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EVALUATION OF ENERGY PRODUCTION COMPANIES EFFICIENCY BASED ON THE COMBINATION OF PRINCIPAL COMPONENT ANALYSIS (PCA) AND DATA ENVELOPMENT ANALYSIS (DEA)

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Abstract

The optimizing transformation of our country's energy structure relies on the improvement of production efficiencies of domestic Energy Companies. The efficiency improvement, in turn, is theoretically based on a set of scientific evaluation approaches. Data Envelopment Analysis, a nonparametric method to evaluate the relative effectiveness of decision-making units, has a strong discriminating power to exclude invalid factors. However, DEA is sensitive to the number of evaluated decision-making units, data accuracy and normalization. In order to diminish or reduce the impact of these interference factors, the paper proposed to adopt principal component analysis to the traditional DEA model to reduce dimensions of the indicator system, and with the assistance of a data normalization approach, finally achieved the production efficiency evaluation of decision-making units. Furthermore, this proposed methodology is testified through empirical researches in 13 subsidiaries of a known domestic energy company.

Key words: energy companies, energy structure, DEA, PCA, production efficiency

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