# Analyzing the resocialization of the Brazilian male prison system through Data Envelopment Analysis (DEA)

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**Abstract**: The preservation of public safety holds a prominent position on the political agenda of numerous countries, particularly to advance welfare. According to Altamirano *et al.* (2020), the escalation of crime rates poses a significant threat to long-term economic development. Consequently, ensuring public safety has emerged as an essential condition for countries to achieve sustainable development (Zou *et al.*, 2021). Fernandez and Kuenzi (2010) further emphasize that public security has the same importance as other socio-economic variables in democracy consolidation.

Considering these difficult circumstances, the prison system typically falls short in the process of resocializing inmates, hindering their successful reintegration into society following their release. In this study, the promotion of resocialization is identified as the provision of sufficient educational and work conditions within the prison system. This emphasis on educational and work activities is crucial as it enables inmates to improve their human capabilities (Sen, 2000), and actively engage in civil society. This issue is particularly critical for developing nations, notably in Latin America and Africa, where high crime and incarceration rates are prevalent (Limoncelli *et al.*, 2020). Moreover, developing countries struggle with limited financial resources and fundamental needs across several sectors, highlighting the need for a more efficient prison system in the inmate's resocialization.

In the field of public security, the prison system has emerged as a significant financial burden for numerous countries (Aharoni *et al.*, 2020). Policymakers are challenged to manage a costly system with limited investment. This scenario not only hampers the system's operation but also exposes several problems, such as overcrowding in Prison Units (PUs) and unsanitary conditions for both prison staff and inmates (Auty; Liebling, 2020). Noteworthy, this environment poses health risks for inmates and significantly compromises their resocialization into society (Wallace; Wang, 2020).

There is a research gap in quantitative studies regarding the efficiency of prison systems in reintegrating inmates into society, particularly in developing regions. This gap is represented by the following research problem: *which are the best PUs providing better conditions for prison resocializations?* Therefore, this article aims to create a new indicator to reveal the best PUs in Brazil in terms of promoting resocialization activities (i.e., education and work). The contribution of this study lies in establishing a proxy for resocialization among PUs in Brazil, which helps policymakers and other researchers.

Methodologically, this study is classified as a retrospective cross-sectional study. This study analyzed the male prison system in Brazil from January to June 2022, with data sourced from SISDEPEN (2024). The database includes 437 male PUs with available data. These PUs were chosen because of the comprehensive and reliable information, enabling a detailed investigation into various aspects of PUs and their operations. This article uses the DEA-BCC model (Banker *et al.*, 1984), which considers the difference in the PUs size. The DEA model is output-oriented to achieve the best quality of the system through the current infrastructure of the Brazilian prison system. The inputs are the number of inmates, operating expenses, and staff. The outputs are inmates working, inmates in regular study activities (literacy, primary and secondary education), inmates in sentence remission programs through reading, and inmates in supplementary educational activities. The result of the model will correspond to the overall efficiency of the PUs. In addition, this article used the Inverted Frontier as a tiebreaker method.

The proposed indicator is called the Prison Resocialization Efficiency Index (PREI). The PREI is relevant because it serves as a proxy for measuring the efficiency of PUs in promoting conditions for the resocialization of inmates. This metric has the potential to serve as a foundational measure for evaluating analogous initiatives in other developing countries.

The PREI indicates that just 3 PUs (0.69%) achieved high efficiency, while 26 (5.95%) demonstrated medium efficiency, 142 (32.49%) displayed low efficiency, and 266 (60.87%) exhibited very low efficiency levels. These results highlight a concerning scenario, with 99.21% of the PUs failing to provide activities that contribute to the resocialization of prisoners after their release.

Analyzing the Brazilian macro-regions, the South (0.2890) and the Midwest (0.2815) regions presented the best PREI average efficiency.

However, these values are still considered low efficiency. On the other hand, the North (0.2754), Northeast (0.2310), and Southeast (0.1697) are categorized as very low PREI efficiency.
We also analyzed the Brazilian states. The Roraima state (0.3801) presented the best PREI efficiency, followed by Alagoas (0.3726), and Mato Grosso do Sul (0.3618). These states ranked in the top 3 states in Brazil. However, even these top-performing states exhibited a low level of efficiency, indicating a lack of an adequate system promoting activities for inmates' resocialization. In contrast, Pernambuco (0.1232), Bahia (0.1212), and Minas Gerais (0.0931) had the lowest PREI values, categorizing them as areas of very low efficiency. Another analysis was conducted to compare PUs based on their size. Small PUs (≤200 inmates) and medium PUs (>200 and ≤500 inmates) exhibited the highest PREI values, at 0.3140 and 0.2386, respectively. This outcome aligns with the conclusions of the literature (Hall *et al.*, 2013; Hennebel *et al.*, 2017), that suggested smaller PUs are generally more efficient than larger ones. Finally, our findings reveal the low level of resocializing efficiency among Brazilian PUs. This result indicates that public authorities should propose management plans to better allocate resocializing programs and improve the infrastructure of the prison system resources.

**Keywords:** Resocialization; Prison system; Brazil; Data Envelopment Analysis (DEA); inmates.

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