Determinants of Female Sterilization in Brazil, 2001–2007

Ernesto Friedrich de Lima Amaral
Universidade Federal de Minas Gerais
eflamaral@gmail.com

Joseph E. Potter
The University of Texas at Austin
joe@prc.utexas.edu

Objective

- This study aims to investigate the determinants of female sterilization in Brazil between January 2001 and July 2007.
- The analysis is innovative because it adds time of exposure to the risk of sterilization into survival models.
- We seek to comprehend the effects of different birth intervals (postpartum duration) on the possibility of a woman getting sterilized.
- Our main hypothesis is that when taking into account a person's months of exposure to sterilization, the effects of color/race and years of schooling will lose significance.

Fertility and contraception in Brazil

- An increase in the prevalence of modern contraceptive methods is a major factor associated with the decline of the country's total fertility rate (IBGE, 2012):
  - 5.8 children per woman in 1970
  - 1.9 children per woman in 2010
- Contraceptive methods are largely focused on the use of pills and female sterilization.
- The government did not intervene in order to reduce fertility, change female reproductive behavior, or increase the use of contraception.

Type of contraception

- There has been an expansion of modern methods.
- Change in the distribution of married and cohabiting women between 15–44 years of age by type of contraceptive use:

Type of contraception	1996	2006
Do not use	22.1	18.4
Female sterilization	**38.5**	**25.9**
Male sterilization	**2.8**	**5.1**
Pills	**23.1**	**27.4**
Condom	**4.6**	**13.0**
Withdrawal	3.0	2.1
Periodic abstinence	2.9	1.0
Others (IUD, diaphragm, injections…)	**3.0**	**7.0**
Total	**6,613**	**8,707**

Source: Perpétuo and Wong (2009).

Family planning law

- In 1997, the federal government implemented the family planning law.
- One of the goals of the law was to enable sterilization in public hospitals, but with restrictions on surgeries during cesarean deliveries, childbirth, and abortion.
- Female and male sterilizations are permitted only for those 25+ years of age or with at least two children born alive.
- However, municipalities have insufficient resources to supply female sterilization.
- Despite legal impediments, female sterilization is still performed in conjunction with cesarean sections, especially in private hospitals.

Data

- Data is from the 2006 Brazilian National Survey on Demography and Health of Women and Children (PNDS).
- Women between 15–49 years of age at the time of the interview, who experienced live births between January 2001 and July 2007.
- The database was disaggregated into postpartum duration as the unit of analysis, which includes 17,376 observations, related to 3,398 live births, and 2,762 women.
- Women were exposed to the risk of sterilization for a total of 88,228 months, resulting in 855 women being sterilized.

Methods

- **Piece-wise constant exponential regression models:** based on starting and ending times of exposure to the risk of sterilization (survival analysis).
- **Dependent variable:** risk of a woman getting sterilized, considering the month and year of procedure.
- **Independent variables:**
  - Postpartum duration in months: 0, 1, 2, 3–6, 7–12, 13–18, 19+
  - Age in years at time of delivery: 15–24, 25–29, 30–34, 35–49
  - Parity at delivery (2, 3, 4+), calculated with information about number of children ever born and birth order
  - Place of delivery: public hospital (SUS), health insurance (“convênio”), private hospital

Other variables

- **Independent variables:**
  - Region of residence: North, Northeast, Southeast, South, Central-West
  - Color/race: white (“branca”), black (“preta”), brown (“parda”), yellow/Asian (“amarela”), indigenous (“indígena”)
  - Years of schooling: 0–3, 4–7, 8–10, 11+
- The database only addresses the region of residence and years of schooling at the time of the interview.

Categories with higher prevalence of births and sterilizations, 2001–2006

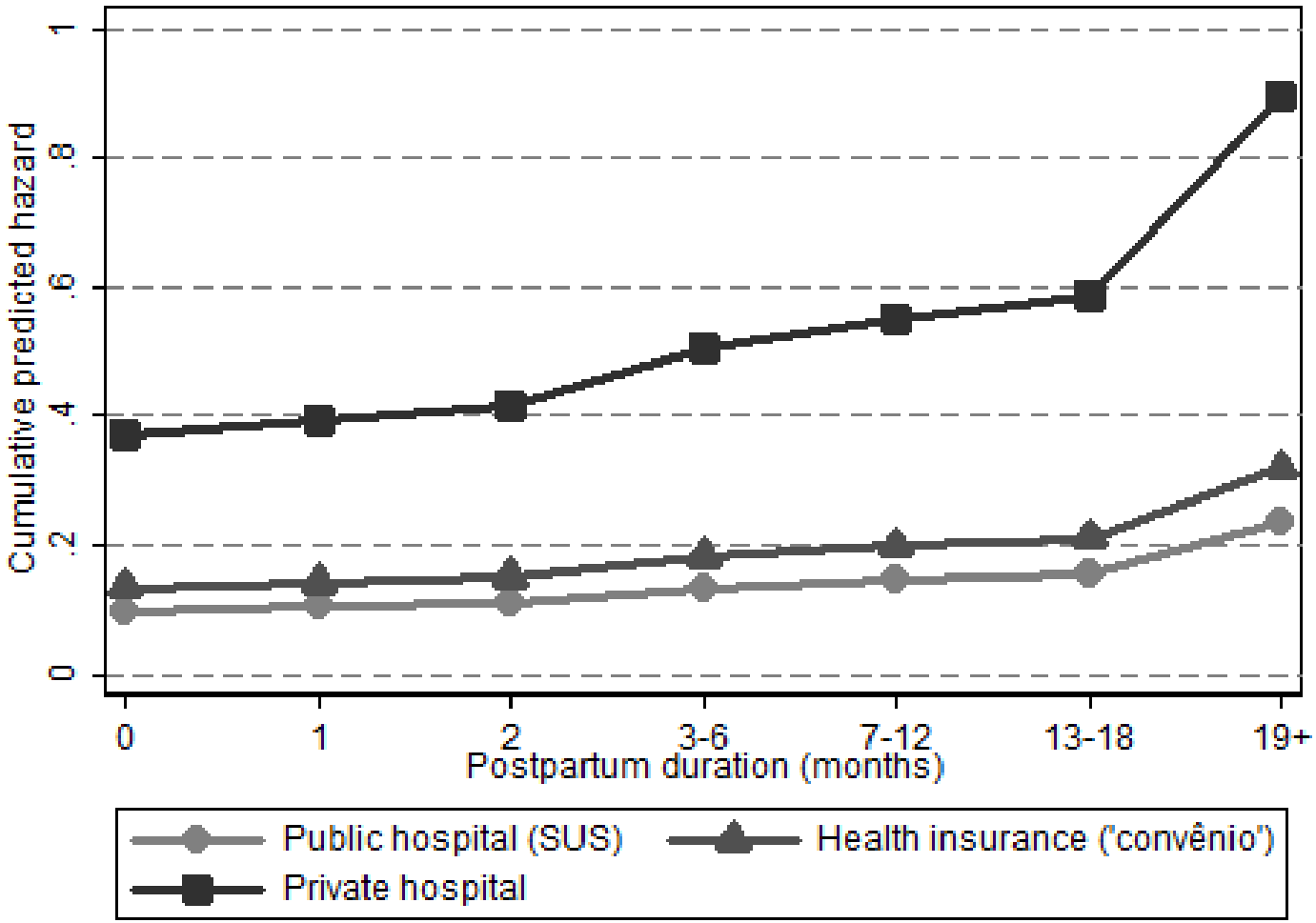
Variables	Births	Sterilizations
Age	15–24 (42%)	30+
Parity at delivery	2 children (50%)	3+ children
Place of delivery	Public hospital (84%) Health insurance (8%) Private hospital (8%)	Private hospital
Region	North (22%)	North
Color/race	Brown (52%)	Brown
Years of schooling	4–7 (39%)	11+

Source: 2006 PNDS.

Regression results

- Models indicate that sterilization is greater:
  - Following childbirth.
  - Among older women.
  - For those with two children at time of delivery.
  - In areas of elevated fertility rates (North and Northeast).
- Women who gave birth at **private hospitals** experience the greatest chances of getting sterilized following a birth.
- **Color/race** and **years of schooling** are not good predictors of the risk of female sterilization.

Cumulative predicted hazard of female sterilization

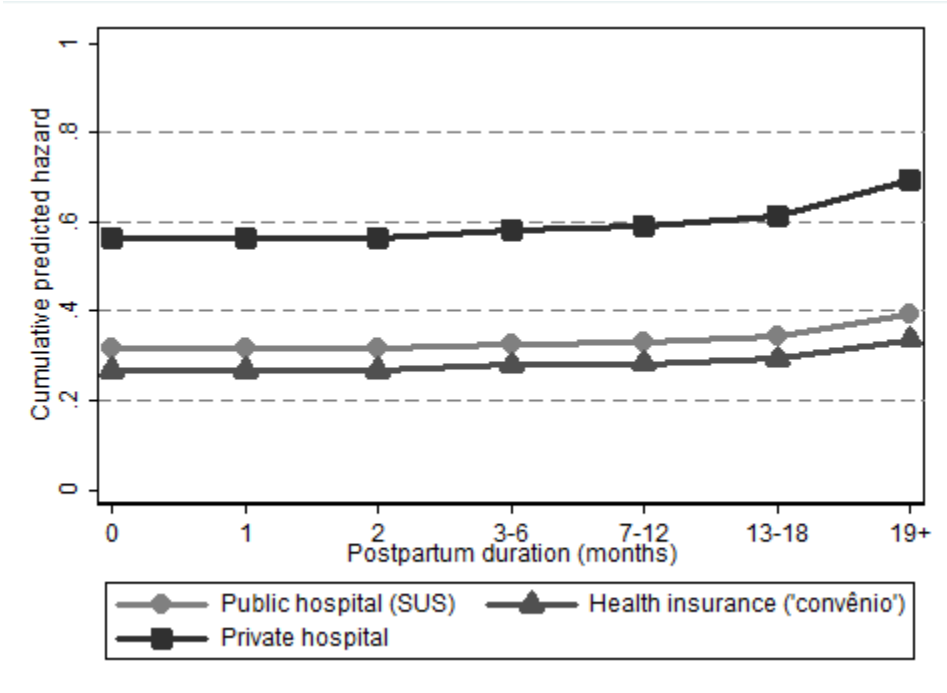


Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.
Source: 2006 PNDS.

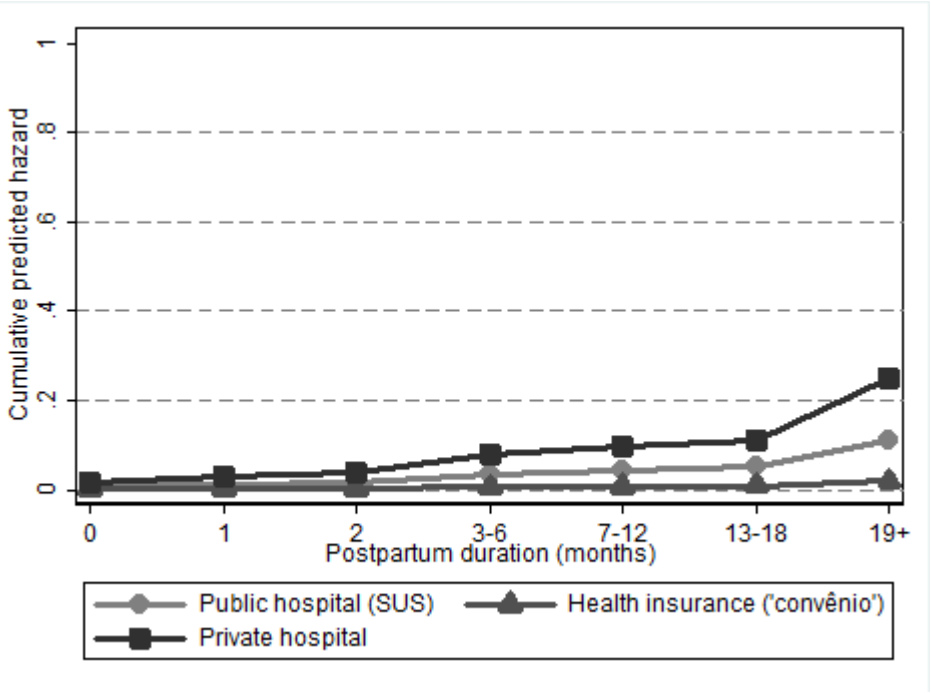
Cumulative predicted hazard of female sterilization

– New models were estimated for each subgroup of women:

Cesarean section



Vaginal delivery



Note: Hazards are for women with 25–29 years of age, parity of two children, living in the Southeast, and represent the mean across the different color/race and years of schooling categories.
Source: 2006 PNDS.

Final considerations

- There is an indication that women may not have been able to get sterilized at public hospitals, due to regulations.
- This evidence of **frustrated demand** for sterilization may be forcing women to search for this irreversible contraceptive method at private institutions.
- Women may be utilizing the private sector in order to get sterilized, following an **unnecessary cesarean delivery**.
- The high prevalence of sterilization in private institutions should be a concern for the government.
- Public policies need to take into account the health service demands of women.