Is physician cost-sharing an alternative to patient cost-sharing?

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Introduction

Patient cost-sharing:

- Common in many countries, including NL
- Reduces healthcare costs
- Concerns about effect on health, financial risk, and unpopularity

Physician cost-sharing:

- GP practices keep part of cost-saving if total healthcare costs of their patients fall under a predetermined benchmark
- Physicians can influence healthcare costs
- Cost-sharing incentives for physicians are common (HMOs in US, AQC in Massachusetts, ACOs in US, global payment to GPs in UK, shared-savings experiment in NL)

This study

We compare physicians' and patients' responses to cost-sharing incentives:

- Do physicians reduce other types of treatments compared to patients?
- How do overall cost reductions compare?
- Which types of patients face the strongest reductions in healthcare costs?

Approach:

- Introduction of shared-savings model to some GP practices
- Variation in cost-sharing incentives over time within a year and across groups of patients (simulated instrumental variables approach similar to Hayen et al. 2021)

Institutional background

- Managed competition in Dutch healthcare system
- Patient cost-sharing
  - Mandatory deductible (from Euro 220 in 2012 to Euro 375 in 2015)
  - Exceptions: Children under age 18, some types of care, e.g. GP care
  - Deductible is paid to health insurer, not to care provider
- Physician cost-sharing
  - GPs are gatekeepers
  - Shared-savings model introduced at 8 large GP practices in one city, as control group we use 59 other GP practices in same city or region
  - GP practices in treatment group keep share of cost-savings below a benchmark conditional on meeting quality requirements

Data

- Administrative data from large Dutch health insurer
- Balanced sample: 26,379 individuals for period 2012 until 2015
- Physician cost-sharing starts in Q3 2014 (only for treatment group)
- Sample restrictions: stay with insurer and same GP, at least 19 years old in 2012, no voluntary deductible
- Outcome variables: 1) total healthcare costs that fall under deductible (quarterly or monthly), 2) total costs for pharmaceuticals and hospital care, 3) hospital costs by priority level (as determined by Dutch Healthcare authority in April 2020)
- Covariates include: Riskscore deciles, predicted probability at beginning of year to exceed deductible by end of year

Empirical approach (physician cost-sharing)

- Combine two-part model with difference-in differences estimation approach
- Two-part model deals with distribution of healthcare costs (many zeros and very long right tail)
- Difference-in-differences allows for differences between treatment and control group

$$y_{it}^{j} = d_{it}\beta^{j} + \gamma_{r(i)t}^{j} + \alpha_{i}^{j} + \mathrm{u}_{it}^{j}$$

- y_{it}^{j} measure of healthcare costs of individual *i* in period *t*.
- $j \in \{ext, int\}$ refers to separate equations for extensive and intensive margin
- d_{it} binary indicator for treatment (physician cost-sharing)
- $\gamma_{r(i)t}^{j}$ risk-score decile specific time effects
- α_{i}^{j} individual fixed-effects

Empirical approach (physician cost-sharing)

- **Effect on total costs:**

$$E[y_{it}^{total}] = E[\hat{y}_{it}^{ext}] \cdot E[\hat{y}_{it}^{int}] \cdot \hat{\phi}$$

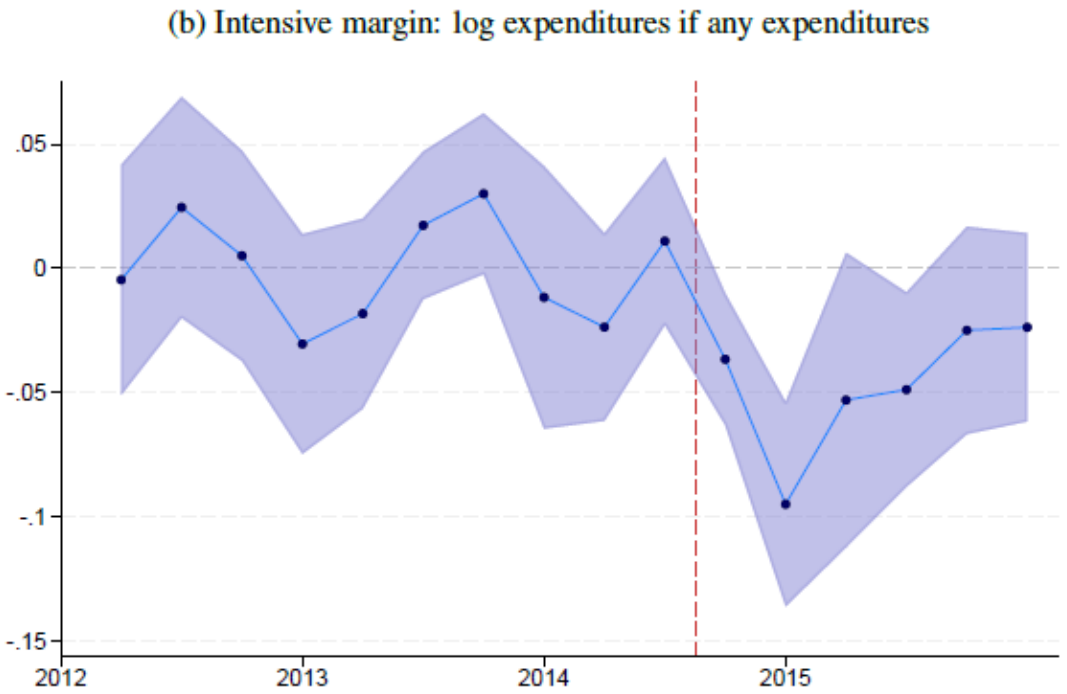
where $\hat{\phi} = \sum \exp(\hat{u}_{it}^{int})/N_{int}$

- Counterfactuals $E[y_{it}^{total,1}]$ and $E[y_{it}^{total,0}]$
- Relative effect: $(E[y_{it}^{total,1}] - E[y_{it}^{total,0}])/ E[y_{it}^{total,0}]$

Main results (physician cost-sharing)

	Obs. if positive Obs. total	Extensive margin (1)	Intensive margin (2)	Total change (3)	Relative change (4)
Total	280074 422064	0.002 [0.486]	-0.047 [0.000]	-29.042 [0.008]	-0.043 [0.008]
Hospital	161250 422064	-0.015 [0.000]	-0.019 [0.256]	-21.033 [0.012]	-0.056 [0.011]
Pharmaceutical	253438 422064	0.005 [0.076]	-0.009 [0.431]	-0.090 [0.921]	-0.001 [0.921]
Priority same day	8518 422064	-0.000 [0.985]	0.032 [0.703]	3.885 [0.916]	0.032 [0.812]
Priority 1 month	31122 422064	0.001 [0.652]	0.000 [0.996]	1.709 [0.798]	0.015 [0.796]
Priority 2 to 6 months	65741 422064	-0.004 [0.152]	-0.051 [0.001]	-10.981 [0.017]	-0.071 [0.016]

Event study results (physician cost-sharing)



Heterogeneous effects (physician cost-sharing)

	Obs. if positive Obs. Total	Extensive margin (1)	Intensive margin (2)	Total change (3)	Relative change (4)
Age 20-45	61647 131296	0.004 [0.477]	-0.057 [0.017]	-21.423 [0.217]	-0.047 [0.223]
Age 45+	218427 290768	0.002 [0.442]	-0.044 [0.005]	-31.178 [0.033]	-0.040 [0.031]
High income	69896 112716	-0.004 [0.490]	-0.030 [0.215]	-20.614 [0.227]	-0.035 [0.225]
Low income	104542 147748	0.000 [0.945]	-0.059 [0.003]	-44.831 [0.010]	-0.056 [0.008]
High riskscore	183751 211024	0.002 [0.605]	-0.050 [0.005]	-49.170 [0.011]	-0.047 [0.010]
Low riskscore	96323 211040	0.002 [0.711]	-0.039 [0.113]	-8.373 [0.310]	-0.035 [0.306]

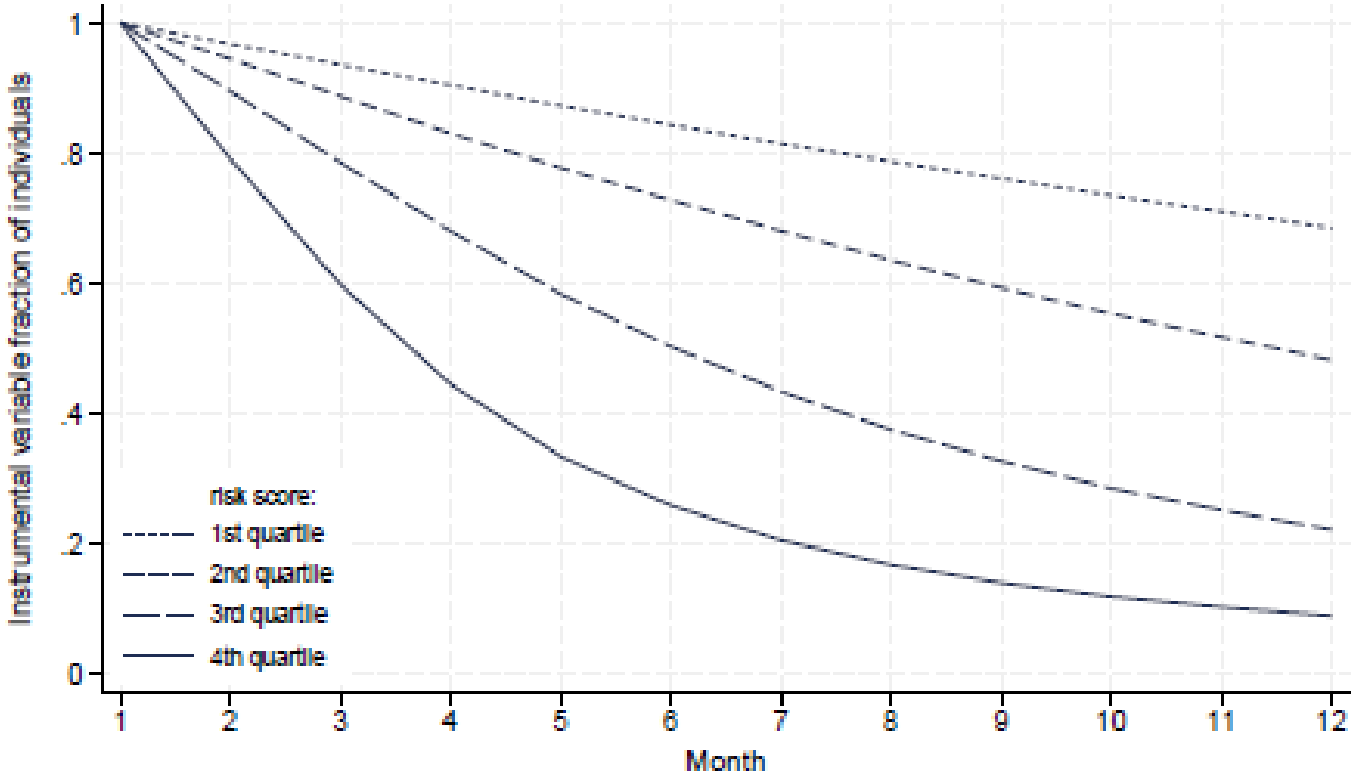
Empirical approach (patient cost-sharing)

- Combine two-part model with simulated instrumental variable approach
- Treatment variable p_{it}: indicator if individual *i* has exceeded annual deductible at beginning of period (month) *t*
- Outcome equation:

$$y_{it}^{j} = p_{it}\beta^{j} + x_{it}\lambda^{j} + \varepsilon_{it}^{j}$$

- y_{it}^{j} measure of healthcare costs of individual *i* in period *t*.
- $j \in \{ext, int\}$ refers to separate equations for extensive and intensive margin
- x_{it} includes riskscore deciles, predicted probability to exceed deductible limit by end of year, 5 year age categories interacted with gender, log of healthcare costs in previous three months, year indicators, and month indicators
- p_{it} is endogenous

Simulated instrument by riskscore quartile



Main results (patient cost-sharing)

	Obs. if positive Obs. total	Extensive margin (1)	Intensive margin (2)	Total change (3)	Relative change (4)
Total	567703 1266192	-0.059 [0.000]	-0.230 [0.000]	-68.697 [0.000]	-0.278 [0.000]
Hospital	232887 1266192	-0.038 [0.000]	-0.114 [0.009]	-35.938 [0.000]	-0.256 [0.000]
Pharmaceutical	468029 1266192	-0.068 [0.000]	-0.233 [0.052]	-9.191 [0.000]	-0.308 [0.000]
Priority same day	9476 1266192	-0.003 [0.010]	-0.132 [0.493]	-10.144 [0.049]	-0.369 [0.018]
Priority 1 month or less	35585 1266192	-0.012 [0.000]	0.054 [0.564]	-11.038 [0.003]	-0.263 [0.001]
Priority 2 to 6 months	76599 1266192	-0.019 [0.000]	0.020 [0.711]	-14.426 [0.000]	-0.235 [0.000]

Effect on annual level (patient cost-sharing)

	Observed mean (1)	Counterfactual mean (2)	Total change (3)	Relative change (4)
Total costs	2570.47	2869.61	-299.14	-0.104
Hospital costs	1465.12	1633.79	-168.66	-0.103
Pharmaceutical costs	288.60	325.86	-37.26	-0.114
Priority same day	294.17	325.95	-31.78	-0.097
Priority 1 month or less	495.59	542.88	-47.29	-0.087
Priority 2 to 6 months	563.43	632.62	-69.19	-0.109

Heterogeneous effects (patient cost-sharing)

	Obs. if positive Obs. total	Extensive margin (1)	Intensive margin (2)	Total change (3)	Relative change (4)
Age 20-45	101484 613920	-0.041 [0.000]	0.032 [0.647]	-10.535 [0.275]	-0.079 [0.245]
Age 45+	466219 878640	-0.051 [0.000]	-0.173 [0.000]	-63.487 [0.000]	-0.217 [0.000]
High income	135251 341148	-0.073 [0.000]	-0.129 [0.029]	-44.650 [0.000]	-0.229 [0.000]
Low income	218171 435348	-0.052 [0.000]	-0.254 [0.000]	-84.418 [0.000]	-0.282 [0.000]
High risk	364065 515832	-0.061 [0.005]	-0.196 [0.013]	-103.572 [0.000]	-0.239 [0.000]
Low risk	203638 750360	-0.103 [0.000]	0.062 [0.397]	-24.742 [0.001]	-0.212 [0.000]

Conclusions

How do physicians' responses to cost-sharing incentives compare to patients responses to cost-sharing incentives?

- Physicians' response is more targeted. Physicians cut mostly on hospital care, especially low priority hospital care
- Patients cut across the board
- Physicians cut at intensive margin, patients also at extensive margin
- Patients respond much stronger to cost-sharing incentives
- Little evidence for heterogeneous effects. Both patients and physicians reduce costs more for persons in lower income neighborhoods and for higher risk scores.