BRAZIL'S PHARMACEUTICAL PRICE-CAP REGULATION REVEALS A PRIVATE-SECTOR DISTORTION: HIGHER PRICES RELATIVE TO THE CAP COINCIDE WITH HIGHER PRIVATE VOLUMES, WHILE PUBLIC DEMAND DECLINES

HPR125

Evidence from Brazilian private health insurance and SUS procurement, 2015 – 2023.

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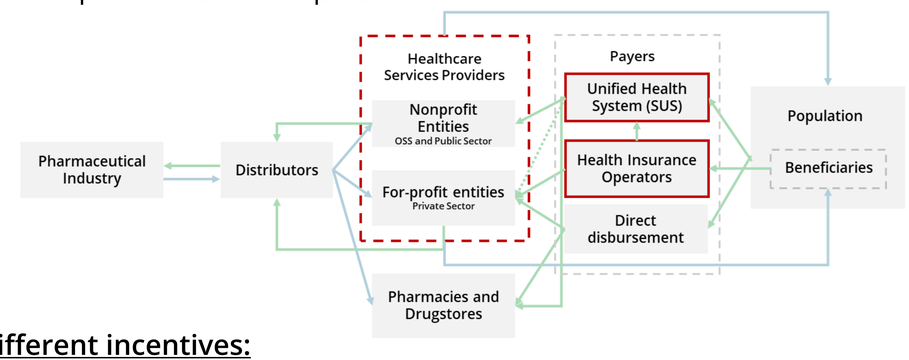
Research question

How do **sector-specific discounts** from CMED pharmaceutical price caps **affect demand responses** when private health insurances and SUS face different pricing incentives?

Context

Analysis on the **payer–provider stage**, not on the upstream transaction between manufacturers/distributors and healthcare providers: the **observed prices** represent amounts **paid** or reimbursed by **private health plan operators** or **SUS/public entities** to providers for treatments that include pharmaceutical inputs.



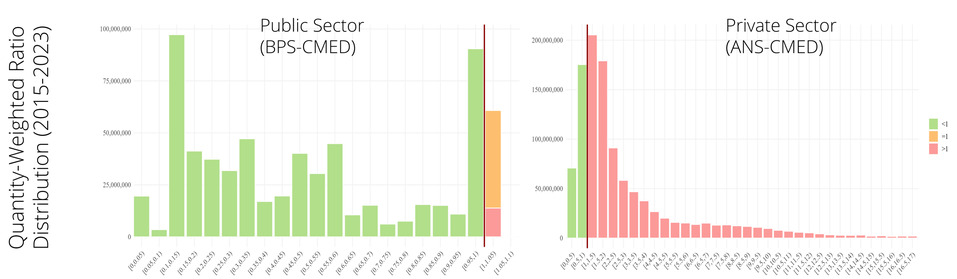
Different incentives:

Private market: providers may acquire medicines upstream and bill health plans using CMED-linked reference prices, creating scope for **margin retention**.

SUS: public buyers negotiate under procurement rules and budget constraints; TCU has considered **CMED prices unreliable as procurement benchmarks**.

Data Analysis

680 matched product records observed over 108 months (2015–2023).
Main sources: ANS/TISS, MS/BPS, and CMED pharmaceutical price-cap files.



Method

Key variables

$$D_{it} = \log\left(\frac{P_{it}^{obs}}{P_{it}^{cap}}\right) \qquad Y_{it} = \log(Q_{it})$$

The interaction $D_{it} \times S_{it}$ captures whether SUS responds differently from private health insurance.

Fixed-effects Ordinary Least Squares (FE)

$$Y_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 S_{it} + \beta_3 (D_{it} \times S_{it}) + \theta R_i + \eta L_{it} + \upsilon G_{i,t-1} + \alpha_{registry(i)} + \kappa_{price\_cathegory(i)} + \lambda_{icms(i)} + \rho_{adjustment\_validity(t)} + \varepsilon_{it},$$

Limitations: lack of a valid instrument (Sargan test rejection)
possible price–quantity simultaneity

Double Machine Learning (DML)

Inputs
Y_{it}
$D_{it} \times S_{it}$
controls X_{it}

→ **5-fold cross-fitting** →

Learners
LASSO, CART, Random Forest, XGBoost, Neural Net

→ **Residualization**
$\tilde{Y}_{it} = Y_{it} - g(X)$
$\tilde{D}_{it} = (D_{it}, D_{it} \times S_{it}) - m(X)$

→ **Final Estimation**
$\tilde{Y}_{it}$ on $\tilde{D}_{it}$

Main Results

Method	Model	Private response D_{it}	Public differential $D_{it} \times S_{it}$	Implied public response β_3 or γ
FE (p-value)	OLS	0.602*** (0.0384)	-0.645*** (0.0918)	-0.043
DML (95% CI)	Lasso	0.463*** [0.365, 0.561]	-0.618*** [−0.794, −0.441]	-0.155
	Random Forest	0.517*** [0.403, 0.631]	-0.484** [−0.782, −0.185]	0.033
	Neural Net	0.472*** [0.358, 0.585]	-1.060*** [−1.350, −0.762]	-0.588

Private providers appear to respond to **margin-based incentives**, higher deviations from cap resulted in higher quantities, while **SUS procurement** suggests **budget constrains** and **economies of scale**.

Discussion

- **Private results** suggest a **distortion**: higher prices relative to CMED caps coincide with higher volumes.
- This pattern fits **margin-based incentives in private billing**: providers may retain part of negotiated discounts instead of fully passing them to health plans.
- **SUS** results are **weaker or negative**, consistent with centralized procurement, budget limits, and negotiated prices.
- The same price-cap rule creates different responses across sectors because reimbursement and procurement incentives differ.