

タイトル: Incorporating water purification in efficiency evaluation:
Evidence from Japanese water utilities

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要約

Water production, service and water quality have been used as dimensions of efficiency evaluation in previous studies of water utilities' performance. However, the previous studies did not consider amount of raw water that water utilities purified before the water is delivered to household. The purified amount is likely different among utilities and may affect cost. Without considering on it, performance evaluation can possibly inappropriate.

This study attempts to show that the inclusion of water purification efforts should be another crucial dimension in the efficiency measurement. First, we use a stochastic cost frontier to estimate the technical efficiency of 392 Japanese water utilities in 2005. The estimation is done in two separate models: with half-normal and exponential distribution.

From the result, we observe how the efficiency score and ranking fluctuate when purified amount of raw water is considered. Then, by using the cost-inefficiency score as dependent variable, we estimate factors which influence on inefficiency with Tobit model. Subsidy, quality of raw water and density of main length expansion are used as dependent variables in the regression.

We prove empirically that the amount purified can influence the operating cost, resulting in a variation in the efficiency score and ranking. Including a purification indicator in efficiency measurement would help to judge more fairly the performance of water utilities, particularly those that use a low quality water source. Moreover, the impact of different qualities of water source on performance efficiency can be controlled. These are the main contributions of this study.

The result suggests that in order to encourage water purification efforts, it is crucial to incorporate purification in benchmarking.