Article title: Portuguese Primary Health Care and Prevention Quality Indicators for Diabetes Mellitus – A Data Envelopment Analysis

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Supplementary file 1

Table S1. Estimation of the efficiency using Vector Return to Scale (VRS) DEA model with output orientation, according to the different models (supplement to Table 2)

| ACES              | PQI 01 2016 | PQI 01 2017 | PQI 03 2016 | PQI 03 2017 | PQI 14 2016 | PQI 14 2017 | PQI 16 2016 | PQI 16 2017 | PQI 93 2016 | PQI 93 2017 |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Alentejo Central  | 3.58        | 4.37        | 3.59        | 7.11        | 6.66        | 3.83        | 2.23        | 3.81        | 2.57        | 2.59        |
| Alentejo Litoral  | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        | 1.00        |
| Baixo Alentejo    | 2.09        | 4.90        | 2.39        | 5.17        | 3.96        | 1.52        | 3.21        | 3.18        | 2.75        | 2.09        |
| São Mamede        | 4.54        | 2.44        | 1.37        | 3.88        | 9.84        | 1.69        | 2.18        | 1.79        | 2.40        | 1.42        |
| Barlavento        | 3.42        | 4.67        | 2.45        | 4.58        | 1.01        | 3.88        | 3.51        | 1.94        | 1.98        | 2.07        |
| Algarve Central   | 2.03        | 3.57        | 1.78        | 2.16        | 7.08        | 4.78        | 4.09        | 3.74        | 1.72        | 1.46        |
| Localização                  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
|-----------------------------|------|------|------|------|------|------|------|------|------|
| Sotavento                   | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Baixo Mondego               | 1.79 | 1.61 | 1.78 | 2.30 | 30.65| 7.54 | 2.71 | 2.96 | 2.17 |
| Baixo Vouga                 | 2.10 | 3.49 | 1.76 | 2.30 | 9.93 | 7.82 | 3.31 | 2.53 | 1.71 |
| Beira Interior Sul          | 1.00 | 1.00 | 1.00 | 1.37 | 1.00 | 1.58 | 1.00 | 1.00 | 1.00 |
| Cova da Beira               | 1.00 | 2.21 | 1.00 | 2.58 | 1.00 | 10.84| 1.00 | 2.67 | 1.00 |
| Dão Lafões                  | 2.12 | 3.33 | 1.67 | 3.09 | 12.05| 9.84 | 2.10 | 2.16 | 1.53 |
| Guarda                      | 1.00 | 1.00 | 1.00 | 3.07 | 1.00 | 3.37 | 1.00 | 1.00 | 1.00 |
| Pinhal Interior Norte       | 1.00 | 1.59 | 1.68 | 1.95 | 19.99| 3.06 | 1.30 | 1.00 | 2.10 |
| Pinhal Litoral              | 2.60 | 3.41 | 2.93 | 2.71 | 43.50| 15.58| 2.06 | 2.59 | 2.84 |
| Almada/ Seixal              | 3.03 | 4.59 | 2.42 | 3.57 | 5.24 | 6.47 | 3.66 | 4.60 | 2.04 |
| Amadora                     | 7.09 | 5.21 | 3.05 | 4.14 | 7.10 | 5.68 | 3.24 | 6.64 | 3.01 |
| Arco Ribeirinho             | 3.94 | 2.28 | 3.39 | 4.57 | 11.77| 15.14| 2.56 | 6.92 | 2.61 |
| Arrábida                    | 3.59 | 4.33 | 3.02 | 8.11 | 5.94 | 5.87 | 3.81 | 7.79 | 2.25 |
| Cascais                     | 3.48 | 3.47 | 2.51 | 5.64 | 8.85 | 5.29 | 1.53 | 5.28 | 1.97 |
| Estuário do Tejo            | 4.26 | 5.72 | 2.88 | 4.91 | 22.20| 21.31| 3.23 | 8.69 | 2.73 |
| Lezíria                     | 5.00 | 7.02 | 2.39 | 2.37 | 23.07| 14.49| 3.22 | 4.80 | 2.77 |
| Lisboa Central              | 2.54 | 2.80 | 2.82 | 4.57 | 23.38| 11.45| 1.50 | 2.33 | 2.48 |
| Lisboa Norte                | 3.44 | 3.46 | 2.14 | 3.53 | 18.79| 12.84| 2.10 | 3.24 | 2.21 |
| Lisboa Ocidental e Oeiras   | 3.78 | 3.98 | 2.78 | 3.39 | 14.72| 6.70 | 2.51 | 3.82 | 2.34 |
| Loures/Odivelas             | 3.65 | 2.66 | 2.06 | 2.33 | 13.21| 6.65 | 3.03 | 2.31 | 2.12 |
| Médio Tejo                  | 2.84 | 3.57 | 1.16 | 3.20 | 16.50| 7.52 | 1.66 | 3.39 | 1.59 |
| Oeste Norte                 | 4.35 | 4.53 | 2.55 | 4.55 | 21.39| 10.93| 3.12 | 5.19 | 2.54 |
| Oeste Sul                   | 3.03 | 1.69 | 2.91 | 4.80 | 6.18 | 6.16 | 3.81 | 3.30 | 2.22 |
| Sintra                      | 5.28 | 5.48 | 3.38 | 3.87 | 14.06| 7.24 | 4.76 | 7.37 | 3.13 |
| Alto Ave                    | 4.25 | 5.63 | 1.84 | 2.32 | 6.94 | 12.03| 2.45 | 4.62 | 1.90 |
| Alto Minho                  | 1.87 | 2.98 | 2.08 | 3.96 | 5.01 | 4.92 | 1.70 | 4.38 | 1.48 |
| Alto Tâmega e Barroso       | 7.94 | 3.87 | 2.75 | 3.86 | 7.40 | 9.38 | 1.91 | 1.75 | 3.07 |
| Ave/Famalicão               | 1.00 | 1.77 | 1.00 | 1.79 | 1.00 | 1.60 | 1.00 | 1.50 | 1.00 |
| Aveiro Norte                | 1.78 | 1.65 | 1.00 | 3.36 | 3.23 | 2.46 | 1.99 | 1.54 | 1.16 |
| ACES                     | Actual PQI 93 2016 | VRS DEA 2016 | Actual PQI 93 2017 | VRS DEA 2017 |
|-------------------------|-------------------|--------------|-------------------|--------------|
| Alentejo Central        | 99.52             | 38.76        | 83.64             | 32.32        |
| Alentejo Litoral        | 75.42             | 75.42        | 87.35             | 87.35        |
| Baixo Alentejo          | 198.52            | 72.14        | 89.95             | 43.12        |
| São Mamede              | 100.80            | 42.00        | 48.20             | 33.86        |
| Barlavento              | 76.89             | 38.76        | 69.39             | 33.60        |

Table S2. Potential of improvement Vector Return to Scale (VRS) DEA model. Target: PQI 93 rates (supplement to Table 5)
| Local                          | Mercado_I   | Mercado_II  | Mercado_III  | Mercado_IV |
|-------------------------------|--------------|-------------|--------------|------------|
| Algarve Central               | 66.57        | 38.76       | 47.23        | 32.32      |
| Sotavento (Efficient)         | 38.76        | 38.76       | 41.82        | 41.82      |
| Baixo Mondego                 | 84.09        | 38.76       | 39.37        | 32.32      |
| Baixo Vouga                   | 66.18        | 38.76       | 50.06        | 32.32      |
| Beira Interior Sul            | 63.52        | 63.52       | 35.48        | 35.48      |
| Cova da Beira                 | 123.06       | 123.06      | 100.27       | 37.12      |
| Dão Lafões                     | 59.11        | 38.76       | 52.97        | 32.32      |
| Guarda                        | 63.70        | 63.09       | 63.11        | 43.12      |
| Pinhal Interior Norte         | 81.23        | 38.76       | 32.32        | 32.32      |
| Pinhal Litoral                | 109.99       | 38.76       | 72.85        | 32.32      |
| Almada/ Seixal                | 79.04        | 38.76       | 60.79        | 32.32      |
| Amadora                       | 116.68       | 38.76       | 91.03        | 33.38      |
| Arco Ribeirinho               | 101.13       | 38.76       | 90.66        | 32.32      |
| Arrábida                       | 87.36        | 38.76       | 91.60        | 32.32      |
| Cascais                        | 76.31        | 38.76       | 75.86        | 32.32      |
| Estuário do Tejo              | 106.01       | 38.76       | 120.58       | 32.32      |
| Lezíria                        | 107.36       | 38.76       | 93.35        | 32.32      |
| Lisboa Central                 | 96.10        | 38.76       | 76.82        | 32.32      |
| Lisboa Norte                   | 85.64        | 38.76       | 74.81        | 32.32      |
| Lisboa Ocidental e Oeiras      | 90.57        | 38.76       | 63.86        | 32.32      |
| Loures/Odivelas                | 82.03        | 38.76       | 45.63        | 32.32      |
| Médio Tejo                     | 61.48        | 38.76       | 61.31        | 32.32      |
| Oeste Norte                    | 98.26        | 38.76       | 92.67        | 32.32      |
| Oeste Sul                      | 86.03        | 38.76       | 61.12        | 32.32      |
| Sintra                         | 121.26       | 38.76       | 77.99        | 32.32      |
| Alto Ave                       | 73.75        | 38.76       | 68.68        | 32.32      |
| Alto Minho                     | 57.19        | 38.76       | 57.22        | 32.32      |
| Alto Tâmega e Barroso          | 118.88       | 38.76       | 76.16        | 34.31      |
| Ave/Famalicão                  | 72.14        | 72.14       | 68.66        | 58.23      |
| Localização                  | Julho | Outubro | Novembro | Dezembro |
|-----------------------------|-------|---------|----------|----------|
| Aveiro Norte                | 45.10 | 38.76   | 44.04    | 34.58    |
| Baixo Tâmega               | 52.48 | 38.76   | 45.86    | 32.82    |
| Barcelos/Esposende         | 71.14 | 38.76   | 43.47    | 33.07    |
| Braga                      | 52.85 | 38.76   | 33.84    | 32.32    |
| Douro Sul                  | 78.25 | 38.76   | 67.36    | 36.67    |
| Espinho Gaia               | 58.55 | 38.76   | 48.89    | 32.32    |
| Feira e Arouca             | 57.41 | 38.76   | 44.62    | 32.60    |
| Gaia                       | 54.33 | 38.76   | 56.78    | 32.99    |
| Gerês/Cabreira             | 89.59 | 38.76   | 34.41    | 34.41    |
| Gondomar                   | 107.89| 38.76   | 89.22    | 32.32    |
| Maia/Valongo               | 105.10| 38.76   | 102.85   | 32.32    |
| Marão e Douro Norte        | 74.23 | 38.76   | 57.49    | 33.66    |
| Matosinhos                 | 79.60 | 38.76   | 77.38    | 32.32    |
| Nordeste                   | 59.80 | 38.76   | 46.94    | 32.32    |
| Porto Ocidental            | 93.29 | 38.76   | 75.04    | 32.32    |
| Porto Oriental             | 90.31 | 38.76   | 80.08    | 35.68    |
| Vila do Conde/Póvoa de Varzim | 90.38 | 38.76   | 67.10    | 32.99    |
| Santo Tirso/Trofa          | 56.43 | 45.83   | 67.73    | 67.73    |
| Vale do Sousa Norte        | 68.21 | 38.76   | 72.06    | 32.32    |
| Vale do Sousa Sul          | 60.99 | 38.76   | 59.25    | 32.32    |
Figure S1. Basic residual plots for checking the Tobit Regression model fit - PQI 01.
Figure S2. Basic residual plots for checking the Tobit Regression model fit – PQI 03.
Figure S3. Basic residual plots for checking the Tobit Regression model fit – PQI 14.
Figure S4. Basic residual plots for checking the Tobit Regression model fit – PQI 16.
Figure S5. Basic residual plots for checking the Tobit Regression model fit – PQI 93.