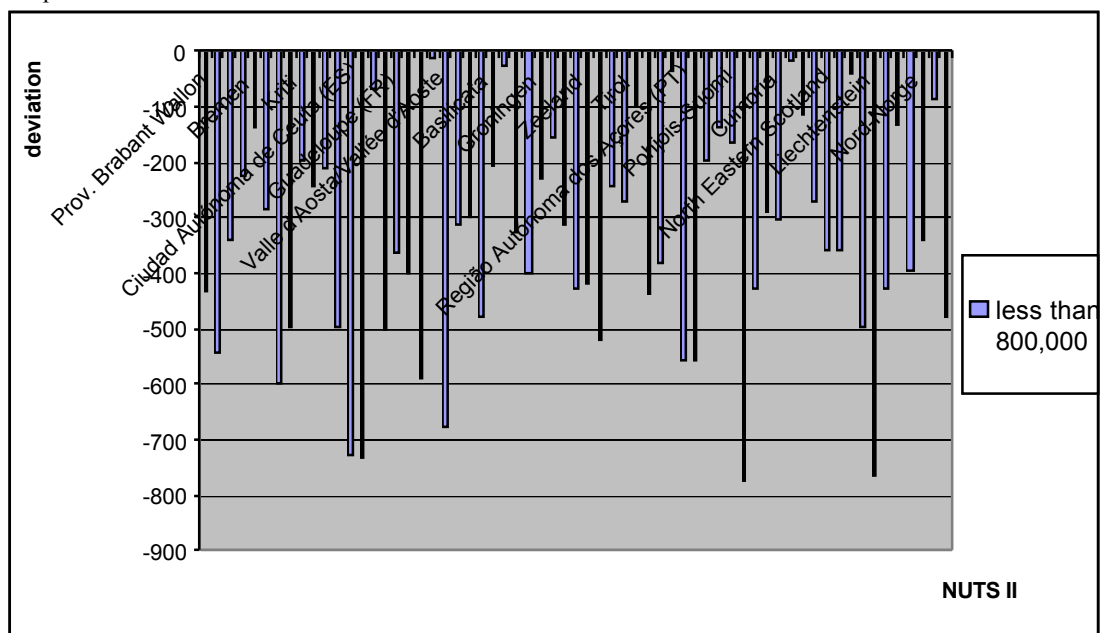
Table 6. Descriptive statistics for the analyzed deviations of the population number within NUTS II level from the demanded demographic criterion for the EU members in 2006 – deviations from the lower limit

Variable	Deviation for the cases where NUTS II is lower than 800 thousands inhabitants
N	71
average	335,640
standard deviation	194,480
medial	327,400
minimum	13,800
maximum	773,200

In 71 out of 317 units at the level NUTS II (22.4 %) there is a deviation below lower limit of the demographic criterion (800.000 inhabitants) for the level NUTS II and the average value of deviation is 335.640 with standard deviation of 194.480.



Graph 2. Deviation for the cases where NUTS II is with less than 800 thousands inhabitants



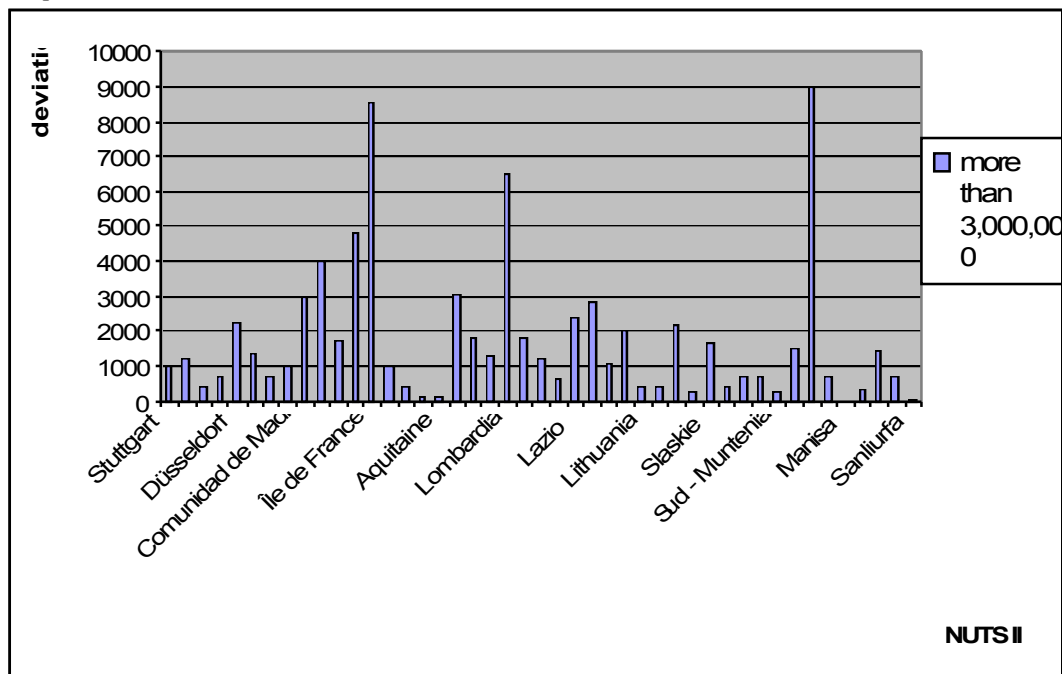
The graph 2 presents deviation from minimal demographic size (800,000 inhabitants) at NUTS III level.

Table 7. Descriptive statistics for the analyzed deviations of the population number within NUTS II level from demanded demographic criterion for the EU members in 2006 – deviations from the upper limit

Variable	Deviation for the cases where NUTS II is with more than 3 million inhabitants
N	46
average	1,703,250
standard deviation	2,007,970
medium	1,045,400
minimum	27,900
maximum	9,025,600

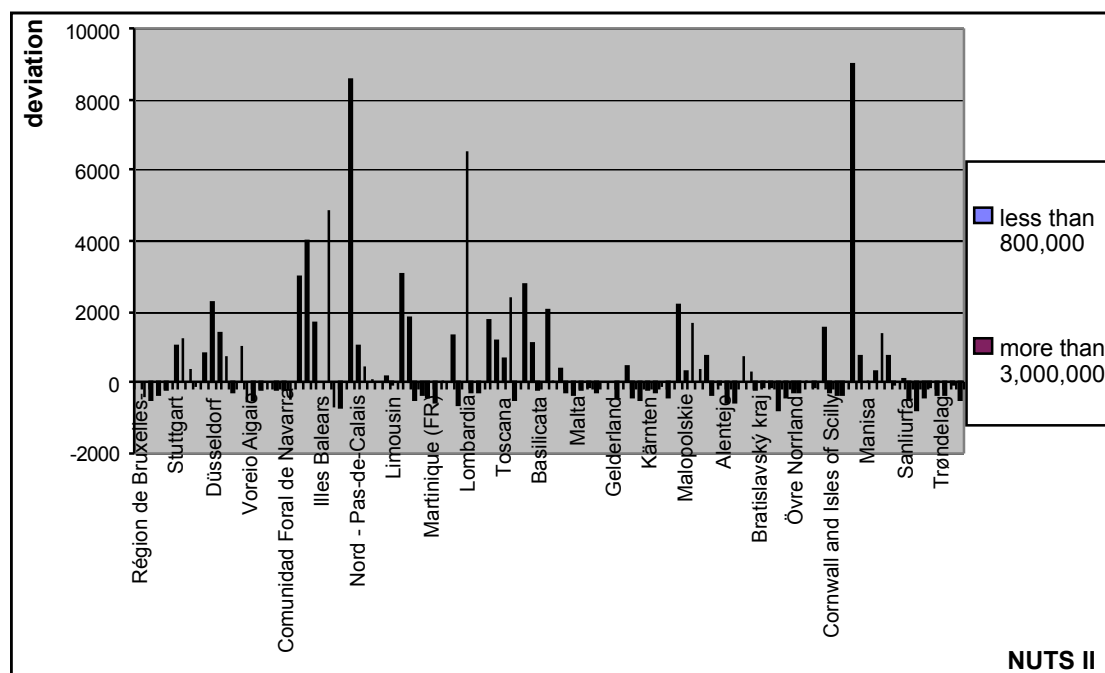
In 46 out of 317 units the level NUTS II (14.5%) there is a deviation under the higher limit of the demographic criterion (3 million inhabitants) for NUTS II and the average value of the deviation is 1,703,250 with standard deviation equal to 2,007,970.

Graph 3. Deviation for the cases where NUTS II is with more than 3 million inhabitants



The graph 3 presents deviation from maximal demographic size NUTS II regions, or, three million inhabitants.

Graph 4. All deviations for the statistic regions at the second level



Thus, in 117 out of 317 units at level NUTS II (36.9%) there is a deviation from the limits of the demographic criterion for the level NUTS II, indicating the fact that the criterion of democratic size is not key relevant criterion for NUTS classification.

Regarding the fact that we stated deviation from determined demographic criterion in 36.9% of analyzed cases<sup>11</sup>, the hypothesis that demographic criterion is not relevant was confirmed, because it was respected at only 37% of statistic regions of the second level while introducing the Regulation on establishing common classification of territorial units for the statistics (NUTS).

In the second step we verify the relevance of the criterion of demographic size in the procedure related to defining of NUTS regions at the III level in the EU countries. According to available data basis<sup>12</sup> we come to the elementary parameters which describe the analyzed variable (number of population). Results of descriptive analysis are presented in the following table.

Table 8. Descriptive statistics for the analyzed variable number of population within NUTS III level for the EU members in 2007

Variable	Number of population within NUTS III level in the EU countries in 2007
N	1,327
average	378,030.7
standard deviation	12,244.42
median	249,498

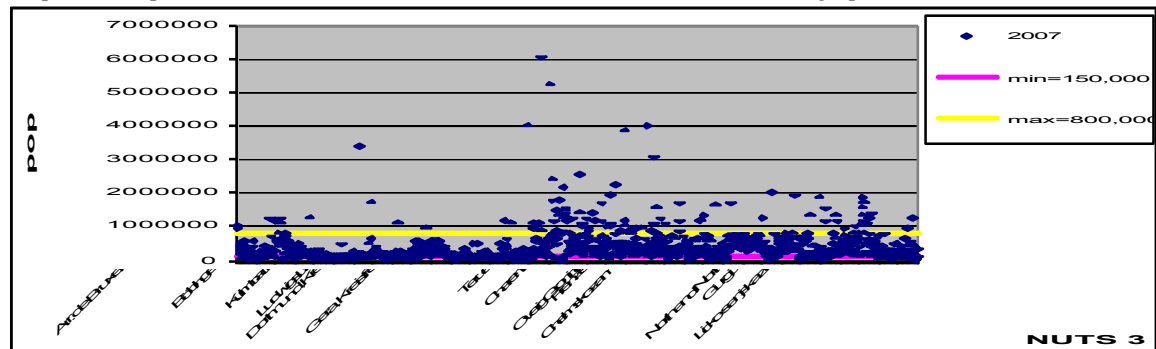
<sup>11</sup> All (317) statistic (NUTS) regions at the second level that are followed by EUOROSTAT were analyzed

<sup>12</sup> <http://nui.epp.eurostat.ec.europa.eu/nui/show.do>, pristup: 12 Januar 2010 08:43:34 GMT

minimum	10,013
maximum	6,052,583

Demographic size, statistic region at the third level was analyzed. As it may be seen from the upper table, there are units with noticeable deviations from real conditions at NUTS III level and given demographic criterions, regarding the fact that the minimal value for the analyzed variable is lower than the lower limit of the criterion for NUTS III and maximal value for the analyzed variable is higher than the higher limit of the criterion for the NUTS III. Graph 5. clearly shows deviations per certain units of NUTS III.

Graph 5. Comparison of the situation in 2007 on the level NUTS III and demographic criterion



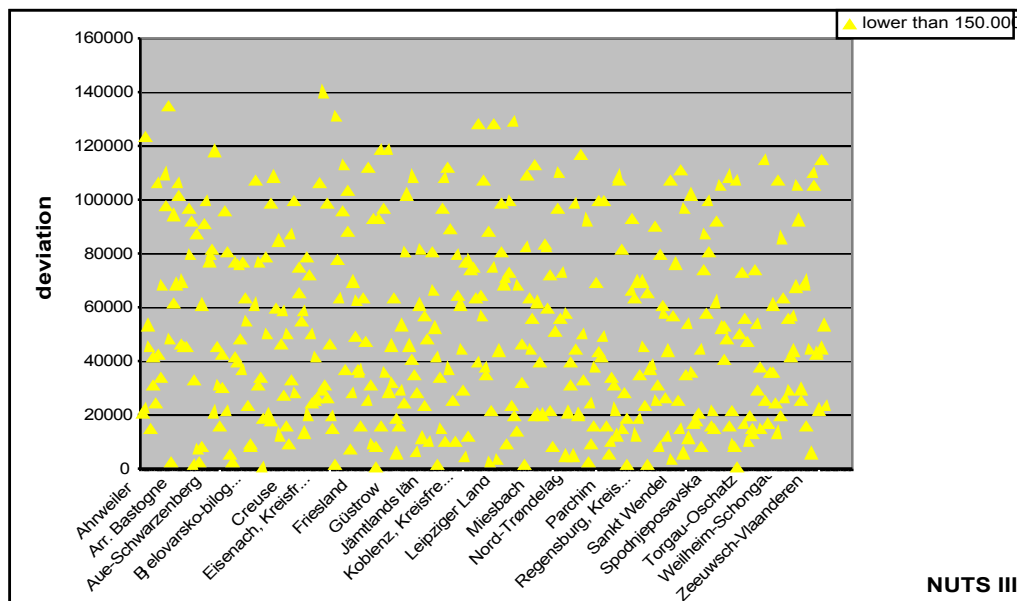
X-axis represents number of inhabitants in 2007 and the y-axis statistic regions at the third level. The graph shows distribution of statistic regions per demographic size in comparison to demographic criterions from paragraph two articles three of the Resolution. At 803 out of 1.327 (60.51%) units on NUTS III level demographic criterion is satisfied. All other units deviate from the demographic criterion for NUTS III level. In order to analyze these deviations in details we specifically follow the units with noted deviations to the lower level than the minimal value per demographic criterion and the units with noted deviation to the higher level than the maximal value per demographic criterion. Obtained parameters are presented in tables 6 and 7.

Table 9. Descriptive statistics for analyzed deviation of the population number within NUTS III level from the given demographic criterion for the EU members in 2007 – deviation from lower limit

Variable	Deviation for the cases where NUTS III is with less than 150 thousands inhabitants
N	405
average	50,409.03
standard deviation	1,676.93
median	44,950
minimum	344
maximum	134,700

At 405 out of 524 units at level NUTS III (77.29%) there is a deviation below lower limit of demographic criterion of the level NUTS III and the average value of the deviation is 50,409.03 with standard deviation of 1,676.93.

Graph 6. Deviation for the cases where NUTS III is with less than 150 thousands inhabitants



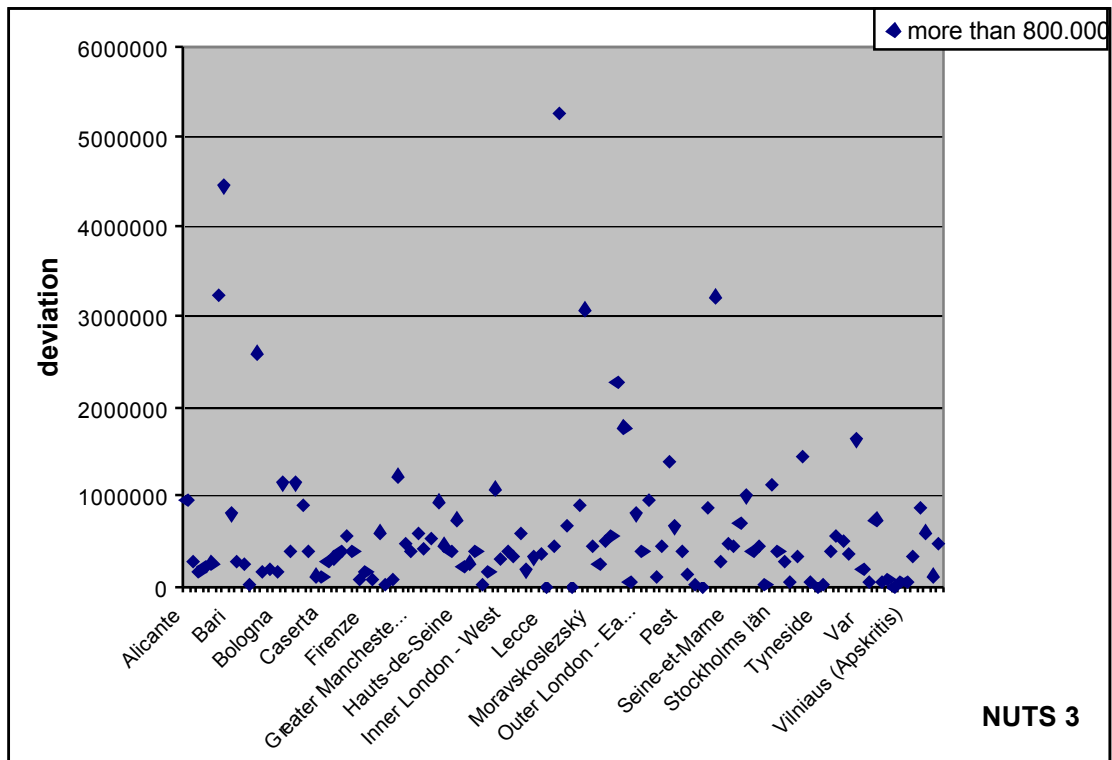
The graph 6 presented deviations of demographic size of statistic regions at the third level from minimal demographic criterion.

Table 9. Descriptive statistics for the analyzed deviation of the number of inhabitants within NUTS III level from the given demographic criterion for the EU members in 2007 – deviation from the higher limit

Variable	Deviation for the cases where NUTS II is with more than 800 thousand inhabitants
N	119
average	608,866.5
standard deviation	77,603.44
median	380,000
minimum	483
maximum	5,252,583

In 119 out of 524 units at the level NUTS II (22.71%) there is a deviation above upper limit of demographic criterion (800.000 inhabitants) for NUTS III and the average value of deviation is 608,866.5 with standard deviation of 77,603.44.

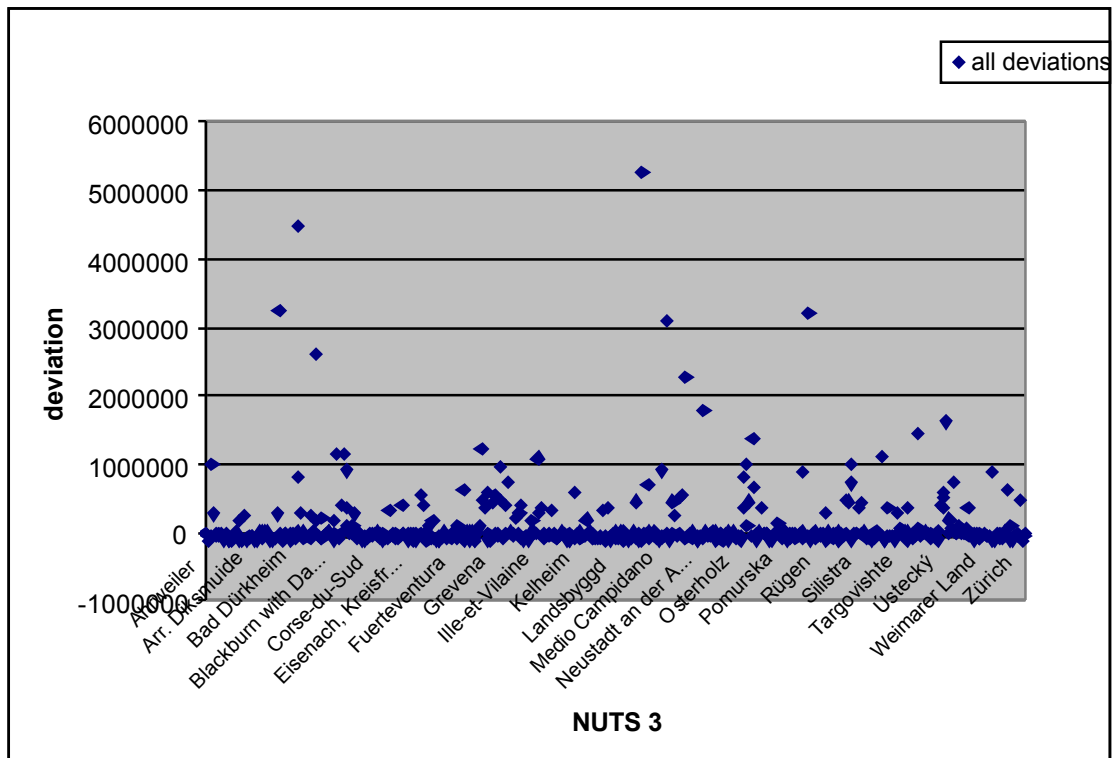
Graph 7. Deviation for the cases where NUTS III is with more than 800 thousand inhabitants



The graph 7 presents deviations from maximal demographic size determined in paragraph two articles three of the Resolution for statistic regions at the third level.

The following graph presents all deviations of demographic criterion for analyzed statistic regions of the third level.

Graph 8. All deviations for the statistic regions at the third level



Thus, in approximately 40% of analyzed statistic regions at the third level there is recorded deviation from demographic criterions determined by the Regulation.

### Problems and prospects

If we strictly establish demographic criterion according to Regulation No 1059/2003 on this three cases: first, official administrative divided of Bosnia and Herzegovina, and second, Delegation EC proposal on five regions, and third, proposal of team of Economic Institute, first and third cases more correct than second case.

Where is problem? Proposal of team of Economic Institute is only science proposal. Administrative regionalization of Bosnia and Herzegovina based on Dayton could be change in context redefinition Bosnian Constitution.

We ask what happened in the old and new EU countries according demographic criterion in establishing NUTS regions. Relevant statistical analysis of demographic size of statistic regions belonging to the second and the third levels confirms the hypothesis that there is a significant deviation from demographic criterions determined by paragraph two article three of the Regulation (EC) number 1059/2003 of the European Parliament and the Council. Verifying on NUTS II level showed that in about 37% analyzed cases there is a deviation from the limits of demographic criterion and on NUTS III level in about 40 % analyzed cases. We confirm that demographic criterion not absolutely relevant in old and new EU countries

In this moment, we do not open question statistical region on thread level in Bosnia and Herzegovina.

Bosnia and Herzegovina needs first proposal for statistical regionalization in the context implementation Regulation on the establishing common classification of territorial units for the statistics. Regulation (EC) No 1059/2003 of the European Parliament and of the Council from May 26<sup>th</sup>, 2003 related to the establishment of common classification of territorial units for statistics.

Bosnia and Herzegovina as soon as possible needs statistical region on second and third level, because she has obligation sent to Eurostat main database (GDP per capita, people, etc.). Bosnia and Herzegovina could be having census of people at 2011. It is time for decision about statistical regions.

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