

# Efficiency and equity in the spatial planning of primary schools

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**FIGURE 1**

Efficiency vs equity in school location.

**FIGURE 2**

Gini coefficient in the accessibility to schools for different spatial distributions.

The shrinking populations of many regions in Portugal have led to a discussion about the criteria which should guide the restructuring of public services at the local scale and the policy goals that should guide them. This discussion is particularly concerned with the conflicting goals of limiting increasing per capita costs and providing an adequate level of accessibility throughout the territory. The planning of school facilities can, thus, be framed by the concept of efficiency – the capacity to adjust the means used to obtain a given policy goal – and equity – the fair provision of services to different populations. But while providing a well-established conceptual framework, exactly what these concepts mean in the spatial planning of services is still up for debate.

This article contributes to this debate by analyzing the spatial distribution of primary schools at a local case-study. It is based on a linear programming approach to optimize the resources needed for the operation and installation of school facilities and the level of

accessibility that is provided, solving a capacitated facility location problem and a p-median facility location problem. The solutions to those problems were used as benchmarks for the actual spatial distribution of schools, identifying how it could be made more efficient or equitable and the criteria which have been prioritized in recent school planning policies.

The main findings were that concentrating students in fewer locations could lead to significant cost reductions, given the importance of school sizes for per capita costs, but that this concentration would have a significant impact on the equity in the accessibility to this kind of service. Comparing more efficient or equitable solutions to the actual spatial distribution of schools also allowed to conclude that, in the analyzed context, changes to the spatial distribution of schools were made with significant equity concerns, and very far from cost minimizing solutions.

