ANALYSIS OF METHODOLOGIES FOR MEASUREMENT OF TECHNICAL EFFICIENCY INDEX IN POWER UTILITIES IN BRAZIL

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Overview

This article analyzes methodologies for measuring the technical efficiency index for the 30 largest power utilities in Brazil. Thus, it confronts the methodology of the ANEEL (regulatory agency) for the assessment of regulatory operational costs of the periodic tariff front review cycle with the proposed alternative methodology to observe the technical efficiency of performance of these companies combining aspects of quality of service to the society. Index Terms - Power Utilities in Brazil; ANEEL; Technical Efficiency Index; Data Envelopment Analysis.

Methods

Therefore, we used the Data Envelopment Analysis (with DEA models oriented input). Two scenarios were adopted: in C1, we observe the quantitative variables adopted by ANEEL, and in C2, we analyze service quality variables. Thus, based on performance results relative to the reporting period, technical efficiency measures are identified with positive development trend, for all of the 30 largest power utilities.

Results

The results obtained in the comparative DEA models between the scenarios analyzed are shown in Fig. 5 (a), (b) and (c) (C1-CRS, C2-CRS, C1-VRS, C2-VRS, C1-NDRS and C2-NDRS) and it is noticed that there are divergences in the classificatory lists of technical efficiency (benchmarking) of these companies between the different scenarios and DEA models tested. It should be highlighted the evident inversion in the classificatory listings in the specific case of CEMIG (large business size), which presented medium measures of strong technical inefficiency in the DEA CRS model (C1 equal to 0.5598 and C2 equal to 0.5598) and modeling DEA NDRS (C1 equal to 0.5598 and C2 equal to 0.55.98) and presented median measurements of maximum efficiency in the DEA VRS model (C1 equal to 1.0000 and C2 equal to 1.0000).

In the C2 scenario, a group analysis of the 210 results obtained from the specifications for the DEA model and the return of the production scale in the EMS software for the 30 electricity distribution companies shows that 95 EDEEs (45 %) exhibited increasing scale returns (IRS) and presented a size smaller than the most productive size. Already 105 EDEEs (50%) showed decreasing returns of scale (DRS) and presented a size superior to the most productive size.

Conclusions

Finally, it exposes some considerations about the need to improve some points in the methodology for the calculation of regulatory operational costs by ANEEL, representing challenges to guarantee the balance between low rates and sustainability of the electricity distribution sector, considering aspects of quality through customer satisfaction and performance in the continuity of electricity supply

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