

## **ANALYSIS BY COHORT OF THE BACCALAUREATE GRADUATES AND HIGHER STUDIES GRADUATES – TERRITORIAL DISPARITIES IN ROMANIA**

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### **Abstract**

*The present work aims to analyze the dynamics of the higher education graduates by cohort according to the evolution of the number of baccalaureate graduates by region and county. There are gaps between the different areas, in favor of the more developed ones. Apart from the city of Bucharest, counties such as Cluj, Timiș, Brașov, Sibiu, Arad, which attract young people from other areas of the country and because of the better offer of employment upon completion of studies, stand out. The conclusions of this analysis based on the data of the official statistics confirm the existence of disparities in the territorial profile, between the poorer areas of the country and the most developed, being appropriate a coherent policy to favor these areas in granting funds for a higher education accessible to the population.*

### **Keywords**

Higher education; licensed; baccalaureate graduates; discrepancies in education

### **JEL Classification**

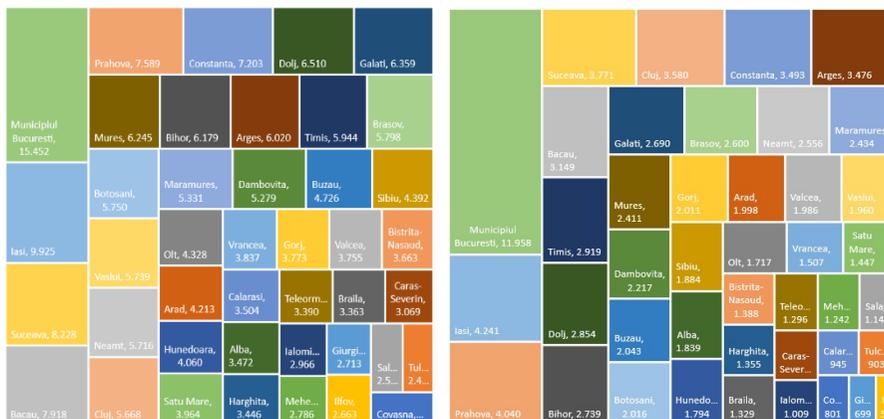
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### **The evolution of baccalaureate graduates from the period 2011-2021, by cohorts**

Assuming that the vast majority of baccalaureate graduates come from the same generation of live births, we further looked at what happened to each cohort separately, leaving aside the influences of mortality and migration.

Thus, from the cohorts of live births from the years 1993-2003, the baccalaureate graduates from the years 2011-2021 resulted, considering that every year, most graduates with a baccalaureate come from the cohort to which they should belong as a year of birth.

In the whole country, out of a number of 212,459 children born alive in 2003, a number of 97,121 children (45.7%) completed the baccalaureate in 2021. Bacău County, out of a number of 7,918 children representing the cohort of 2003, a number of 3,149 children (39.8%) complete the baccalaureate in 2021. If in 2003 Bacău county was in 4th place in the country after the city of Bucharest and the counties of Iași and Suceava in terms of the number of live births, in 2021 it was in 5th place in terms of the number of baccalaureate graduates, being surpassed by the counties of Prahova and Suceava. (figure 1)

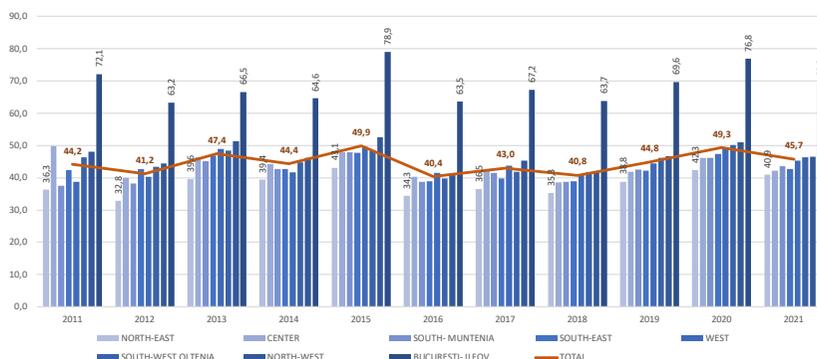


**Figure 1. The cohort of live births from 2003 by county and the corresponding baccalaureate graduates from 2021**

Source: Personal processing of the INS – Tempo online available data

In a number of 11 counties, the share of baccalaureate graduates in the country as a whole was higher than the share of live births from the cohort of origin, in descending order according to the municipality of Bucharest, these being: Cluj (+38.2%), Argeş (+26.3%), Gorj (+16.6%), Prahova (+16.5%), Alba (+15.9%), Vâlcea (+15.7%), Timiş (+7.4%), Constanţa (+6.1%), Arad (+3.7%) and Suceava (+0.3%).

From this point of view, Bacău County is in 25th place, the share of baccalaureate graduates in the country as a whole (3.24%) being -13% lower than the share of live births - cohort of 2003 (3.73%) .



**Figure 2. Share of baccalaureate graduates in total live births-cohorts in the period 2011-2021, by region**

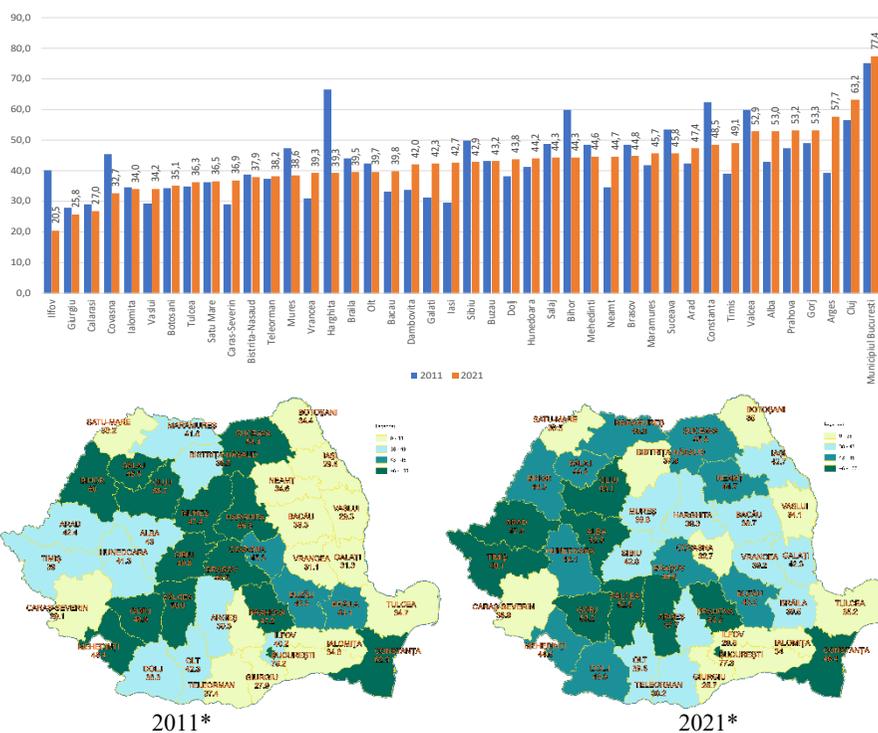
Source: Personal processing of the INS – Tempo online available data

In Figure 2, a maximum can be observed in 2015 of the share of baccalaureate graduates in total live births from the cohort to which they belong, this being the highest level in the analyzed period both for the country (49.9%) and for each region in part. The North-East region ranks last in the country with a share of 40.9%, after the regions: Bucharest-Ilfov (78.9%), North-West (52.6%), West (49.7%), South-West Oltenia (48.3%), South-Muntenia (47.9%), Center and South-East, each with 47.8%.

In 2021, Romania's average was 45.7%, the last place being also held by the North-East Region, with 40.9%.

In the period 2011-2021, the average rate of promotion in the North-East Region was 38.1%, below the national average (44.6%). Practically, the degree of poverty of the region shows once again its effects on the resources allocated by the population for learning and respectively on the level of education of the population. The Northeast region was consistently in last place, even though the share of graduates in the total live births by cohort increased slightly compared to the first years. Out of the last 11 years, in a number of 8 years the share was below 40% and only in 2015, 2020 and 2021 did it slightly exceed this percentage.

The situation by counties can be seen in Figure 3, both in the column diagram and in the two comparative maps for the extreme years of the period.



\* values truncated to one decimal place

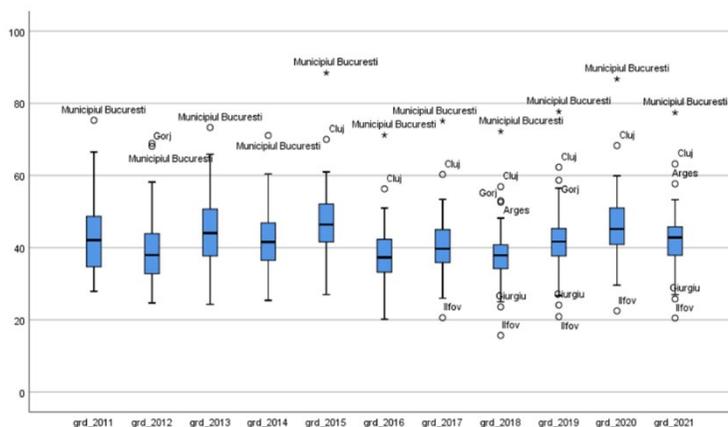
**Figure 3 Share of baccalaureate graduates in total live births-cohorts in 2011 and 2021, by county (%)**

Source: Personal processing of the INS – Tempo online available data

Bacău County, from a 33.3% share in 2011 of graduates with a baccalaureate in total born of that generation (35th place in the country), reaches a 39.8% share in 2021, occupying the 25th place in the country's county hierarchy. Lower shares in the region in 2021 can be found only in Botoșani and Vaslui counties, the poorest from an economic point of view.

In the period 2011-2021, the average weight is 36% for Bacău county, occupying the 4th place in the region after the counties: Suceava (44.9%), Neamț (41.3%), and Iași (38.2%). Even after this aspect, the influence of the level of economic development is known, with Bacăul losing a lot in recent years.

From the comparison of the two cartograms, we can see on the one hand the decrease in the number of counties with weights below 38%, from 15 counties in 2011 to 4 in 2021, but also the decrease in the number of counties with weights above 46%, from a number of 15 to a number of 6 (including the municipality of Bucharest). The number of counties with weights between 43%-46% increases from 3 in 2011 to 10 in 2021, and the group of those with weights between 38%-43% increases from 10 to 11 counties, in this situation also finding Bacău county.



**Figure 4** Boxplot of the distribution of counties according to the share of baccalaureate graduates in total live births-cohorts in the period 2011-2021

Source: Personal processing of the INS – Tempo online available data

Similar aspects can also be observed in the boxplot in Figure 4, where the distributions of counties are presented according to the share of baccalaureate graduates in total live births of the respective generation, for the period 2011-2021.

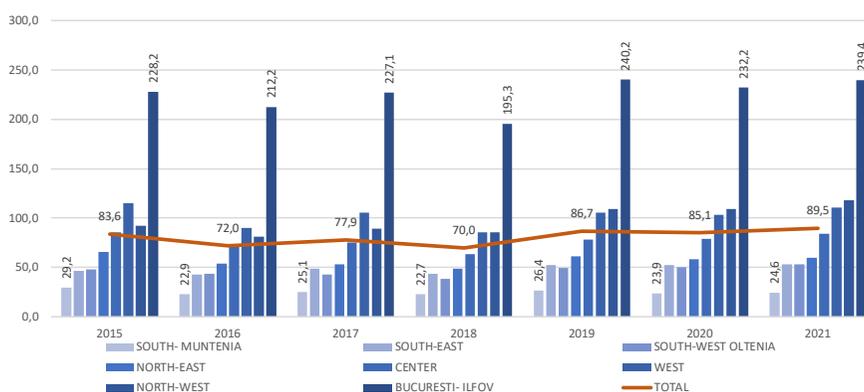
The highest median is found in 2015, the best year for this indicator, the values being obviously decreased in the following years. In 2021, the interquartile range decreases slightly compared to the previous two years, with the first 25% of the smallest counties finding them up to 37%, and the first 25% of the largest counties above 46%, with the decrease of both the minimum level as well as the maximum. The outliers can also be observed, i.e. the counties that make a discordant note compared to the rest, in the last year they were the municipality of Bucharest, and the counties of Cluj and Argeş with high extreme values, and at the opposite pole the counties of Ilfov and Giurgiu.

### **Evolution of bachelor's graduates in total baccalaureate graduates from 2015-2021, by cohorts**

In general, we would expect the evolution of graduates with a bachelor's degree to be in direct relation with the evolution of baccalaureate graduates, but in reality, this only manifests itself in the Bucharest-Ilfov Region. Although the Northeast Region has a dynamic of baccalaureate graduates of +7.4% in the period 2011-2018, the graduates with bachelor's degrees corresponding to these generations, respectively those from the period 2014-2021, register a decrease of -5.1 %. This, given that the national average of the dynamics of baccalaureate graduates was -2.9% and that of bachelor's graduates was +0.7%. In the case of Bacău county, an increase of baccalaureate graduates was observed by +8.4% for this period, but materialized in a -4.1% reduction in the number of graduates, as if we were dealing with an inverse relationship between the two indicators (figures 5).

Indirectly, it results that large university centers, and especially those located in the most developed areas of Romania, attracted a large part of the baccalaureate graduates of the North-East Region. For example, in the North-West Region, although the number of baccalaureate graduates decreases by -9.4%, the number of bachelor's graduates from these cohorts increases by +10.2%. In this case, the counties that have flourished economically but also socially in recent years, attracting more and more students in search of better future jobs paid, but also more numerous and diverse possibilities for spending free time. It can also be observed from here that the "richer", more developed counties attract more and more intelligence, perpetuating and deepening the gaps between the development of different areas of the country.

For these reasons, the state should intervene and invest more in education in the case of less developed areas, thus having a greater chance for graduates to stay there after completing their studies and contribute to their development.

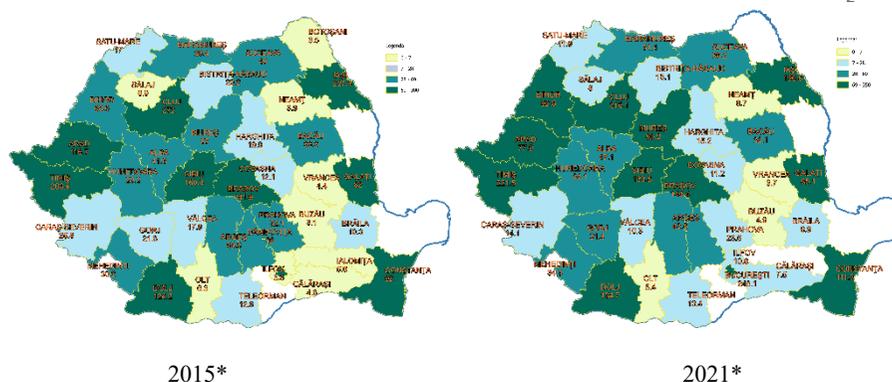
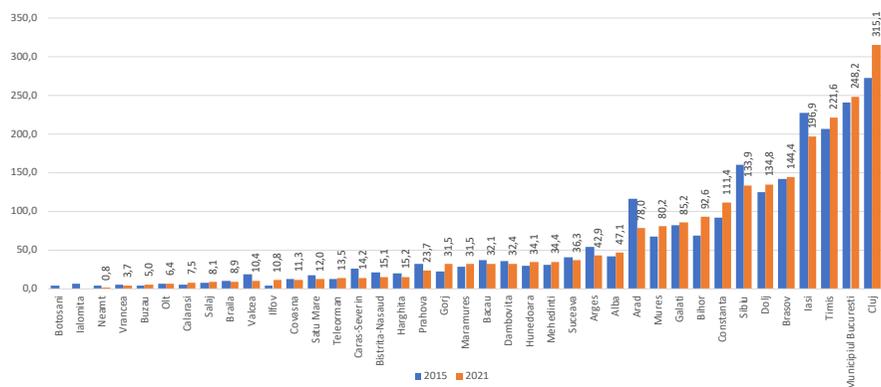


**Figure 5 Share of bachelor graduates in total baccalaureate graduates-cohorts in the period 2015-2021, by development regions (%)**

Source: INS own data processing – Tempo online

The evolution of the share of bachelor's graduates in total baccalaureate graduates from the cohort to which they belong can be seen in Figure 5, with the Bucharest-Ifov Region being in first place every year. Thus, in 2021, the number of bachelor's graduates from this region was almost 2.4 times higher than the number of baccalaureate graduates for that generation. The Bucharest-Ifov Region was followed by the North-West Region (+17.8% bachelor's graduates compared to bachelor's graduates of the same cohort), the West Region (+11%), all other regions coming with a relative reduction of bachelor's graduates versus those with a baccalaureate for the same cohort, while the national average was -10.5%.

In terms of dynamics, it can be observed that the North-West Region is ahead of the West Region, these changing their place in the hierarchy, Cluj counties making a significant contribution, followed by Bihor. Thus, in the North-West Region the share of bachelor's graduates in the baccalaureate graduates of the cohort to which they belong was +27.6% in 2021 compared to 2015, followed by the South-East Region with +12.96%, the Region South-West Oltenia with +10.38% and Bucharest-Ifov Region with +4.95%. All the other four development regions experienced reductions in the indicator: by -15.87% in the South-Muntenia Region, by -8.75% in the North-East Region, by -3.43% in the Western Region and by -1.2% in the Center Region.



\* values truncated to one decimal place

**Figure 6. Share of bachelor's graduates in total baccalaureate graduates-cohorts in 2015 and 2021, by county (%)**

Source: Personal processing of the INS – Tempo online available data

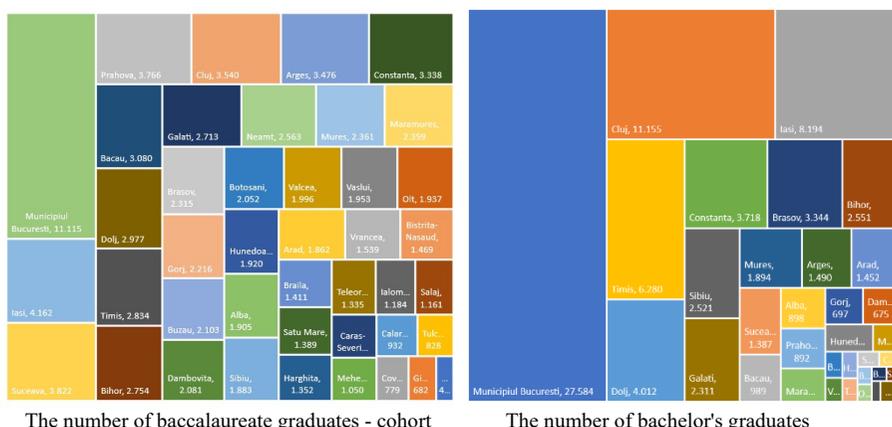
The distribution of the country's counties for this indicator is presented comparatively in the two extreme years of the period, both in the diagram and in the cartograms in figure 6.

Although according to the number of those who passed the baccalaureate exam in 2018, Bacăul is in 8th place after Bucharest, Iași, Suceava, Prahova, Cluj, Argeș and Constanța, with 3,080 graduates, in terms of the number of 2021 graduates we are in 15th place, with 989 graduates. Thus, the share of bachelor's degree graduates in total baccalaureate graduates of the cohort is only 32.1% for Bacău County, almost half of the average of the North-East Region (60.1%).

In first place is the county of Cluj, with a number of bachelor's degree graduates 3 times higher than the baccalaureate graduates of that generation, which means that over two thirds come from high school students from other counties of the country. In the same good situation are the capital (2.48 times), Timiș county (over 2.2 times), Iași county (with +97% more graduates than those who took the baccalaureate), Brașov county (with + 44.4%), Dolj County (with +34.8%), Sibiu County (with +33.9%) and Constanța County (with +11.4%).

Comparing the two maps, there is a change for the better in favor of the counties in the North-West and West Regions.

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The number of baccalaureate graduates - cohort      The number of bachelor's graduates  
**Figure 7. The number of bachelor's graduates in 2021 and the number of baccalaureate graduates - cohort, by county**

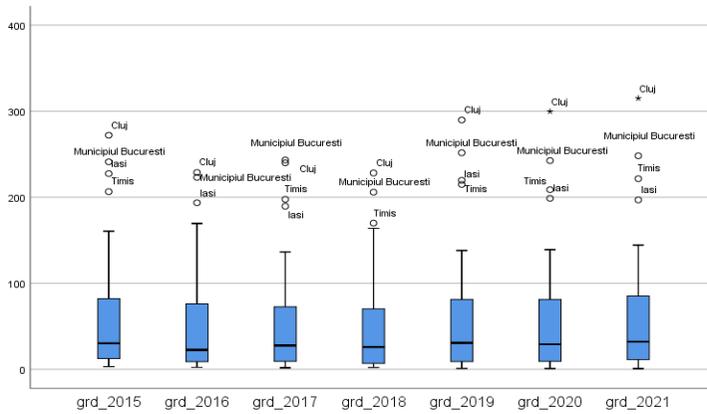
Source: Personal processing of the INS – Tempo online available data

In Figure 7, the county structures of the number of baccalaureate graduates in the 2018 cohort and the corresponding bachelor's graduates in 2021 can be seen, the counties being in order of the weights held in the total country. Thus, if in 2018 a number of 95,692 high school students passed the baccalaureate, 11.6% of them came from the capital (11,115 students), followed by Iași County with 4,162 students (4.3%), Suceava County with 3,822 students (4%), Prahova county with 3,766 students (3.9%), Bacău county being in 8th place with 3,080 students (3.2%).

Regarding the number of graduates in 2021, corresponding to the 2018 cohort of baccalaureate graduates, they totaled 85,665 across the country, most of them being concentrated in the city of Bucharest, representing approximately one third of the total (27,584 graduates, respectively 32, 2% of the total). The counties follow: Cluj with 11,155 people (13%), Iasi with 8,194 people (9.6%), Timiș with 6,280 people (7.3%), Dolj with 4,012 people (4.7%), Constanța with 3,718 people (4.3%), Brașov with 3,344 people (3.9%), Bihor with 2,551 people (3%), Sibiu with 2,521 people (2.9%). Bacăul ranks 15th with 989 licensed persons, representing 1.2% of the country's total.

From Figure 8 you can see the boxplot of the distribution of counties according to the share of bachelor's graduates in total baccalaureate graduates by cohort, the smallest difference between the minimum and maximum being in 2017, with a maximum deviation of 241.4% , while the gaps have increased over time, reaching 314.3% in 2021 (a minimum of 0.8% and a maximum of 315.1%).

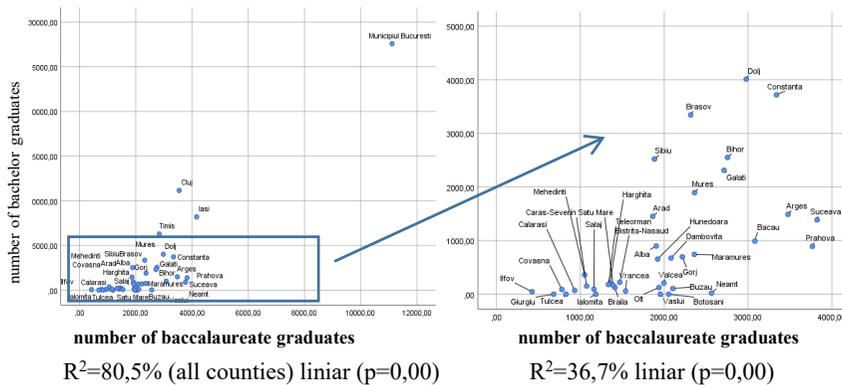
The counties that stand out as outliers, being with values outside the box-plot, are always the same four (Cluj, Bucharest, Timiș and Iași). If in the last three years the median is around 25% and the interquartile range is somewhat the same in size, the County of Cluj stands out more and more strongly as an outlier, distancing itself more and more from all the counties of the country, but also from the other three outlier.



**Figure 8** Boxplot of the distribution of counties according to the share of bachelor's graduates in total baccalaureate graduates-cohorts in the period 2015-2021

Source: Personal processing of the INS – Tempo online available data

Trying to identify a link between the number of baccalaureate graduates and the number of graduates in the same cohort, we drew up the correlogram in Figure 9.



**Figure 9.** Scatterplot between the number of baccalaureate-cohort graduates and the number of bachelor graduates in total, by county in 2021

Source: Personal processing of the INS – Tempo online available data

If we include all counties, it would result that the number of baccalaureate graduates determines the number of bachelor's graduates in the respective cohort by 80.5%, being a rather intense link between the two categories. Thus, we would estimate that for an increase of 10 baccalaureate graduates, the number of bachelor's graduates would increase by 25 people on average.

Again, the correlogram shows the disadvantage of Bacău county, which is far below the regression line, compared to advantageous counties such as the four outliers, but also compared to counties such as Braşov and Sibiu, for example.

If we exclude the outliers, the connection becomes of medium intensity, the degree of determination being reduced to 36.7%, therefore the number of baccalaureate graduates determines to a lesser extent the number of graduates per cohort.

## Conclusions

We believe that a balanced development policy of all areas of the country and the EU, respectively, should take into account a priority allocation of funds for education to these areas, the allocation of a greater number of budgeted places in higher education compared to the established indicators, which to make access to a "European education" more attractive and easier for young people.

The allocation of funds must encourage more participation of young people in higher education within existing university centers in less developed areas. In these areas, the population even in the cities, not to mention the rural population, has low incomes and can hardly afford access to a higher education. This is also the reason for a very high school dropout even among those who enrolled in higher education courses in these university centers, young people not being able to support their studies and offering their workforce to activities that require a high lower preparation.

In this way, young people from disadvantaged backgrounds, such as those from rural areas, would be attracted even more, young people who, although they may have an above-average level of intelligence, do not have access to higher education from a financial point of view. If they are given more facilities to be able to financially support their studies, these areas would have a much greater chance to develop in the future, by the return of young people with a higher education to the areas where they belong. But unfortunately, as all the presented statistical data have shown, the most developed areas continue to attract even more students and, indirectly, the future highly specialized workforce, most of whom remain after completing their studies in the locality where they perfected their education by crowding these already crowded areas.

At the same time, in order to put into practice the desire of a higher education accessible to the whole country, favorable to social inclusion, it is necessary to grant higher funds as a priority to university centers in disadvantaged areas, in order to reduce the existing inequities and develop a process of convergence regionally at the level of the entire country.

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