Challenges in Performance Assessment in Primary Health Care: The Portuguese Context

2nd Workshop on Efficiency and Productivity Analysis
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Agenda

- Main research objective
- The context of study – The Portuguese health system
- The methodology used: DEA
- Multi-level framework for health care evaluation
- The data
- The results, next steps and challenges
- Conclusions

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Main Research Objective

To assess and further develop the potential of DEA as a tool for formative evaluation in health care delivery

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Portuguese National Health System

- Regional Centres of Public Health
- District Health Authorities (18)
- Medical Institute of Genetics
- Centres of Histocompatibility
- Institute of Ophthalmology
- Regional Centres of Alcoholism

- Portuguese Institute of Oncology
- Hospitals
- Health Centres (350)
- Lisboa, Coimbra and Porto

Context – The Portuguese health system

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**Methodology: DEA**

DEA is a non-parametric technique that compares the efficiency of several organisations that use multiple inputs to produce multiple outputs.

### DEA Input - oriented model (CRS)

<table>
<thead>
<tr>
<th>Envelopment Form</th>
<th>Multiplier Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>$TE_0 (x, y)^{CRS} = \text{Min } \theta$</td>
<td>$TE_0 (x, y)^{CRS} = \text{Max } u y_0$</td>
</tr>
</tbody>
</table>

**Subject to:**

- $\theta x_0 - X \lambda \geq 0$
- $Y \lambda \geq y_0$
- $\lambda \geq 0.$

**Subject to:**

- $v x_0 = 1$
- $-vX + uY \leq 0$
- $v \geq 0, u \geq 0.$

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Why use DEA for formative evaluation in health care?

- DEA allows the use of multiple inputs and outputs without the need to specify weights
- DEA does not require the specification of a functional form for the production function
- DEA uses all the data available to construct a best practice empirical frontier, to which each non-optimal production point is compared
- DEA provides a range of useful information for performance improvement

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Multi-level framework for health care evaluation

Equity

Efficiency

Effectiveness

Local Needs

Resources Used

Services Provided

Patient Characteristics

Outcomes of care

Cost-Effectiveness

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The measurement of equity

Equity is concerned with justice and fairness in the treatment of cases.

An equitable health care system provides services of the same standard independently of, for example, patients’ income group, age, sex and area of residence.

Our measure of equity across centres

% of residents registered with a family doctor

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The measurement of technical efficiency

Technical efficiency assesses the relationship between the outputs produced and the resources used.

Our DEA Model (input-oriented):

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of doctors</td>
<td>Number of family planning consultations</td>
</tr>
<tr>
<td>Number of nurses</td>
<td>Number of maternity health consultations</td>
</tr>
<tr>
<td>Number of administrative professionals</td>
<td>Number of junior health consultations</td>
</tr>
<tr>
<td>Number of other professionals</td>
<td>Number of adult health consultations</td>
</tr>
<tr>
<td></td>
<td>Number of elderly health consultations</td>
</tr>
<tr>
<td></td>
<td>Number of other consultations</td>
</tr>
<tr>
<td></td>
<td>Number of home visits by the doctor</td>
</tr>
<tr>
<td></td>
<td>Number of home visits by the nurse</td>
</tr>
<tr>
<td></td>
<td>Number of vaccinations</td>
</tr>
<tr>
<td></td>
<td>Number of injections</td>
</tr>
<tr>
<td></td>
<td>Number of curatives and other treatments</td>
</tr>
</tbody>
</table>

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The data

- The data refers to the year of 2004

- The sample contains 17 District Health Authorities – Lisbon was excluded due to missing data

- We compared 279 health centres
The results

<table>
<thead>
<tr>
<th></th>
<th>Efficiency</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>100,00%</td>
<td>100,00%</td>
</tr>
<tr>
<td>Min</td>
<td>45,38%</td>
<td>55,60%</td>
</tr>
<tr>
<td>Average</td>
<td>89,73%</td>
<td>93,54%</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>12,36%</td>
<td>9,00%</td>
</tr>
<tr>
<td>N.º of centres that scored 100%</td>
<td>122</td>
<td>73</td>
</tr>
</tbody>
</table>

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## Results by District Health Authority

<table>
<thead>
<tr>
<th>District Health Authority</th>
<th>Nº of Health Centres</th>
<th>Nº of efficient Health Centres</th>
<th>Nº of self-evaluators</th>
<th>Average Efficiency</th>
<th>Average Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braga</td>
<td>15</td>
<td>6</td>
<td>1</td>
<td>91,65%</td>
<td>90,80%</td>
</tr>
<tr>
<td>Bragança</td>
<td>12</td>
<td>1</td>
<td>0</td>
<td>79,94%</td>
<td>98,00%</td>
</tr>
<tr>
<td>Porto</td>
<td>38</td>
<td>26</td>
<td>9</td>
<td>96,05%</td>
<td>85,60%</td>
</tr>
<tr>
<td>Viana do Castelo</td>
<td>13</td>
<td>3</td>
<td>1</td>
<td>79,19%</td>
<td>94,10%</td>
</tr>
<tr>
<td>Vila Real</td>
<td>13</td>
<td>4</td>
<td>0</td>
<td>86,44%</td>
<td>97,60%</td>
</tr>
<tr>
<td>Aveiro</td>
<td>19</td>
<td>14</td>
<td>4</td>
<td>97,81%</td>
<td>98,50%</td>
</tr>
<tr>
<td>Castelo Branco</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>85,19%</td>
<td>99,00%</td>
</tr>
<tr>
<td>Coimbra</td>
<td>19</td>
<td>7</td>
<td>3</td>
<td>88,61%</td>
<td>95,20%</td>
</tr>
<tr>
<td>Guarda</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>76,52%</td>
<td>99,60%</td>
</tr>
<tr>
<td>Leiria</td>
<td>17</td>
<td>12</td>
<td>6</td>
<td>96,70%</td>
<td>96,10%</td>
</tr>
<tr>
<td>Viseu</td>
<td>23</td>
<td>14</td>
<td>4</td>
<td>94,98%</td>
<td>94,10%</td>
</tr>
<tr>
<td>Santarém</td>
<td>16</td>
<td>4</td>
<td>1</td>
<td>89,38%</td>
<td>91,10%</td>
</tr>
<tr>
<td>Setúbal</td>
<td>20</td>
<td>5</td>
<td>3</td>
<td>85,32%</td>
<td>75,70%</td>
</tr>
<tr>
<td>Beja</td>
<td>12</td>
<td>4</td>
<td>0</td>
<td>88,22%</td>
<td>95,40%</td>
</tr>
<tr>
<td>Évora</td>
<td>12</td>
<td>8</td>
<td>3</td>
<td>91,27%</td>
<td>96,00%</td>
</tr>
<tr>
<td>Portalegre</td>
<td>15</td>
<td>8</td>
<td>2</td>
<td>93,41%</td>
<td>97,70%</td>
</tr>
<tr>
<td>Faro</td>
<td>12</td>
<td>3</td>
<td>0</td>
<td>81,23%</td>
<td>86,80%</td>
</tr>
</tbody>
</table>

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Equity versus efficiency of RHAs

Equity versus efficiency of District Health Authorities

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Next steps and challenges...

- Include environmental variables
- Develop weight restrictions based on ‘production trade-offs’
- Develop models to evaluate effectiveness
- Undertake a dynamic analysis, looking for patterns in the results and relate them with policy changes and other alterations
- Workshops with all the RHAs
- Workshops with some of the health centres
- Investigate why some DHAs and centres appear to perform better than others
- Identify learning networks

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Concluding remarks

- We found a great deal of variability in terms of performance of the Portuguese health centres

- From our results, efficiency does not appear to be influenced by the existence of Emergency Assistance Services

- There are some DHAs that score below average in both criteria (e.g. Setúbal)

- There are some DHAs that score very highly in both criteria (e.g. Aveiro)

- There are some DHAs that score highly in terms efficiency and low in terms of equity (e.g. Porto)

- There are some DHAs that score highly in terms of equity and low in terms of efficiency (e.g. Guarda)

- We believe that DEA can be very useful for formative evaluation in health care

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Thank you.

If you want a copy of the slides, please e-mail me: camado@ualg.pt

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