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## Birth rate in Portugal

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This paper presents a study on the birth rate in Portugal. The quantitative data analysis of 308 municipalities concludes that the variables “live births of mothers residing in Portugal with Portuguese and foreign nationality”, “fertility rate of the various age groups”, “live births of mothers residing in Portugal according to their level of education” and “births by gender” are strongly correlated, presenting common factors that significantly influence the birth rate.

**Keywords:** birth rate, correlation, factor analysis

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A study carried out by the Francisco Manuel dos Santos Foundation [3] concluded that around 25% of individuals expect to have only one child. Those with a higher level of education, generally become parents later. However, women with higher levels of education show a greater intention to have a larger number of children, despite actually having fewer. The Portuguese population has been decreasing, and since 2011, Portugal has lost around 196,000 inhabitants. Exceptions to this trend occurred only in the years 2019 and 2020. In 2019, the Portuguese population increased compared to 2018 by about 19,300 inhabitants and 75,700 inhabitants when the years 2020 and 2019 are compared. However, this growth is not due to the increase in the birth rate among the Portuguese population, but mainly, to the positive migration balance [2].

The data in this work were collected from the PORDATA database [1] considering 308 municipalities in Portugal. The study considered 17 variables related to live births of mothers residing in Portugal, with Portuguese and foreign nationality and according to their level of education; fertility rate for various age groups and, births by gender.

ANOVA and t-tests allowed to conclude, with a significance level of 1%, that there are significant differences between the average live births of Portuguese and foreign mothers living in Portugal. Obviously, the average number of births of Portuguese mothers is higher than that of foreign mothers. Furthermore, significant differences were observed between the average fertility rate by age, with the highest value in the 30-34 age group. Concerning the level of mothers' education, significant differences were found where mothers with higher education exhibiting a high average score. Regarding the number of births by gender, the study concluded that, on average, more boys were born than girls and this

difference is statistically significant ( $p\text{-value} < 0.001$ ).

A factor analysis with VARIMAX rotation was performed producing 4 factors. The scree plot (Figure 1) and the Kaiser's criterion were used to determine the number of factors to be retained. These factors represented the mother's education; the fertility rate at

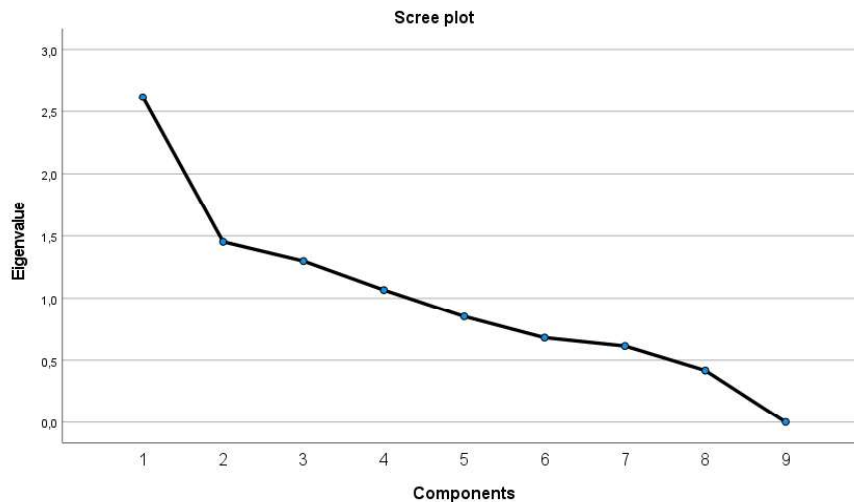


Figure 1: Factor analysis scree plot

extreme ages; the fertility rate in the 25-29 age group and the fertility rate in the 20-24 age group. However, it should be highlighted that there are factors with a very small number of variables, namely the 3rd and the 4th factors.

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## References

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