Reviewer's report

Title: Relative Efficiency and Productivity: A Preliminary Exploration of Public Hospitals in Beijing, China

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Reviewer: Kalevi Luoma

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Major Compulsory Revisions

1. The paper needs to be revised and edited thoroughly before it can be considered worthy of publishing. At its present form the paper has a number of major problems and shortcomings. The language needs to be improved considerably. Now, the paper contains so many cumbersome sentences with odd choice of words that a reader must spend a lot of effort to understand main points and arguments of the paper.

A major problem with the paper is that it does not make a coherent whole.

2. There are internal inconsistencies in the paper. Authors claim that DEA is unable to measure inefficiency caused by allocative efficiency, which reflects the ability of a hospital to use the inputs in optimal proportions. If one has data on input prices this statement is false, as many cost efficiency studies using DEA show. The statement is also inconsistent with authors’ writing elsewhere in the text. A central concept used in the paper is technical efficiency.

3. One of the main purposes of the paper is to measure technical efficiency. But although authors use the term technical efficiency in presenting their results, their efficiency scores cannot be regarded to be valid measures of technical efficiency. The data that is used for calculating efficiency scores include among input variables total expenditure and among output variables total revenue. Therefore efficiency scores reflect not only technical efficiency but also allocative efficiency in the use of inputs and in the production of outputs.

4. The fact that the productivity analyses presented in the paper use total expenditure as an input variable in addition to other input variables, which affect total expenditure, introduces double counting into the productivity and efficiency analyses. Double accounting occurs also among the outputs of the analyses. Total revenue is used as an output measure together with the number of outpatient visits and the number of discharged patients. Because of double accounting, it is really hard to interpret the results of the paper.

5. There are reasons to believe that the findings for TFP growth and technological change are not robust. Two sets of results are presented in the paper: one which includes revenue among output variables and one that does not. According to the results the estimate for TFP growth is higher when revenue is not included among output variables. Given that for the mean hospital the increase in revenues (67%) has been considerably faster than in other outputs
(outpatient visits 42%, discharged patients 31%), this is a surprising finding. A possible explanation for the finding may be that the TFP estimates obtained by Malmquist DEA method are not necessarily very reliable when the number of observations is small. As Coelli and Rao (2001) note in Malmquist DEA method the explicit price information is replaced by implicit (or shadow) price information, derived from the frontier surface. The piece-wise linear nature of the DEA surface (and the regular occurrence of slack regions) can result in wide variations in shadow prices. These variations subsequently lead to significant differences in the weights assigned to different inputs across the sample. Furthermore, these implicit prices may differ substantially from market prices and hence result in TFP measures that differ substantially from those obtained using other methods. Authors should investigate and discuss whether this problem might explain their results.

6. The chapter on the impact of inflation should be revised. Authors are correct in emphasizing that inflation should be taken into account in assessing productivity changes. But removing the effect of the inflation is needed only when one uses monetary measures for output or input variables (e.g. revenue as an output measure or expenditure as an input measure). If outputs and inputs are measured in volume terms, e.g. the number of different services provided or the number of employees (as in Ng’sudy (2011) there is no need to adjust figures due to inflation. I do see the point of testing the statistical significance of the effect of inflation by the use of Wilcoxon signed rank sum tests.

7. The paper lacks a clear focus. Authors should concentrate on presenting and discussing the results of the efficiency and productivity analyses and substantially shorten the texts that deal with managerial and organizational issues which authors’ results inform very little.

Minor Essential Revisions

8. Some of the terms and expressions authors use are clearly incorrect. For instance, in the chapter on technical efficiency change they use the term recession when they refer to decreasing technical efficiency. Some terms are rather odd as supplier induced demand. This should be replaced with the more appropriate expressions.

9. The authors should provide the explanation for the symbols used in formulas (1), (2) and (3).

Discretionary Revisions

10. Presentation of the results is not reader-friendly and illustrative. The texts following the tables, presenting the results are followed by texts which in essence only repeat the information that is already shown in the tables. There seems to be very little effort to summarize or elaborate the findings of the study.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Not suitable for publication unless extensively edited
Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I declare that I have no competing interests.