Risk sharing between sickness funds and primary care physicians

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Data

- 1999 data of one Dutch sickness fund, combined with 1998 data on pharmaceuticals
- In total: 592,694 enrollees
- Subgroup: 549,733 enrollees
- Physician at least 250 enrollees
- Subgroup: 396 primary care physicians
First pair:

\[ \text{Cost}_j = f(\text{Age}_{i*j}, \text{Gender}_{i*j}, \text{Urbanisation}_{i*j}, \text{LegalGround}_{i*j}, \text{Extension} \times \text{PCG}_{i*j}) \]

Second pair:

\[ \text{Pharma}_j = f(\text{Age}_{i*j}, \text{Gender}_{i*j}, \text{Urbanisation}_{i*j}, \text{LegalGround}_{i*j}, \text{Extension} \times \text{PCG}_{i*j}) \]
Results

First pair:
- Adj. R² for model 1: 4.7%
- Adj. R² for model 2: 7.9%

Second pair:
- Adj. R² for model 3: 5.5%
- Adj. R² for model 4: 14.5%
### Example of model 1 and 2

<table>
<thead>
<tr>
<th>Primary care physician</th>
<th>Actual total costs</th>
<th>Overall average costs</th>
<th>Predicted costs by model 1</th>
<th>Predicted costs by model 2</th>
<th>Lower bound model 2</th>
<th>Upper bound model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1,046</td>
<td>1,160</td>
<td>1,003</td>
<td>1,060</td>
<td>929</td>
<td>1,191</td>
</tr>
<tr>
<td>B</td>
<td>1,617</td>
<td>1,160</td>
<td>1,185</td>
<td>1,238</td>
<td>1,021</td>
<td>1,454</td>
</tr>
</tbody>
</table>
Further research

- Include risk factors for race and ethnicity, quality, income, education and DCGs
- Use multiple years separately and as panel
- How to construct a bonus from the prediction of the costs?
  - linear / nonlinear
  - level
  - boundaries