The Impact of Payment Source and Hospital Type on Rising Cesarean Section Rates in Brazil, 1998 to 2008

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Motivation

- Incidence of high cesarean section (CS) rates (DATASUS, 2010):
  - Brazil (52%)
  - Public hospitals (30%)
  - Private hospitals (80%)
- Maximum level recommended by the World Health Organization: 15%.
- This study explores:
  - Whether high CS rates in Brazil continued from 1998 to 2008
  - The relationship between CS rates and hospital ownership (public or private) and payment for delivery (public or not)

Nonclinical factors & cesarean section

- CS rates vary based on nonclinical factors of women:
  - Income level
  - Education level
  - Onset of prenatal care
  - Insurance coverage
  - Hospital type
  - Payment status

Income level & cesarean section rates

- We expected a negative relationship between income and cesarean section rates.
- Lower income is correlated to poorer health, later onset of prenatal care, and less access to quality care.
- In fact, the opposite is true: as income goes up, so do cesarean section rates.

Previous regulations

- The 1997 family planning law regulated the practice of female sterilization, preventing this procedure from being performed during cesarean sections in public hospitals.
  - The incidence of sterilization performed during cesarean sections is still a common practice, especially in private hospitals.
- In 1998, the Brazilian government instituted a cap of 30% that it would reimburse on cesarean sections.
  - This regulation had the initial effect of lowering cesarean section rates, but this effect diminished over time as hospitals developed strategies for hiding their actual cesarean numbers.

Data and methods

- **Data source:** 1998 (n=4,645), 2003 (n=4,263), and 2008 (n=3,660) Brazilian household surveys (PNAD).
- **Dependent variable:** indicates whether a woman delivered by cesarean section or vaginally in the previous 12 months.
- **Independent variables:**
  - Age: 15–19, 20–24, 25–29, 30–49
  - Years of schooling: 0–3, 4–7, 8–10, 11, 12+
  - Live birth order: 1, 2, 3+
  - Region: North, Northeast, Southeast, South, Central-West
  - Type of hospital and payment for delivery
- **Logistic regression models** for each year.

Dependent variable

- What was the main type of health care treatment a woman received while she was last hospitalized in the previous 12 months?

    1. Clinical treatment
    2. Vaginal delivery
    3. Cesarean delivery
    4. Surgery
    5. Psychiatric treatment
    6. Exams

Type of hospital and payment

- The **health establishment** in which a woman was last hospitalized in the previous 12 months was:
  (1) public; (2) private; (3) do not know.
- This last hospitalization was funded using the **SUS** (free public health care system)?
- Results of the **four-category** hospital-payment variable:
  - Public hospital with SUS
  - Private hospital with SUS
  - Public hospital with private for-profit health insurance
  - Private hospital with direct out-of-pocket payment

Description of women

- Women who deliver **publicly-financed births** (SUS) in public hospitals (71% in 2008) are:
  - Younger
  - Less educated
  - Have more children than all other groups
- Women who deliver **privately-financed births** in private hospitals (24% in 2008) are:
  - The oldest (by about 3 years)
  - Most highly educated (by about 4 years)
  - Have the lowest number of children (about 0.5 fewer children)

Cesarean section percentage by age, education & live birth order

Variables	Categories	1998	2008
Age	15–19	27.5	40.4
	20–24	37.7	44.6
	25–29	45.6	55.5
	30–49	53.2	65.7
Years of schooling	0–3	25.8	35.7
	4–7	37.4	42.1
	8–10	44.3	46.4
	11	59.8	60.1
	12+	79.2	82.0
Live birth order	1	43.9	57.5
	2	47.1	53.7
	3+	34.0	42.3

Source: 1998 and 2008 Brazilian household surveys (PNAD).

Cesarean section percentage by region & hospital/payment type

Variables	Categories	1998	2008
Region	North	37.7	48.7
	Northeast	28.5	44.2
	Southeast	49.2	57.3
	South	44.1	59.8
	Central-West	54.3	57.4
Hospital / Payment	Public / SUS	31.0	41.2
	Private / SUS	40.8	56.5
	Public / Non-SUS	49.1	72.4
	Private / Non-SUS	72.9	85.0
Total		**42.0**	**52.9**

Source: 1998 and 2008 Brazilian household surveys (PNAD).

Odds ratios of getting a CS by age, education & live birth order

Variables	Categories	1998	2003	2008
Age	15–19	*ref.*	*ref.*	*ref.*
	20–24	1.5**	1.8**	1.1
	25–29	2.0**	2.4**	1.7**
	30–49	2.9**	3.2**	2.4**
Years of schooling	0–3	*ref.*	*ref.*	*ref.*
	4–7	1.4**	1.3*	1.3
	8–10	1.5**	1.6**	1.3
	11	2.0**	1.6**	1.4*
	12+	3.0**	1.9**	1.9**
Live birth order	1	1.0	1.1	1.4**
	2	*ref.*	*ref.*	*ref.*
	3+	0.6**	0.6**	0.8*

* Significant at p<0.05; ** Significant at p<0.01. Source: 1998, 2003, and 2008 Brazilian household surveys (PNAD).

Odds ratios of getting a CS by region & hospital/payment type

Variables	Categories	1998	2003	2008
Region of residence	North	1.4*	1.0	1.2
	Northeast	*ref.*	*ref.*	*ref.*
	Southeast	1.6**	1.5**	1.1
	South	1.3*	1.4**	1.3
	Central-West	2.1**	1.6**	1.2
Hospital / Payment	Public / SUS	*ref.*	*ref.*	*ref.*
	Private / SUS	1.4*	1.3	1.8*
	Public / Non-SUS	1.7**	2.3**	2.8**
	Private / Non-SUS	3.5**	4.8**	5.4**
Sample size (n)		4,645	4,263	3,660

* Significant at p<0.05; ** Significant at p<0.01. Source: 1998, 2003, and 2008 Brazilian household surveys (PNAD).

Final considerations

- Our findings suggest that **private sources of payment** exert a positive influence on cesarean rates in Brazil over and above the influence of **hospital ownership**.
- **Scheduling cesarean deliveries** minimizes professional disruptions and maximizes an obstetrician's number of private patients.
- Recent studies suggest that it is unlikely that women's **demand for surgical birth** is driving the rising rates of cesarean sections.
- Women who have privately-financed deliveries by cesarean section may be using this procedure to obtain a **surgical sterilization**.

Implications

- Public sector policies have been implemented:
  - 1997 family planning law preventing postpartum sterilization
  - 1998 law establishing a cap on cesarean rates
- However, interventions need to focus on:
  - Encouraging doctors in private hospitals to **work in teams** in order to avoid the need for scheduled cesarean births
  - Establishing a cap on reimbursements for cesarean sections by **private health insurance** companies
  - Improving access to **sterilization in public hospitals**, which will prevent unnecessary private sector cesareans