



Universidade do Porto

FEP Faculdade de
Economia

Supplier inducement and length of stay in a public health care system: the case of cesarean delivery

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□ Outline:

- ◆ Motivation
- ◆ Literature Review
- ◆ Data
- ◆ Graphical Analysis
- ◆ Results:
 - SID
 - LOS
- ◆ Conclusions



1. Motivation

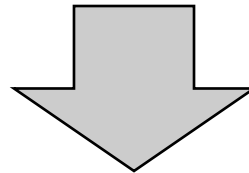
- ❑ Between 1996 and 2006, the number of cesarean deliveries in Portugal increased 49% and the associated average length of stay (ALOS) declined by 28.4%.
- ❑ Over the same period, the number of vaginal deliveries fell 15% and the associated ALOS dropped 15%.

Portugal has the second highest rate of cesarean deliveries within the European Union (*European Perinatal Health Report, 2008*).



1. Motivation

- ❑ In the end of 2002, the legal status of 31 hospitals changed, from public institutions of the Administrative Public Sector (SPA) into hospitals Anonymous Society (SA).
- ❑ In 2005, all hospitals SA were transformed into enterprise-hospitals (EPE) with an autonomous model of institutional organization within the public central administration. In the end of this year, more five hospitals were transformed into EPE .



Entrepreneurial principles such as freedom of choice by the patient, budget contracting, and the improving the flexibility in the management of human resources.



2.Objective of the paper

Our aim is to verify if supplier inducement of cesarean delivery prevails in Portuguese public health care system over the period 1996-2006, using as identification an exogenous change in the legal status of some public hospitals.

Furthermore, we test whether this change in legal status also leads to a decrease in the average length of stay.



3. Literature Review

- The literature on supply inducement usually assesses how **three** potential changes in the environment facing physicians or health care providers determine the inducement of cesarean deliveries:
- the first of these changes is related to the **payment schemes** (Stafford 1990, Fisher et al. 1995, Roberts et al. 2000, King 2000, Murray 2000).
 - the second used exogenous change is variations in the **physician/population density** across areas (Fuchs 1978, Cromwell and Mitchell 1986, Birch 1988, Grytten, Holst, and Laake 1990, Grytten et al 1995).
 - the third exogenous change is changes in the **fertility rate** (Gruber and Owing 1996).



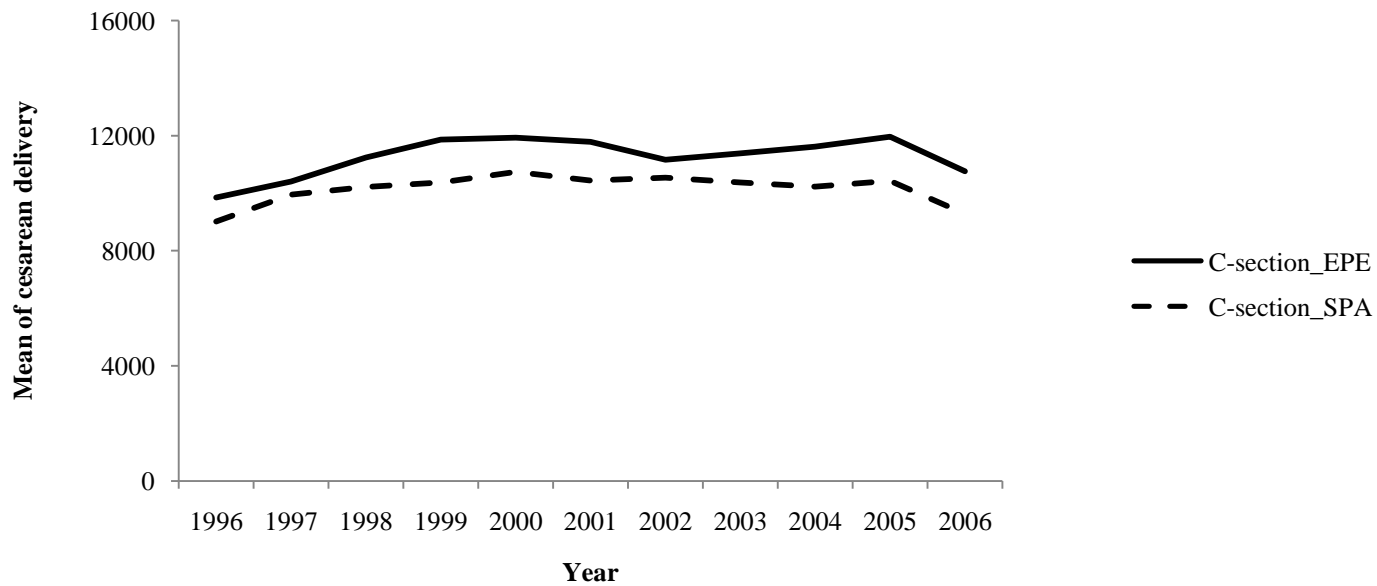
4. Data

Variable	All Births		EPE		SPA	
	Mean	S. Dev.	Mean	S. Dev.	Mean	S. Dev.
Cesarean	0.278	0.448	0.272	0.445	0.286	0.452
Age < 20	0.065	0.246	0.064	0.245	0.065	0.246
Age 20-25	0.209	0.406	0.212	0.409	0.205	0.403
Age 25-30	0.335	0.472	0.336	0.472	0.333	0.471
Age 30-35	0.268	0.443	0.266	0.442	0.270	0.444
Age 35-40	0.105	0.306	0.103	0.303	0.107	0.309
Age 40-45	0.019	0.137	0.019	0.136	0.019	0.138
Age 45+	0.001	0.031	0.001	0.031	0.001	0.031
Two or more children	0.011	0.103	0.010	0.100	0.012	0.108
Urgent admission	0.948	0.222	0.966	0.181	0.927	0.261
Planned admission	0.036	0.187	0.031	0.173	0.043	0.202
Other admission	0.000	0.006	0.000	0.005	0.000	0.007
C-section by year _lag	6.019	4.217	5.084	2.609	7.111	5.329
No C-section_lag	16.636	11.439	14.958	8.515	18.595	13.851
Length of stay	3.582	2.564	3.464	2.432	3.719	2.705
Fecundity rate	42.929	4.464	43.222	4.613	42.587	4.257
Physicians	174.217	176.505	140.376	167.833	213.740	178.163
Observations	847106		456352		390754	



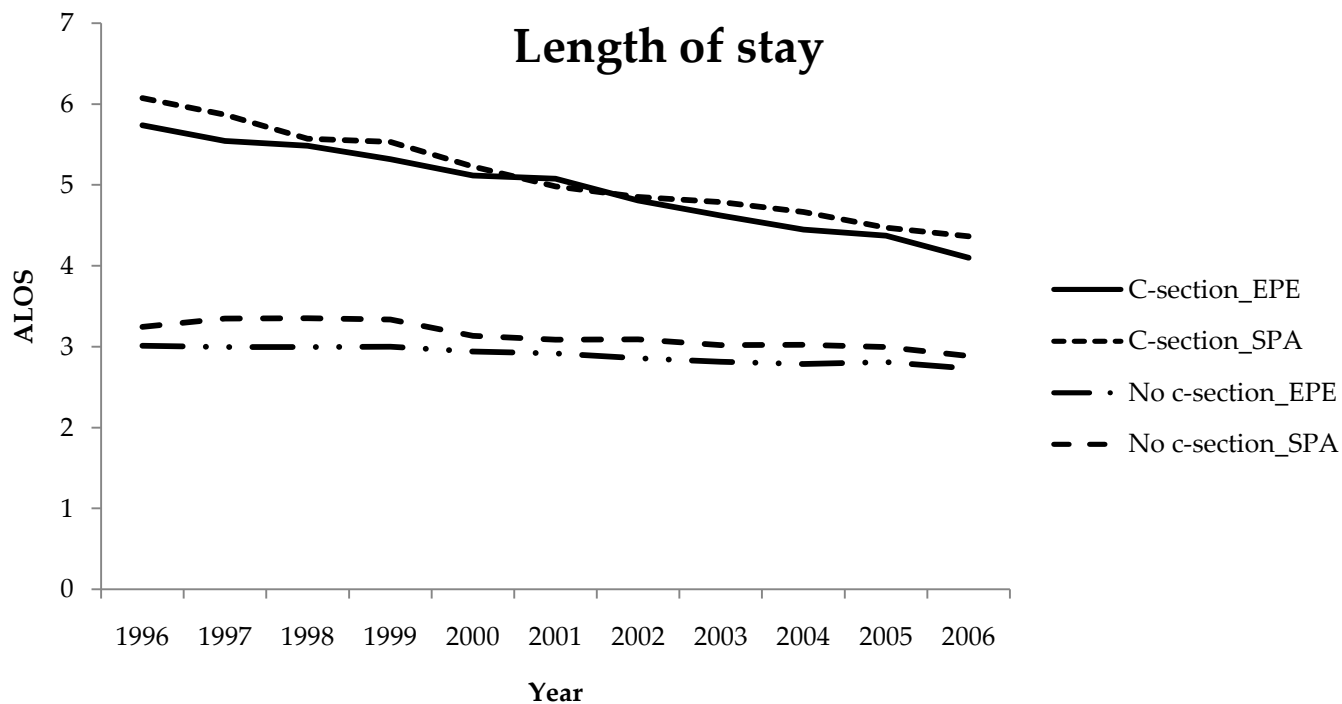
5. Graphical Analysis

Cesarean delivery





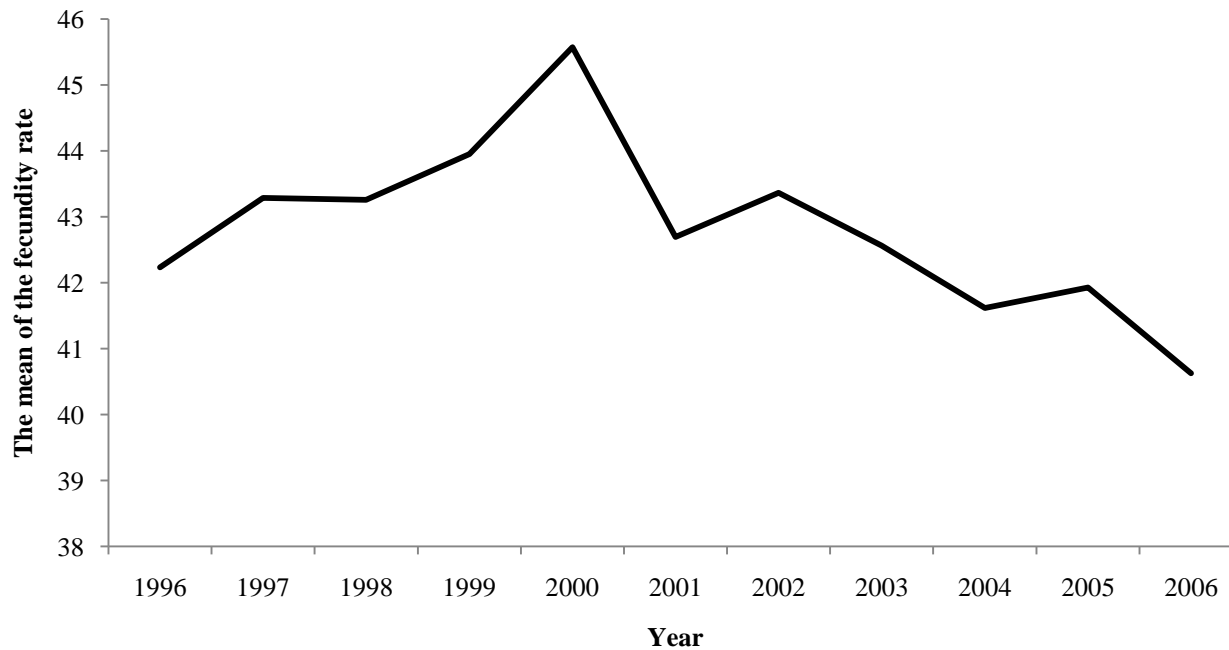
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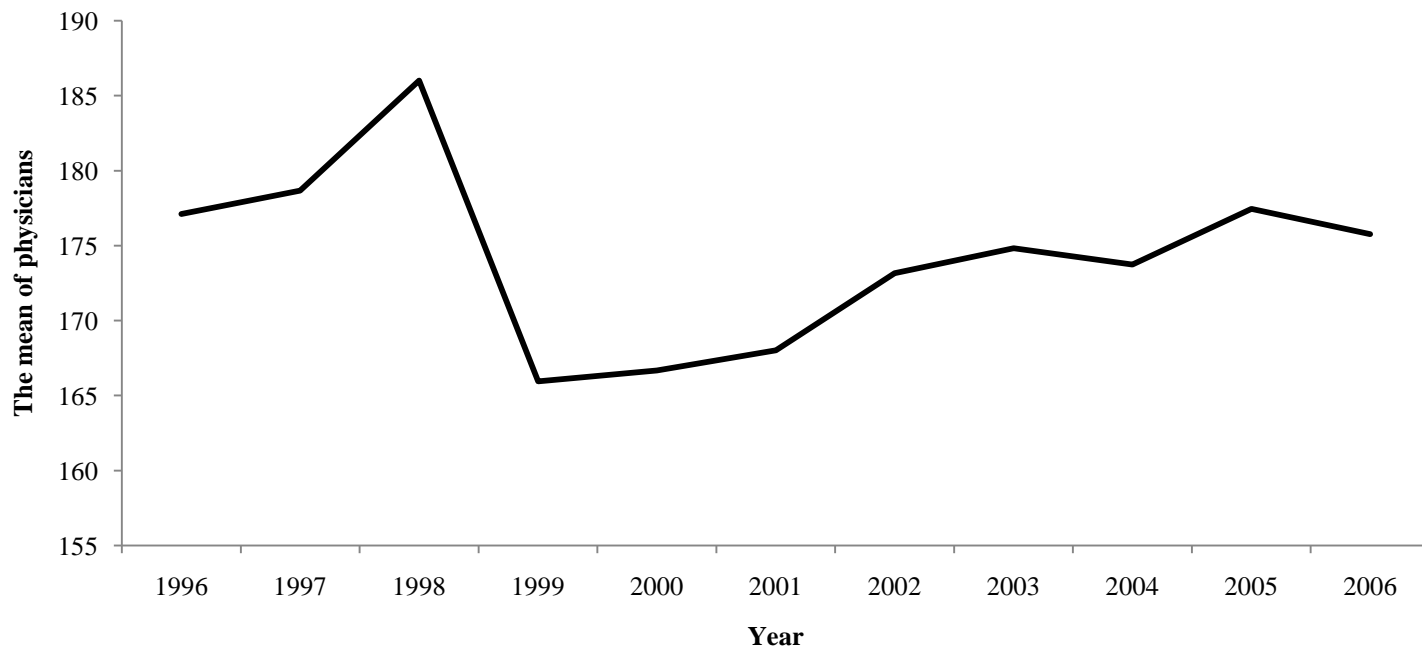
Fecundity rate





5. Graphical Analysis

Physicians





6. SID (Marginal Effects)

	(1)	(2)	(3)	(4)	(5)
Age 20-25	0.055*** (0.003)	0.055*** (0.003)	0.055*** (0.003)	0.055*** (0.003)	0.055*** (0.003)
Age 25-30	0.102*** (0.003)	0.102*** (0.003)	0.102*** (0.003)	0.102*** (0.003)	0.102*** (0.003)
Age 30-35	0.142*** (0.003)	0.142*** (0.003)	0.142*** (0.003)	0.142*** (0.003)	0.142*** (0.003)
Age 35-40	0.205*** (0.003)	0.205*** (0.003)	0.205*** (0.003)	0.205*** (0.003)	0.205*** (0.003)
Age 40-45	0.277*** (0.005)	0.277*** (0.005)	0.277*** (0.005)	0.277*** (0.005)	0.277*** (0.005)
Age 45+	0.334*** (0.018)	0.334*** (0.017)	0.334*** (0.018)	0.334*** (0.018)	0.334*** (0.017)
Two or more children	0.356*** (0.005)	0.356*** (0.005)	0.356*** (0.005)	0.356*** (0.005)	0.356*** (0.005)
Urgent admission	0.003*** (0.005)	0.003*** (0.005)	0.003*** (0.005)	0.005*** (0.005)	0.005*** (0.005)
Planned admission	0.258*** (0.007)	0.258*** (0.007)	0.258*** (0.007)	0.261*** (0.007)	0.261*** (0.007)
C-section_lag	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)
No C-section_lag	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Fecundity rate		-0.001* (0.000)			-0.001* (0.000)
Number of Physicians			3.31E-07* (0.000)		0.000* (0.000)
EPE				-0.095*** (0.008)	-0.094*** (0.008)
EPE_group1 (2002)				0.012*** (0.002)	0.011*** (0.002)
EPE_group2 (2005)				0.047*** (0.009)	0.047*** (0.009)



7. LOS

	<i>Coefficient</i>	<i>Marginal Effects</i>
Age 20-25	-0.088*** (0.021)	-0.038
Age 25-30	-0.100*** (0.020)	-0.044
Age 30-35	-0.033 (0.022)	-0.015
Age 35-40	0.110*** (0.025)	0.051
Age 40-45	0.317*** (0.037)	0.165
Age 45+	0.420*** (0.130)	0.232
Two or more children	1.103*** (0.023)	0.885
Urgent admission	-0.016 (0.036)	-0.007
Planned admission	0.105** (0.042)	0.049
C-section_lag	0.019*** (0.006)	0.009
No c-section_lag	-0.008** (0.002)	-0.004
Fecundity rate	0.008*** (0.003)	0.004
Number of Physicians	0.002*** (0.000)	0.001
EPE	-0.355*** (0.076)	-0.156
EPE_group1 (2002)	-0.083*** (0.028)	-0.036
EPE_group2 (2005)	-0.281** (0.095)	-0.109
Cesarean delivery	0.103*** (0.007)	0.034
Constant	0.435*** (0.144)	



8. Conclusions

We verify that not only the enterprise hospitals were more likely to perform a cesarean section, but they also had a higher decrease in the average length of stay for mothers that were subject to it.



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Thanks for your attention!