The Efficiency Spillovers Of Intramoenia Activity

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Shaping powerful minds

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- Part of a set of papers on payments and performance in the Portuguese NHS
- Volume effects (Gisele Braun)
- Upcoding (Pedro P Barros and Gisele Braun)
- Evaluation of a specific program (Gisele Braun and Pedro P Barros)

The research question

- Extra activity to recover waiting lists – as part of the SIGIC – management of waiting lists
- Additional payment for additional activity, no specific target clinical area
- Question: what were the effects of this "marginal activity" on total activity and efficiency? What is the size of spillovers from one type of activity to the other?

Extra pay for extra activity

- Under the waiting list management system – SIGIC (deployed in 2004/2005), hospitals of the NHS can perform extra activity (over and above the normal schedule of doctors) for extra pay
- It can be patients from the same hospital or from other hospitals – need to be transfers under the SIGIC rules

- Advantages – part of the guarantee to patients of maximum waiting times
- Disadvantages – perverse incentives related to normal activity (?) – crowding-out effect
- Advantage not so obvious – better organization to satisfy this extra demand will spillover to normal activity

Quick theoretical background

- Fixed capacity – more extra activity means crowding out
- Flexible capacity – extra activity has no impact on normal activity
- Efficiency effort – more activity is associated with more effort for efficiency
- Efficiency effort spillover – doing extra activity benefits all cases

- Since the intention is to address crowding out and spillovers in efficiency effects, there is the need to recognize explicitly the role of emergency room admissions – their uncertainty is likely to create additional costs
- Proxy for efficiency – length of stay of each episode

Testable effects

- Efficiency (proxied by length of stay by episode) increases with existence of a SIGIC case but also with the total number of cases?
- Emergency room-based episodes contribute to less efficiency?

Data

- DRG data for Portugal
- Only DRGs with more than 100 episodes of SIGIC in 2010 were included for analysis
- Simple direct relations – OLS for number of cases, negative binomial with fixed effects for length of stay by episode – hospital – year, OLS with fixed effects for hospital – year data

Strategy

- Number of days – length of stay – as dependent variable
- Potential factors:
  - Age and Gender: demographics
  - Diagnosis (number) and Procedures (number)
  - Fixed effects and yearly dummies
  - Episode is SIGIC (-?) or emergency room (+?)
  - % of emergency room in total (disruption?)
  - % SIGIC on programmed cases (spillovers: disruption vs efficiency spillovers)

Preliminary results - all

Negative binomial regression — Number of obs = 450345
LR chi2(62) = 313268.01
Dispersion = mean — Prob > chi2 = 0.0000
Log likelihood = -950427.84 — Pseudo R2 = 0.1415

los	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
b_date	-.0000132	1.91e-07	-69.33	0.000	-.0000136	-.0000129
sexo	-.0305558	.0025166	-12.14	0.000	-.0354882	-.0256234
sigic	-.1560701	.0038755	-40.27	0.000	-.163666	-.1484742
urgente	.4743359	.0038654	122.71	0.000	.4667598	.4819119
percent_urgentes	.289616	.0108077	26.80	0.000	.2684332	.3107988
percent_sigic_prog	-.0446222	.0058644	-7.61	0.000	-.0561163	-.0331282
diag	.0316175	.0005502	57.47	0.000	.0305392	.0326958
np	.0366675	.0004091	89.64	0.000	.0358657	.0374693
d_ano2	-.0255823	.0028069	-9.11	0.000	-.0310838	-.0200808
d_ano3	-.0552571	.0028738	-19.23	0.000	-.0608897	-.0496244
d_ano4	-.0656878	.0029584	-22.20	0.000	-.0714862	-.0598893
_cons	.9325814	.007696	121.18	0.000	.9174975	.9476653
/lnalpha	-1.711245	.0042655			-1.719606	-1.702885
alpha	.1806407	.0007705			.1791368	.1821572

Likelihood-ratio test of alpha=0: chibar2(01) = 2.1e+05 Prob>=chibar2 = 0.000

- Birth date – younger, less LOS
- Gender: women spend less time
- SIGIC episodes spend less time
- Emergency room spend more time
- Percent emergency room increases LOS
- Higher severity means higher LOS
- Higher percent of SIGIC, lower LOS

- Composition effect of SIGIC spillover?

Preliminary results – excludes SIGIC

```
Negative binomial regression                    Number of obs   =     384129
                                                LR chi2(61)     =  258798.64
Dispersion     = mean                           Prob > chi2     =     0.0000
Log likelihood = -820954.07                     Pseudo R2       =     0.1362

------------------------------------------------------------------------------
         los |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      b_date |   -.000013   2.03e-07   -63.99   0.000    -.0000134   -.0000126
        sexo |  -.0324984   .0027244   -11.93   0.000    -.0378381   -.0271587
     urgente |   .4767792   .0039741   119.97   0.000     .4689902    .4845682
percent_urgentes |   .2677726   .0114053    23.48   0.000     .2454187    .2901265
percent_sigic_prog |  -.0184132   .0067358    -2.73   0.006    -.0316151   -.0052112
        diag |   .0340443   .0005979    56.94   0.000     .0328725     .035216
          np |   .0400827    .000449    89.27   0.000     .0392027    .0409627
      d_ano2 |  -.0240553   .0030616    -7.86   0.000    -.0300559   -.0180546
      d_ano3 |  -.0526797   .0031305   -16.83   0.000    -.0588153   -.0465441
      d_ano4 |  -.0630125   .0032111   -19.62   0.000    -.0693062   -.0567188
       _cons |   .8968979   .0085761   104.58   0.000      .880089    .9137068
-------------+----------------------------------------------------------------
    /lnalpha |  -1.653873   .0044632                     -1.66262   -1.645125
-------------+----------------------------------------------------------------
       alpha |   .1913076   .0008538                      .1896414    .1929884
------------------------------------------------------------------------------
Likelihood-ratio test of alpha=0:  chibar2(01) = 2.0e+05 Prob>=chibar2 = 0.000
```

Preliminary results

```
Negative binomial regression                    Number of obs   =     384129
                                                LR chi2(64)     =  258831.82
Dispersion     = mean                           Prob > chi2     =     0.0000
Log likelihood = -820937.47                     Pseudo R2       =     0.1362

------------------------------------------------------------------------------
             los |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------+------------------------------------------------------------
          b_date |   -.000013   2.03e-07   -63.93   0.000    -.0000134   -.0000126
            sexo |  -.0324281   .0027243   -11.90   0.000    -.0377677   -.0270885
         urgente |   .4769429   .0039742   120.01   0.000     .4691536    .4847321
  percent_urgentes |   .2676972   .0114045    23.47   0.000     .2453447    .2900496
percent_sigic_prog |   .0302564    .012891     2.35   0.019     .0049905    .0555222
                 |
            ano# |
             c.  |
percent_sigic_prog |
            2008 |  -.0537631    .017725    -3.03   0.002    -.0885034   -.0190228
            2009 |  -.0423089   .0181812    -2.33   0.020    -.0779434   -.0066745
            2010 |  -.1082813   .0189202    -5.72   0.000    -.1453642   -.0711984
                 |
         d_ano2 |  -.0186636   .0035522    -5.25   0.000    -.0256258   -.0117013
         d_ano3 |  -.0484378   .0035982   -13.46   0.000    -.0554902   -.0413855
         d_ano4 |  -.0530387   .0036551   -14.51   0.000    -.0602025   -.0458749
           diag |   .0340856   .0005979    57.01   0.000     .0329138    .0352575
             np |    .040053   .0004491    89.18   0.000     .0391727    .0409333
          _cons |   .8920671    .008647   103.17   0.000     .8751194    .9090148
-----------------+------------------------------------------------------------
       /lnalpha |   -1.65402   .0044635                     -1.662768   -1.645271
-----------------+------------------------------------------------------------
          alpha |   .1912795   .0008538                      .1896134    .1929602
------------------------------------------------------------------------------
Likelihood-ratio test of alpha=0:  chibar2(01) = 2.0e+05 Prob>=chibar2 = 0.000
```

Main findings

- The preliminary results indicate:
  - Extra activity episode is performed with higher efficiency (lower length of stay) – can this be due to emergency room cases? This was controlled.
  - Extra activity exerts an overall positive effect on efficiency (lower length of stay the larger the number of episodes, even excluding the SIGIC cases from the analysis)
  - More emergency room-based episodes create problems