From Gray Income to Maternal and Infant Health Gains: The Impact of Anti-Corruption Inspections in Chinese Hospitals

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Full Paper

"Corruption is embedded in health systems but is rarely openly discussed." — Patricia J. García (2019), former Minister of Health of Peru

MOTIVATION & KEY TAKEAWAYS

MOTIVATION & CHINA CONTEXT

- Informal payments (kickbacks) are pervasive in Chinese hospitals in the 2010s
- The 2015 Large Hospital Inspection targeted gray income ecosystems under the national anti-corruption campaign

RESEARCH QUESTION

How do anti-corruption inspections in hospitals affect physician behavior, healthcare utilization, and maternal & infant health?

KEY TAKEAWAYS

Anti-Corruption Inspection → **Gray Income ↓ Providers' Strategic Responses** → **Maternal & Infant Health Gains**

- **Prenatal Care Expansion (77%)**
- **Drug-service Substitution**
- **Upgrading in Personnel**

√ Gains driven by incentive realignment, not patient selection

Policy Cost	Social Benefit	Net Surplus (Lower Bound)
RMB 207M	**RMB 229M**	**RMB 22.15M**
Increased medical expenditure	Medical savings + human capital gains	≈ USD 3.18M

Net surplus equivalent to annual public health expenditure for **20,249 citizens**

INSTITUTIONAL BACKGROUND & IDENTIFICATION

INSTITUTIONAL BACKGROUND

Pre-2009 Drug markup → hospital revenue → **2009 Reform** Markup removed → **gray income ↑** → **2015–2016** Anti-corruption inspections

DATA

- OG discharge records covering **an entire province** in central China (2015–2017)
- **100** hospitals: **15** inspected in Nov 2015, **10** inspected in Sep 2016, **75** as controls
- Granular clinical data: birth weight & neonatal diagnoses for delivery admissions.
- Identifiers for both the hospital and the attending physician, admission/discharge dates, patient demographics, itemized medical expenditures

EMPIRICAL STRATEGY

- **Staggered DiD** exploiting the rollout of anti-corruption hospital inspections

$$Y_{ht} = \beta_0 + \beta_1 D_{ht} + \mu_h + \gamma_t + \varepsilon_{ht}$$

- Y_{ht} / Y_{iht}: hospital-level outcomes (e.g., OBGYN admissions) or patient-level health outcomes (e.g., birth weight, maternal morbidity) for hospital h in month t
- D_{ht} = 1 if hospital h inspected by month t
- Control: non-inspected hospitals located in counties **w/o** any inspected hospitals
- Hospital FE (μ_h) + Year-Month FE (γ_t); SE clustered at hospital level

EMPIRICAL RESULTS

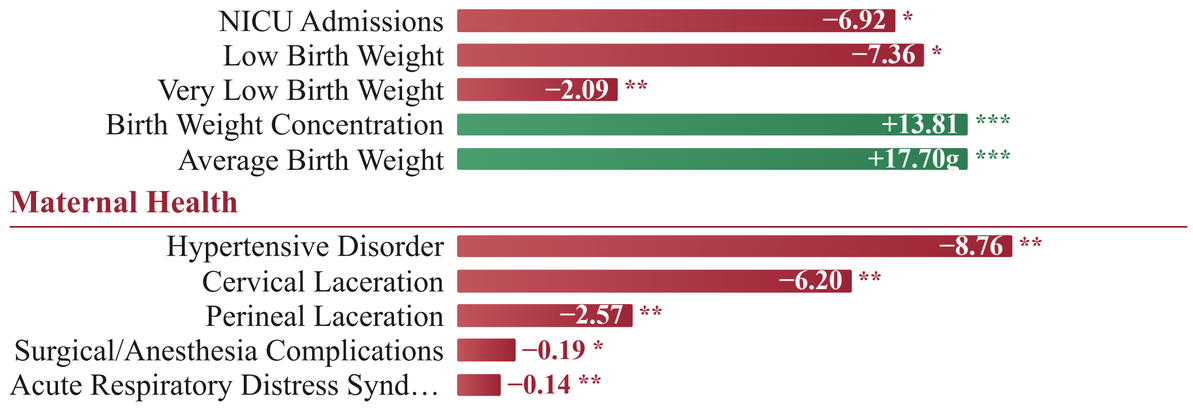
MAIN RESULTS

Panel A: Hospital-Level Outcomes (Monthly)

Outcome	Estimate	% Change
Total OBGYN Expenditure	+RMB 401,944***	▲ +18%
Prenatal Expenditure	+RMB 67,849***	▲ **+79%**
Total OBGYN Admissions	+51 cases***	▲ +15%
Prenatal Admissions	+20 patients***	▲ **+77%**
Avg. Cost per Admission	No change	—

Growth driven entirely by extensive margin (volume), not intensive margin (per-admission spending).

Panel B: Health Outcomes (per 1,000 Deliveries)



MECHANISMS

❶ High-Exposure Providers Drive Effects

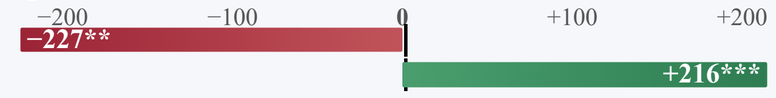
Effects concentrate in hospitals/physicians with greater pre-inspection gray income exposure.

	By Pre-inspection C-section Rate		By Physician Seniority	
	High (>40%)	Low (<40%)	Senior	Junior
★ **Birth Weight (g)**	**+25.7*** **	+2.6	**+18.6** **	+9.1
Low Birth Weight (/1k)	**−12.1***	+1.9	**−9.0***	−0.7
Hypertensive Disorder (/1k)	**−14.7** **	+0.5	**−12.3** **	+0.3

❷ Incentive Realignment: Drug ↓ Service ↑

Expenditure Substitution

Per-admission change by component (RMB)



By Drug Reduction Magnitude

Health gains in **above-median** reduction hospitals:

	Above-Med	Below-Med
★ **Birth Weight (g)**	**+21.01*** **	+9.03
Low Birth Weight (/1k)	**−8.87***	+2.06
Hypertensive Disorder (/1k)	−7.97	−3.35

❸ Physician Turnover

↑ 0.15** /mo
Physician exits post-inspection

↑ 0.12* /mo
Physician entries post-inspection

	Physician Exits	No Physician Exits
★ **Birth Weight (g)**	**+20.6*** **	+4.6
Low Birth Weight (/1k)	**−10.5** **	+5.2
Hypertensive Disorder (/1k)	**−11.3** **	−1.7

❹ Not Cherry-Picking

No selective admission of low-risk patients. Coefficients with 95% CI shown below.

ACCOUNT FOR CONCURRENT POLICIES

2016 TCP may confound results by legalizing second pregnancies. We stratify by maternal age: women **<29** are mainly first-time mothers, unaffected by TCP. **Both groups show consistent health gains.**

	Age ≥ 29	Age < 29	Zero Markup Drug Policy
ADMISSION VOLUME			
★ **Prenatal**	**+11.34** **	**+11.65*** **	**+15.69*** **
HEALTH OUTCOMES			
★ **Birth Weight (g)**	**+16.7** **	**+17.5** **	**+15.9** **
Low Birth Weight	**−8.2***	−5.9	**−6.1***
Hypertensive Disorder	**−7.7***	**−9.1***	**−7.9***