Author's response to reviews

Title: On evaluating Health Centers Groups in Lisbon and Tagus Valley: Efficiency, equity and quality

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Author's response to reviews: see over
Response to editor.

We appreciate the editor’s comments/suggestions. Thanks for giving us the opportunity to improve our paper. We sincerely hope that the comprehensive changes meet the requirements for acceptance.

The following is in response to the editor’s comments:

- **Acknowledgements**
  Please acknowledge anyone who contributed towards the article by making substantial contributions to conception, design, acquisition of data, or analysis and interpretation of data, or who was involved in drafting the manuscript or revising it critically for important intellectual content, but who does not meet the criteria for authorship. Please also include the source(s) of funding for each author, and for the manuscript preparation. Authors must describe the role of the funding body, if any, in design, in the collection, analysis, and interpretation of data; in the writing of the manuscript; and in the decision to submit the manuscript for publication. Please also acknowledge anyone who contributed materials essential for the study. If a language editor has made significant revision of the manuscript, we recommend that you acknowledge the editor by name, where possible.

  *The role of a scientific (medical) writer must be included in the acknowledgements section, including their source(s) of funding. We suggest wording such as 'We thank Jane Doe who provided medical writing services on behalf of XYZ Pharmaceuticals Ltd.'*

  o We added the acknowledgements section to the document.

- **Structure:**
  Please check the instructions for authors on the journal website to ensure that your manuscript follows the correct structure for this journal and article type.

  o The article is now following the recommended structure.

- **Please add the table numbers in the main text.**

  o It was a problem that occurred when compiling the document. The numbers are already on the document.

Thanks for the opportunity to revise and resubmit. We have done our best to strengthen the paper. Furthermore, we believe that readers will benefit from a greater awareness of quantitative approaches to deal with evaluation of Primary Health Care in Portugal.
Efficiency of Health Centers Groups in Lisbon and Tagus Valley - An approach with Data Envelopment Analysis

BMC

Response to referee 1.

We appreciate the thoughtful comments of the first referee. The suggestions helped us present the material in a clearer way.

The following is our response to the referee’s comments.

- The text which was given to me has some formatting problems. For instance, the references got lost. Instead of [12] there is only [?], sometimes only (?). Therefore, it was difficult to follow the references.
  - The referee is right. The references were omitted due to a problem with Latex. It is already solved.
- “We investigated the horizontal equity based on the territorial unit NUTS III and this analysis showed that there is no evidence of relevant differences.” Is that really methodology or already results?
  - Thank you for the comment. We added a new subsection to the methodology section, named “The Kruskal-Wallis test” where we describe this test and a new subsection at the results section, named “Results”.
- First sentence: “more” ? more than what?
  - We changed the expression in order to clarify our point of view.
- At least in theory there is a difference between primary health care as concept and primary care as level of services. I assume you mean primary care when you say primary health care but you should distinguish that.
  - Thanks for your suggestion. We added a new paragraph in order to distinguish between Primary Care and Primary Health Care.
- Page 2: you already explain here why you selected this specific methodology. This should be avoided.
  - Thanks for your remark. We agree and we removed that part of the text.
- The whole section of Portugal and the health care history is interesting but I am not sure that it is the right place here. Maybe shorten it.
  - The article structure was reformulated and now it is in the Background.
- The table on DEA methodology is on the wrong place. It should be in the methodology section.
  - It is in the right place now. The problem was the Latex formatting.
- I do not think that somebody who does not know the methodology would understand it. You should either explain it in more details (for instance all the different DEA models) or illustrate it with graphs. Or both.
Thanks for your suggestion. We elaborated a bit more about the DEA methodology, so that the reader who does not know this technique can understand it.

- From my perspective you do not explain why you used this specific methodology. You just say “it is recent”. But this is no quality at all. Does it fit? Why not something else?
  - We tried to improve the text explaining why the order-m methodology is a good option when one wants to study the environmental variables.

- You should make clear the difference between your methodology and stochastic frontier analysis.
  - Thank you for the suggestion. We added a paragraph explaining why we think DEA is a better option than SFA.

- The fact that higher purchasing power has a negative effect on efficiency is very surprising and would require more explanation. - The same is true for the population.
  - Thanks for your remark. By mistake, we forgot to include the explanation for the negative influence of the high purchasing power on efficiency. Regarding the population, it is explained by the scale efficiency, as explained in a previous section.

We appreciate the referee’s thoughtful suggestions!
Efficiency of Health Centers Groups in Lisbon and Tagus Valley -
An approach with Data Envelopment Analysis

BMC

Response to referee 2.

We appreciate the work the referee put into reviewing our initial submission! Thanks to your suggestions, we have prepared an improved version of the paper. We sincerely hope that our modifications meet expectations.

• 1 Abstract. a. contents and structure of the text is not convincing: improve the main motivation for reading the paper. You should express the aims of your study and consecutively explain your methods. Policy advice and further conclusions are missing. i. Some international readers might not know about the economic problems of Portugal ii. If quality and equity concerns are also main issues of the paper adequate instruments must be described in the methods
   o we agree with the referee and we changed the abstract in order to meet the expectations. We explained the Portuguese economic situation and we explained in the methodology how we studied equity and quality.
• 2. General remarks: a. citation brackets only include “???” b. I do not understand the meaning of some sentences c. Results of 1st and 2nd stage should be combined; similar with respect to discussion
   o The problem with the citation brackets has been corrected. It was a problem with Latex. In both results and discussion we put the order-m and DEA in the same subsection. Regarding the methodology section, the efficiency and the models are followed by the order-m methodology
• 3. Structure of paper: a. Numbering of sections is missing; b. Structure of the paper should be in line with the structure of abstract c. You should integrate your “case study” within the paper, because this is the object of your study
   o We changed the paper structure in order to meet the requirements. As a consequence, we removed the “case study” section.
• 4. Introduction: a. Literature review is not convincing “only a few papers regarding PHC efficiency were found” b. “A common feature of most of these studies is the variables that are chosen” – if you think about the DEA approach, and how these health facilities can be characterized, it becomes clear, why similar variables were selected c. Growth of health expenditures seems to be a problem. Why? You have to describe which kind of growth you mean d. “...created a constant concern about the sustainability of the Portuguese” – source is missing e. There seems to be some confusion about the concept of PHC and the level of primary care within the health care system
   o Regarding the expression “only a few papers”, we replaced it by only 9 papers and we added the corresponding source. With respect to b., we agree with the referee and we removed that phrase. About c and d, we tried to be a little clearer and we added the source. Finally, regarding point e., we added a paragraph in order to clarify the difference between the two concepts.
5. Primary health care in Portugal: a. Some important information about the health care system in Portugal is missing – the information about PHC in Portugal is quite comprehensive. You did not describe the state of the art concerning performance measurement with respect to primary care in Portugal. c. Last section: you do not have to name each of the ACES. Table 2 does not fit into this chapter.
   o We understand the comment and we added additional explanations for the point we were trying to make. We explained how the Portuguese Health Care System is organized. Regarding the state of the art with respect to primary health care in Portugal, it is explained in subsection 1.1. Table 2 was in this section only because of the LaTeX Table formatting commands.

6. Methods: a. Start with the data base of your study. b. Data Envelopment Analysis (first stage) i. You should explain the formulas (table 2), and the meaning of the variables. ii. Define the variables which are used in table 2. iii. Explain “economies of scale”, the corresponding technologies and the reason for choosing CRS/ VRS. iv. Why did you do not consider economies of scope? v. According to your findings you did conduct a dynamic DEA analysis. The corresponding information in the methods is not included! c. Order-m methodology (second stage) i. Variables are not defined (X, Y,...) ii. The reader might not understand the approach based on the included formulas. You should better point out that this methodology is a type of regression. iii. Why did you do not address other approaches, which are included in the literature (tobit, censored regression)? d. Variable selection: i. Explain reasons for selecting the variables which are included in table 3.
   o We restructured this section in line with the referee suggestions. We explained the formulas and variables of DEA, we elaborated about scale efficiency and we explained why we chose it. Regarding the environmental variables, as stated on section 2.1, they were chosen by analysing the ARSLVT activity reports.

7. Case study: a. You should integrate your “case study” within the paper, because this is the object of your study (see 3-c) b. Sample - Your data is not well defined. c. Table 4 should be in the “results” chapter. d. Model specification “we decided to use these three orientations, in order to compare the results” – based on the situation you should clearly state which kind of orientation is more appropriate; discussion of orientation (and the corresponding results) is missing! e. Adopted models: what was the reason for choosing these models?
   o We agree with the referee and, once again, we restructured the article in order to integrate the case study within the paper. We added Table 4 to the results chapter and we elaborated about the different types of orientations and the models we chose.

8. “Efficiency” a. This is the first part of the results section. b. Table 5 does only include results for “input orientation”! c. Table 6 is not explained. d. Some concrete key results of DEA (results with respect to DMUs, inputs and outputs) are not included. e. Discussion of results: i. efficiency 1. You did include a conclusion in the running text! 2. Why did you do not compare your results with findings from other papers? ii. Equity and quality: 1. The used methods were not presented before! (Kruskal Wallis test???)
2. It is not appropriate only to discuss equity and quality – results are missing before 3. Why did you do not compare your results with findings from other papers?
  o In order to improve tables 5 and 6, we added the same tables for the output oriented model and the non-oriented model. We also explained tables 8, 9 and 10 (table 6 before the modification) in the light of the methodology section. Regarding the key results of DEA, we think that this part of the article is already quite extensive. But, if the referee thinks that it is really a big concern, we can add the information that the referee thinks it’s necessary. We explained the Kruskal-Wallis test in section 2.4. Finally, we added equity and quality results. We didn’t compare our results with findings from other papers because ACES are a new type of PHC organization and there aren’t many studies about them.

- 9. Influence of the environment
  a. Results of regressions are missing! Table 7 is not enough! You have to include the corresponding test results
  b. Why did you do not compare your results with other articles?
    o Figures 2 and 3 are some of the regression results (the ones with more relevance). As stated before, the ACES are a new type of organization. Therefore, there aren’t available studies in order to compare our results.

- 10. Strengths and weaknesses of the paper are missing, e.g.
  a. which important variables were not available?
  b. What is new concerning the research question, the data and findings?

11. Concluding remarks
  a. Clear message is missing!
  b. Policy advice is not included!
    o We agree and we further elaborated on the policy implications of the paper.

We appreciate the referee’s thoughtful suggestions!
Response to referee 3.

We thank the referee for his/her work! Because of the reviewer’s suggestions, we were able to improve the paper. We hope that our modifications meet the reviewer’s expectations.

- The most significant weakness of the paper concerns the literature review. I think authors have to better enquire prior publications referred to performance and efficiency measurement in health care structure, in order to: a. Made the “state of art” of this issue b. Develop the research questions and hypothesis of the paper c. Justify the method chosen. As a consequence, I suggest to make a wide review of prior literature, improving the list of references cited in the paper
  o We understand the comment and we added some more references in order to make the “state of the art” of this kind of study, at the international and at the national level. Regarding the justification of the method chosen, it is explained at page 2, when we refer to Jacobs et al.
- Equity of access to health care and quality of service are two furthers variables observed. However, the paper seems to focus only on efficiency if the title, the introduction and the method section are read. So, I suggest authors to emphasize “equity” and “quality” in the cited section. a. A change of the title is strictly advised b. The objective paragraph has to be improved with the reference to equity and quality, which now are not considered. c. Some publications concerned with these variables have to be cited.
  o We agree with the point of view of the referee and we elaborated a bit more about equity and quality. We also cited some publications regarding these two parameters. Also, the title was changed to “On evaluating Health Centers Groups in Lisbon and Tagus Valley: Efficiency, equity and quality”
- The influence of environment on efficiency is the last section of the discussion of results part. In this version of the paper authors make their comments directly in table 7. I strictly recommend to delay this table and to write comments in the main text.
  o We understand the comment and we included the comments in the main text.
- The number of table are now not indicated. Please, write the right number. The references cited in the main text are not completed with the year. Please, write the right year.
  o Thanks for noting this deficiency in the submission. It was a problem that occurred when compiling the document. The numbers are already on the document.

We are grateful to the referee for his/her suggestions!