Do Physicians' Financial Incentives Affect Medical Treatment and Patient Health?

Clemens and Gottlieb

Presented by Wonjun

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- Motivation: Exogenous price shock $\Rightarrow$ Supply change

- Research question: see the title

- Contribution: technology adoption, welfare evaluation of the policy

- Physicians do respond to price shock.

- A possible theoretical explanation

- Price shock can lead to technology diffusion

- Medicare Part B: finances physician and outpatient care for most elderly Americans.

Price Shock

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- ▷ i: county, $a(i)$: area of i, j: service, t: year
- ▷ C_t: Conversion Factor (nominal, normalized to 1)
- ▷ RVU_j: Relative Value Units
- ▷ $GAF_{a(i)}$: Geographic Adjustment Factor

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- Consolidation of $a(i)$ in 1997: $210 \rightarrow 89$ districts.

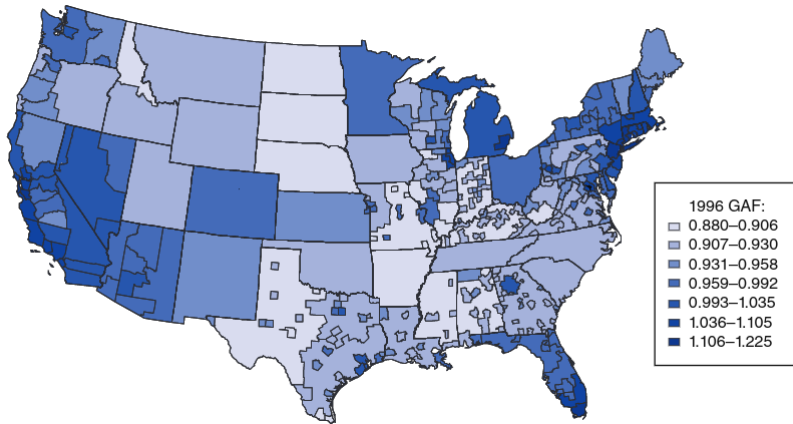# Payment Area Consolidation

Figure: GAF in 1996
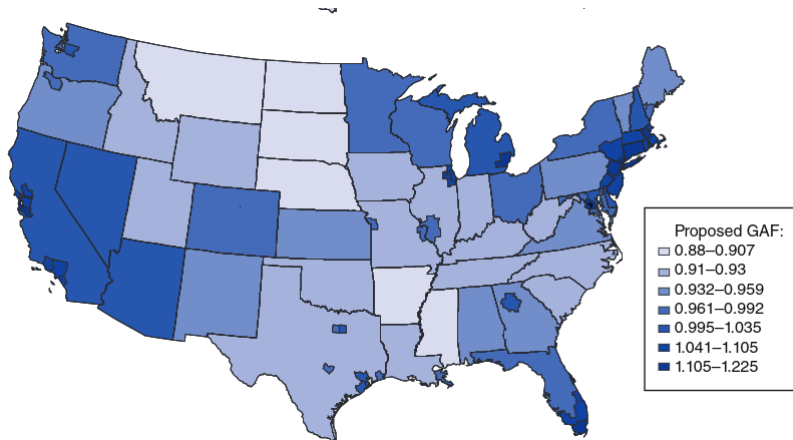
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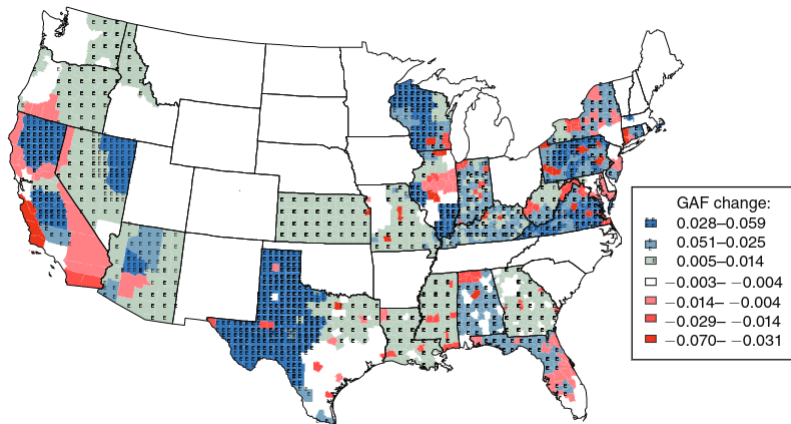

Figure: Proposed GAF

Payment Area Consolidation

Figure: Change in GAF

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I. Price shock on aggregate healthcare supply

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II. Construction of physicians' utility function

Econometric Analysis Preview

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III. Some results: tech adoption, health care practice

Data

- Claims submitted by providers to Medicare for reimbursement.
  - Health care provision
  - 5% of Medicare Part B beneficiary population, panel
- Denominator files
  - Demographic info about the beneficiary sample

- Research question

- Contribution

I. County-level Analysis

Consider an event study of the following

$$\ln\left(\#RVU_{s(i),t}\right) = \sum_{p(t)\neq 0} \beta_{p(t)} \cdot \Delta RR_i \times I_{p(t)} + \gamma_i + \delta_t + \eta_{s(i),t} + \zeta' X_{i,s(i),t} + \epsilon_{i,t}$$

- ▷ $s(i)$: state of county i, $p(t)$: period (grouped year)
- ▷ $\#RVU_{s(i),t}$: total RVUs(services) provided per patient.
- ▷ ΔRR_i: Change in reimbursement rate

I. County-level Analysis

TABLE 2—EFFECT OF REIMBURSEMENT RATES ON LOG HEALTH CARE PER PATIENT

	County level (1)	Baseline (2)	Weighted (3)	Unmatched counties (4)	w/ HMO control (5)	No demog. controls (6)	No comorb. controls (7)	Population controls (8)
				Aggregate health care supply: ln(relative value units per patient)				
Price change × short run	0.801 (0.531)	0.817 (0.596)	1.010 (0.721)	0.454 (0.554)	0.741 (0.598)	0.763 (0.596)	0.776 (0.579)	1.223** (0.653)
Price change × medium run	1.966*** (0.650)	2.012*** (0.770)	1.952** (0.825)	1.676** (0.701)	1.876** (0.762)	1.956** (0.770)	1.996*** (0.750)	2.583*** (0.827)
Price change × long run	1.423* (0.735)	1.464* (0.884)	2.686** (1.211)	1.391* (0.790)	1.405 (0.888)	1.405 (0.880)	1.423 (0.889)	2.268** (0.938)
Old MPLs	177	177	177	200	177	177	177	177
Estimation	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
Standard errors	Clustered	Bootstrap	Bootstrap	Bootstrap	Bootstrap	Bootstrap	Bootstrap	Bootstrap
Observations	28,340	2,301	2,301	2,600	2,301	2,301	2,301	2,301

Figure: "Table" of the estimation results of the event study

I. Payment area level Analysis

$$\tilde{\rho}_{a,t} = \sum_{p(t) \neq 0} \theta_{p(t)} \cdot \tilde{\delta}_{a,t}^{p(t)} + u_{a,t}$$

▷ $s(i)$: state of county i, $p(t)$: period (grouped year)
▷ $\tilde{\rho}_{a,t}$: adjusted log RVUs (partialing out controls).
▷ $\tilde{\delta}_{a,t}^{p(t)}$: adjusted reimbursement rate
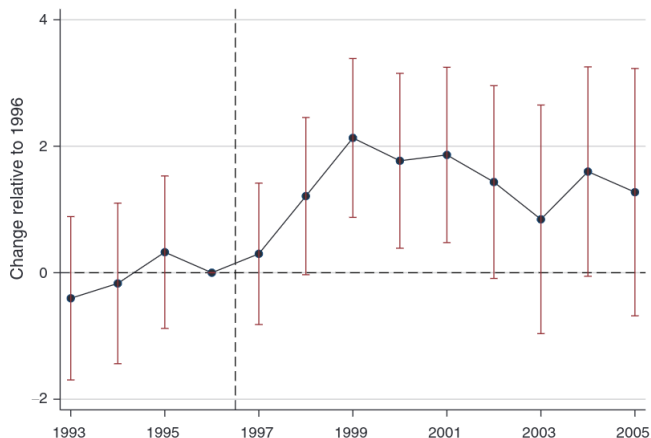
I. Payment area level Analysis

FIGURE 3. IMPACT OF PRICE CHANGE ON AGGREGATE QUANTITY SUPPLIED

Figure: Event Study of reimbursement rate change on aggregate quantity supplied

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- OK, physicians respond to the price shock
  $\Rightarrow$ greater payoff, greater supply[1]

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- Welfare implication?

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II. Medical Care Supply

- Standard practice style

$$U_S(q; \gamma_i) = (r - \bar{c})q - e(\frac{q}{\gamma_i}) + \alpha b(Q)q$$

where r: **reimburse**, q: quantity, γ_i: productivity, c: MC,
$e(\cdot)$: leisure loss, Q: agg. supply, $b(\cdot)$: marginal health benefit

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- Intense practice style (by adopting technology)

$$U_I(q; \gamma_i) = (r - \underline{c})q - k - e(\frac{q}{\gamma_i}) + \alpha b(Q)q$$

  where $\underline{c} < \bar{c}$, k: adoption cost.

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$$\frac{dQ}{dr} = \int_S \frac{dq_S^*}{dr} dF + \int_I \frac{dq_I^*}{dr} dF - [q_I^* - q_S^*] f(\gamma^*) \frac{d\gamma^*}{dr}$$

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- Welfare change

$$\frac{dW}{dr} = [b(Q) - r] \frac{dQ}{dr}$$

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- Instead, the paper presents lists of event studies to support the theoretical formulation of Part II.

$$U_i(q; \gamma_i) = (r - c_i)q - k \cdot 1_I - e(\frac{q}{\gamma_i}) + \alpha b(Q)q$$

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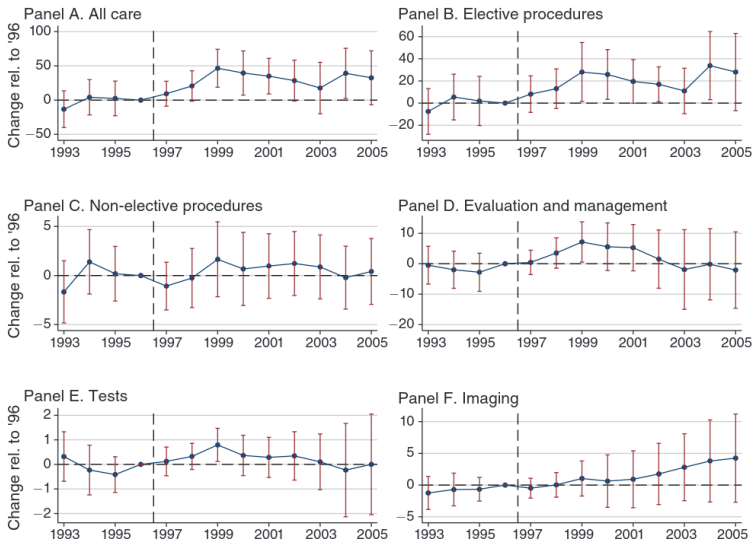$\because \alpha > 0 \Rightarrow \frac{dq}{dr} \downarrow$ if $b(Q) \approx 0 \Rightarrow \frac{dr}{dq} \approx 0$ in less discretionary service.

FIGURE 5. SUPPLY RESPONSE BY SERVICE CATEGORY

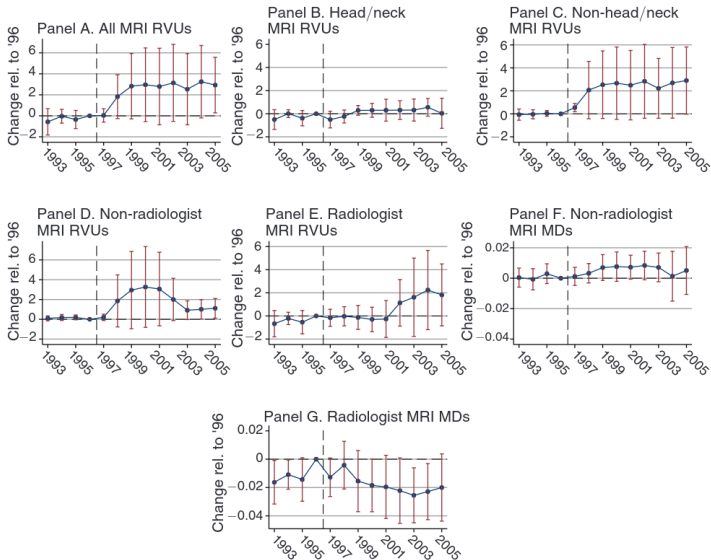- Non-radiologists began to use MRI more (adopted more) as a response to RR increase.

FIGURE 7. IMPACT OF PRICE CHANGE ON MRI PROVISION AND OWNERSHIP

III. Back pain

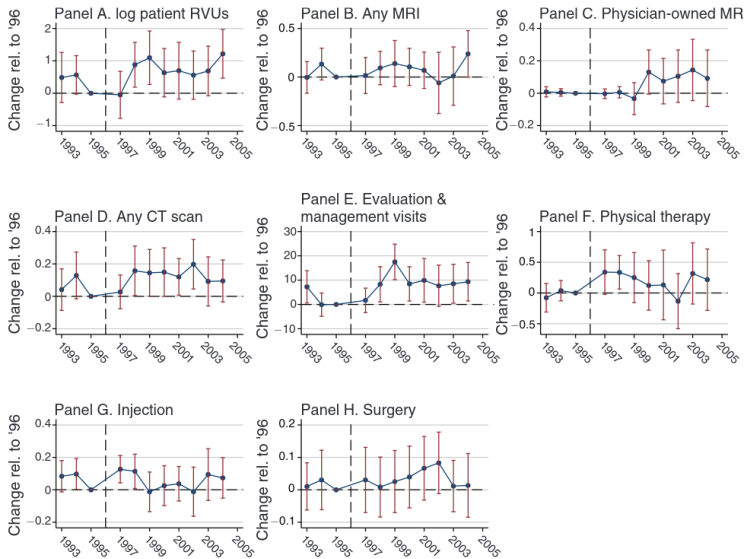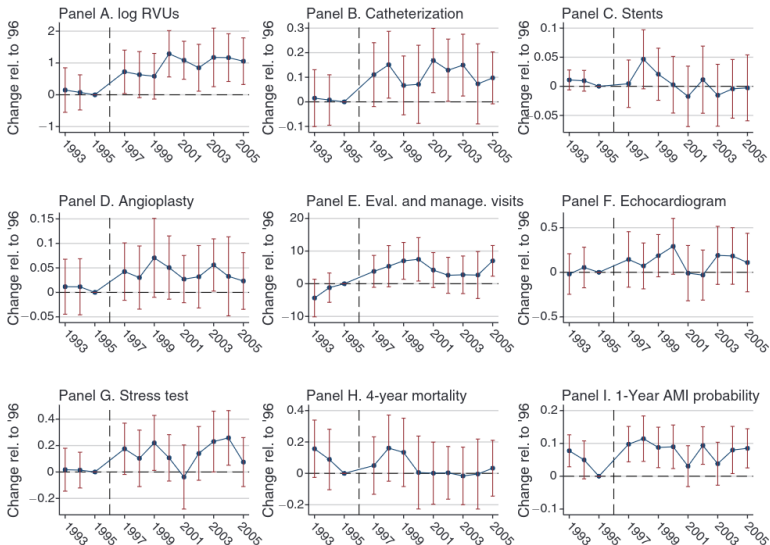FIGURE 8. IMPACT OF PRICE CHANGE ON BACK PAIN TREATMENT

III. Cardiovascular disease

FIGURE 9. IMPACT OF PRICE CHANGE ON CARDIAC PATIENT TREATMENT

Conclusion

- A 2% increase in reimbursement rate leads to a 3% percent increase in care.

- Payment policy is one of the determinants of patient access to care, the composition of care delivered, and the aggregate Medicare spending.

Clemens and Gottlieb, 2014, Do Physicians' Financial Incentives Affect Medical Treatment and Patient Health?, American Economics Review