THE STATISTICS OF ACADEMIC PERFORMANCE OF BACHELOR STUDENTS

STATISTICA REUȘITEI STUDENȚILOR ÎN CADRUL CICLULUI DE LICENȚĂ

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Abstract: *Reuşita academică a studenţilor diferă substanţial între cei 3 ani de studiu universitar. Aceasta cercetare asuma că asupra reuşitei studenţilor din aceiaşi facultate funcţionează aceleaşi tendinţe principale. Astfel analizând reuşita studenţilor din mai mulţi ani am putea sau nu găsi unele coincidente. Utilizând indicatorii tendinţei centrale si abnormalităţii se va încerca de a confirma aceasta ipoteza. Ca rezultat se vor identifica caracteristici ale reuşitei studenţilor si gradul de reuşita al metodelor date de a conchide o analiza relevanta.*

Cuvinte cheie: *Indicatorii tendinţei centrale, repartiţia asimetrica, reuşita studenţilor*

JEL CLASSIFICATION: C80

INTRODUCERE

Even without specific data we can assume that student grades fluctuate over the three years of study. Each semester introduces new courses that replace the older ones. Shifts in grades can occur due to the specifics of each course, either building up on previous knowledge or introducing new concepts, being vocational or technical, being more compatible to the real or humanitarian lyceum profiles, etc. Other reasons could be external factors like gender, the marital status, employment status, financial or social state, developments in technology, personal incentives for academic growth, extracurricular activities such as workshops, volunteering, additional courses (for example facultative courses). Even so, hypothetically, groups of students being taught under the same faculty, more or less, could show some general, group wide statistical trends in their academic performance. By conducting a study on grades of groups in consecutive years, we hope to find some similarities between them and prove that there can exist common traits amongst them, even without having additional information about the composition of the group.

BASE CONTENT

This study uses three main statistical tools in order to compare groups:
1. Radar Charts
2. Median, Mode, Mean Graphs
3. Skew and Kurtosis Values

Radar Charts (Figure 1) are used in comparisons of (usually ranging from 1 to 3) groups respective to multivariate characteristics (Merenstein, n.d.). Through them, we can make first contact with the data. The key feature of this powerful visualization is the ability to identify outliers. In the context of this research, Radar Charts will serve both as compacts ways of visualizing the

distributions of grades in each semester, thus replacing the need of histograms, and easy ways of tracing the evolution of the mode over time. Characteristics will be represented by 0,5 increment intervals starting from the grade of 5, up to the grade of 10. The radius will represent the frequency of values in that interval, and it will be scaled according to the highest frequency in each case, so that it reduces the impact of the difference in the number of students in the group over the representation. As samples, we use four groups from the specialty of World Economy, International Economic Relations, of The Academy of Economic Studies from The Republic of Moldova. Group D in Figure 1 represents a generation one year younger then the others.
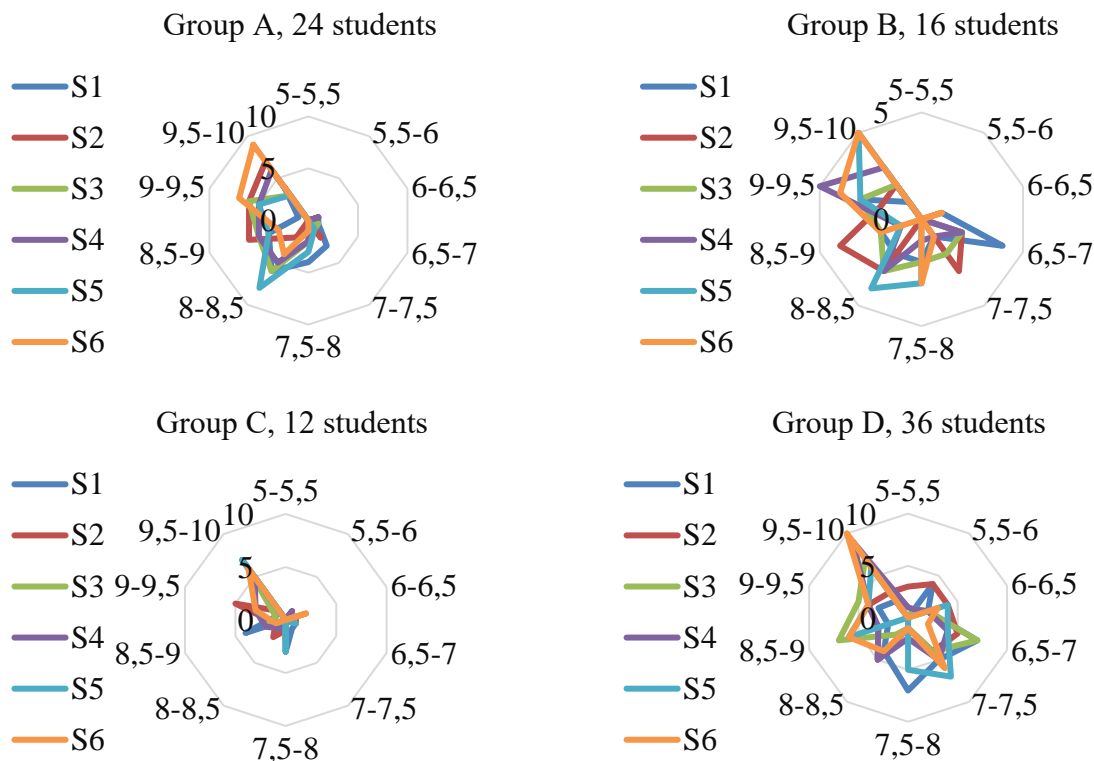
Figure 1. Radial Charts of general student grades over their bachelor studies
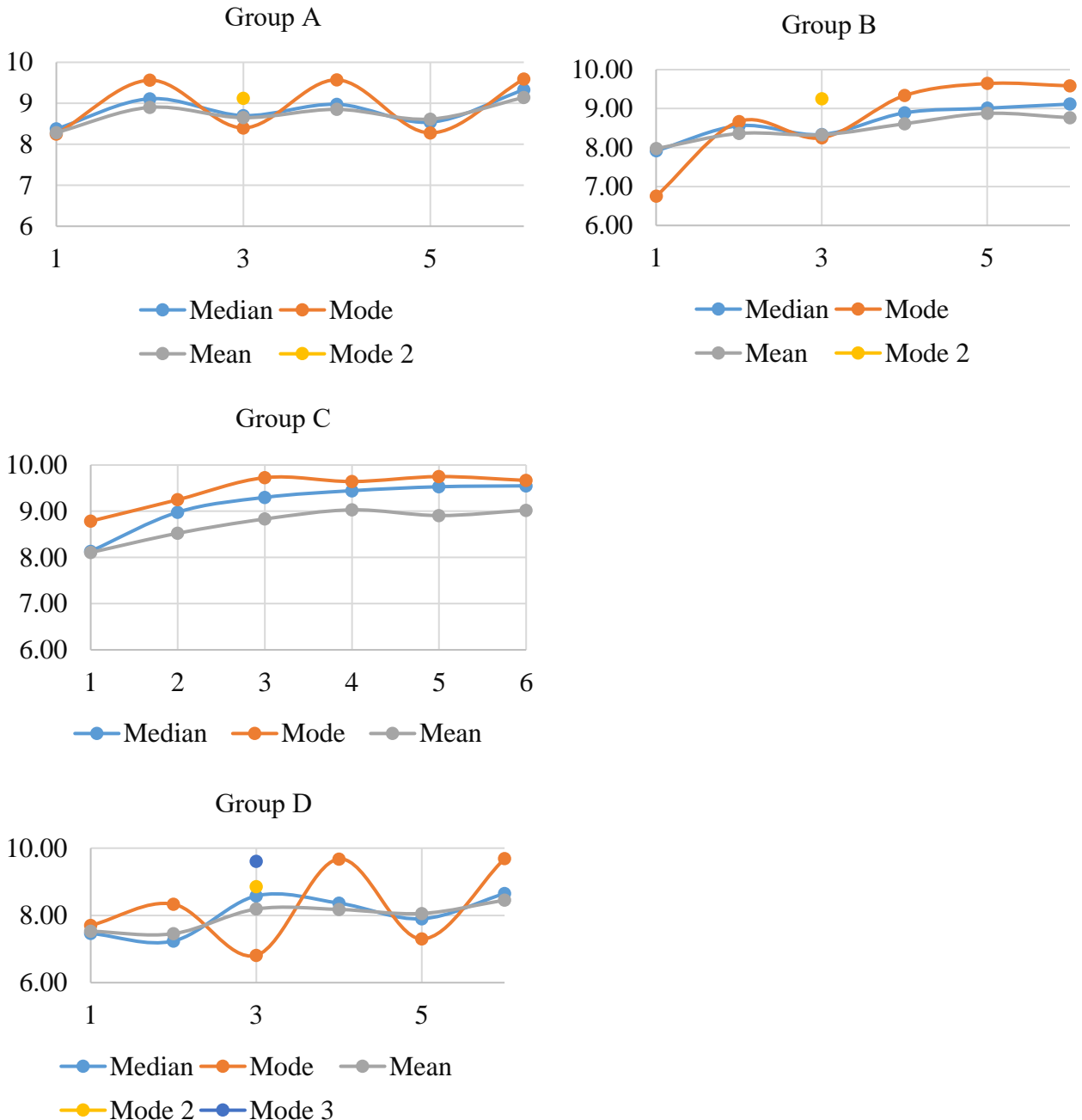*Source: Elaborated by author based on data supplied by The Academy of Economic Studies of Moldova*

Analizing these four instances, we conclude that in the 6th semester, most students reach the interval of 9,5-10 for their general grade. We also notice that the 5th semester has consistently a mode of 7 to 8. Another thing worth mentioning is that grades are mostly concentrated in the middle left section of the circle, in the vicinity of 8,5 to 9.

To describe the data in more detail, we can use the three main measures of central tendency:

mean, median and mode, and their position relative to one another (Grădinaru, Isaic-Maniu, Voineagu, & Mitruţ, 1994). In Figure 2 was graphed these indicators over the six semesters. By doing this, could be observed some peculiar coincidences between Group A and Group D. Firstly, along with Group B, they have more than one mode in the third semester, Group D having the most, at three. Secondly for groups A and D, the fact that the mode dips below the mean and median in odd years, and the median are at a close proximity for the majority of the time, with the median going above the

mean in the last semester. For Group B and C, in contrast, can be observed a stable position of the mode, median and mean (average), creating the image of a negatively skewed distribution.

Lastly, was extracted information from skewness and kurtosis. Skewness measures the degree of symmetry in a variable's distribution. Kurtosis is a measure of the tailedness of a distribution. Tailedness is how often outliers occur. Excess kurtosis represents a higher number of outliers (Turney, 2022,).

Figure 2. Central tendency indicators

Source: Elaborated by author based on data supplied by The Academy of Economic Studies of Moldova
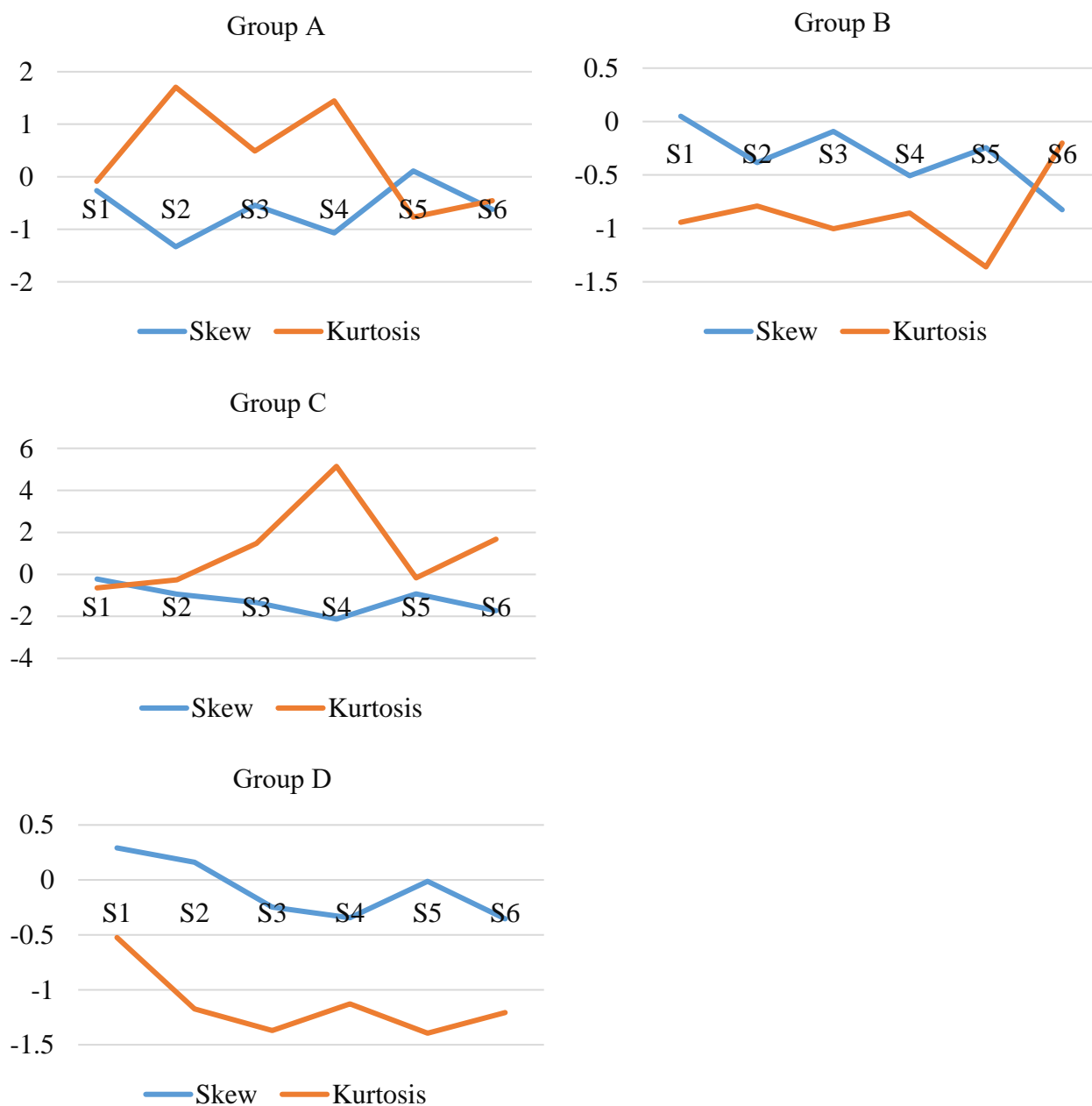
Figure 3. Skewness and Kurtosis

Source: Elaborated by author based on data supplied by The Academy of Economic Studies of Moldova

It would be expected that student grades would have a negative skewness and, since we assume that student grade distribution should be bell shaped, a Mesokurtic distribution.

Indeed, as can be observed in Figure 3, skewdness is around 0 to -1 for all groups, yet kurtosis, as expected, is not so easily described, as it is more affected by specifics of each group, and also the group size. Group C, with the smallest amount of students, has a considerably higher kurtosis. As it is way over 2 it can be called excess kurtosis.

CONCLUSION

By analyzing student performance with the help of statstical tools simmilarities between groups of different years have been observed. Trends such as the presence of a considerably high mode in the fith year, the mode being lower in odd years and the distributions having a negative skew were present in all sampled groups. This has resulted in the belief that grades of students at the same specialty follow the same laws. Yet analysing kurtosis has proven that without an advanced understanding of externa land intrinsic factors of a group, all processes affecting grades over the years cannot be explained.

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