Optimality of no-fault medical liability systems

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Outline

- Introduction & brief literature
- Demand side cost sharing
  - third party vs. no fault – no fault optimal
  - partial liability – no fault optimal
  - elastic demand for health care
    - no fault optimal if there are enough instruments
    - if not, no fault optimal if demand not too elastic
- Suppy side cost sharing
- Conclusion

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  - Counties with higher malpractice liability pressure have higher cesarean rates (Dubay et al, 1999)
  - Spend more on treating heart disease patients with no effect on outcomes (Kessler and McClellan, 1996)

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- In general, this would lead to too little “defensive medicine”
- Doctors will order too few tests etc.
- New Zealand and Sweden are happy with their systems with no intention to reform whereas US has pressure for malpractice reform

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- Show that under some conditions no fault liability is optimal
- Insurance is a better instrument than liability

Literature

- Danzon (1985): effect of health insurance on doctor's choice of tests versus effort in reducing accidents

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- No paper considers the problem of *joint optimality* of liability regime and insurance

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2. In regime *III* the doctor pays the patient

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6. Patient pays $h\theta$ for h and θd for defensive medicine.
7. A treatment related accident occurs with probability $p[d]$ and the Government (doctor) pays the patient L in the $\emptyset$ (III) regime.

The Model: Consumer's utility

- ex-ante utility

$$\Psi_i = (1 - \pi) V [W - R_i] + \pi U_i^p$$

- where $i \in \{\phi, III\}$

Ex post utility

$$U^p = V\left[W - H - R + (1-\theta)\,h - \theta d\right] \\ - p\left[d\right](z + L),$$

- $V[.]$ - utility function
- $W - H$ - income after the health loss
- h - curative care; health improvement
- d - preventive care ("defensive medicine")
- θ - copayment ratio
- R - the tax rate
- $p[d]$ - probability of a treatment related accident effect ($p' < 0$, $p\left(\overline{d}\right) = \underline{p}$, $p(0) = \overline{p}$)
- z - uninsurable loss
- L - insurable loss

Preferences: Doctor

- Cares about the patient's health and out of pocket costs as well as his own income

$$\begin{aligned} U^d_{III} &= Y_{III} - E - p[d]L + \\ &\quad \beta\left(V\left[W - H + (1-\theta)h - \theta d\right] - p[d]z\right) \end{aligned}$$

$$\begin{aligned} U^d_{\emptyset} &= Y_{\emptyset} - E + \\ &\quad \beta\left(V\left[W - H + (1-\theta)h - \theta d\right] - p[d]z\right) \end{aligned}$$

assume $0 < \beta < 1$

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- $Y_\emptyset < Y_{III}$

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- Since doctor's utility is fixed at $\overline{U}^{d}$, maximising welfare is equivalent to maximising Ψ
- NHI's budget constraint:

$$R_{III} = \pi\left(\left(1-\theta\right)\left(h+d\right)+Y_{III}\right)$$

and

$$R_{\emptyset} = \pi\left(\left(1-\theta\right)\left(h+d\right)+p\left[d\right]L+Y_{\emptyset}\right).$$

Demand for defensive medicine

- $d[\theta]$ is the doctor's optimal d in response to a patient facing θ
- Depends on the regime

$$d_{III}[\theta] = \arg\max_d -p[d]L + \beta\widetilde{U}^p$$

$$d_{\emptyset}[\theta] = \arg\max_d \beta\widetilde{U}^p \tag{1}$$

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- This increased Y is paid for through higher R
- In both regimes taxpayer eventually pays for L (either through higher Y or directly).
- *Therefore, only difference is that regime III yields higher d for a given θ.*

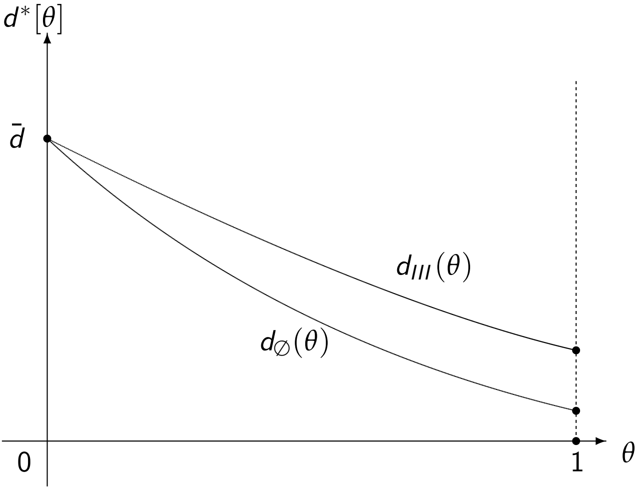

Figure: Best Response $d(\theta)$

Optimality of no-fault

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- Consider a third-party liability system and the optimal $\widetilde{\theta}$ which maximises welfare and implements some $\widetilde{d}$
- There exists a $\theta^* < \widetilde{\theta}$ which implements $\widetilde{d}$ under no-fault

Ex post utility

Compare ex post utility under regimes *III with* $\emptyset$

$$U^p_{III} = V\left[W - H + h - \widetilde{\theta}\left(h + \widetilde{d}\right) - R_{III}\right] - p\left[\widetilde{d}\right] z$$

$$U^p_{\emptyset} = V\left[W - H + h - \theta^*\left(h + \widetilde{d}\right) - R_{\emptyset}\right] - p\left[\widetilde{d}\right] z$$

Regime $\emptyset$ *provides more insurance since consumer gets* $\left(\widetilde{\theta} - \theta^*\right)\left(h + \widetilde{d}\right)$ *more in the event of falling ill*

Tax rates

Compare taxes under regimes *III with* $\emptyset$

$$\begin{aligned} R_{III} &= \pi\left(1-\widetilde{\theta}\right)\left(h+\widetilde{d}\right)+\pi Y_{III} \\ &= \pi\left(1-\widetilde{\theta}\right)\left(h+\widetilde{d}\right)+\pi\overline{U}^{d}+\pi E+\pi p\left(\widetilde{d}\right)L \\ &\quad -\pi\beta\left(V\left[W-H+\left(1-\widetilde{\theta}\right)h-\widetilde{\theta}\widetilde{d}\right]-p\left[\widetilde{d}\right]z\right) \end{aligned}$$

$$\begin{aligned} R_{\emptyset} &= \pi\left(1-\theta^{*}\right)\left(h+\widetilde{d}\right)+\pi p\left[\widetilde{d}\right]L+\pi Y_{\emptyset} \\ &= \pi\left(1-\theta^{*}\right)\left(h+\widetilde{d}\right)+\pi p\left[\widetilde{d}\right]L+\pi\overline{U}^{d}+\pi E \\ &\quad -\pi\beta\left(V\left[W-H+\left(1-\theta^{*}\right)h-\theta^{*}\widetilde{d}\right]-p\left[\widetilde{d}\right]z\right) \end{aligned}$$

$$R_{\emptyset} - R_{III} = \pi\left(\widetilde{\theta} - \theta^*\right)\left(h + \widetilde{d}\right) - \pi\varepsilon$$

where

$$\varepsilon = \beta\left(V\left[W - H + (1-\theta^*)\,h - \theta^*\widetilde{d}\right] - V\left[W - H + \left(1-\widetilde{\theta}\right)h - \widetilde{\theta}\widetilde{d}\right]\right)$$

Regime III costs more since consumer has to pay $\pi\left(\widetilde{\theta} - \theta^*\right)\left(h + \widetilde{d}\right) - \varepsilon$ *more*

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- But, only has to pay $\left(\widetilde{\theta}_{III} - \widetilde{\theta}_{\emptyset}\right)\left(h + \widetilde{d}\right) - \pi\varepsilon$
- Therefore, welfare is higher under regime $\emptyset$ than under III

General liability regime

- timing of the game is identical to that above but this time at stage 1, the NHI *chooses* α (and θ).

Theorem

A no-fault system $(\alpha = 0)$ *is optimal.*

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- doctor pays $\alpha\ L$ and NHI pays $(1-\alpha)\,L$ in the event of an accident
- $\alpha = 0$ corresponds to the no-fault regime
- $\alpha = 1$: third party

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- Suppose there is moral hazard effects on h and d
- Lower θ leads to higher h and d
- then is it always optimal to have $\alpha = 0$?
- depends on the elasticity of demand for h
- However, if the social planner can set different copayment ratio for h and d, $\alpha = 0$ is still optimal

Optimal Defensive Medicine

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- d^1 (the first best level) is where

$$-p'[d](L+z) = V'[W-H-d]$$

Patient Uninsured, Doctor Fully Liable

- $\theta = 1$, and $\alpha = 1$. In this case the doctor's choice of d satisfies

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- For $\beta = 1$, $d = d^1$. For $\beta < 1$, the choice of d

$$\frac{-p'[d](L + \beta z)}{\beta} = V'[W - H - d]$$

and since

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- *There is too much preventive medicine, since the doctor over-weights his own liability compared to the cost faced by the patient.*

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and we have $d < d^1$.

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- *There is too little preventive medicine, since the doctor ignores the accident loss L.*

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- *There is too much preventive medicine, since the patients face no costs.*

Summary

	$\alpha = 0$	$\alpha = 1$
$\theta = 0$	$d = \bar{d} > d^1$	$d = \bar{d} > d^1$
$\theta = 1$	$d < d^1$	$d > d^1$

Table: Summary of optimal d versus the doctor's choice.

Supply-Side Cost Sharing

- Suppose patient is fully insured but doctor faces supply-side cost sharing

$$U^d = Y - E - p\left[d\right]\alpha L - cd + \beta \widetilde{U}^p.$$

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- In this case, both c and α are policy instruments for the NHI to implement d
- We show that since doctor is risk neutral – α and c are substitutes
- Confirms Kesller and McLellan (2002)'s view: Managed care which imposed supply side cost sharing for tests had the same effect as malpractice reform in lowering defensive medicine.

Conclusion

- There are off-setting effects between liability regime and insurance regime
- Optimal liability regime has to take into account the effect on θ
- Third partly liability makes it harder to provide more insurance
- If there are enough instruments or if the moral hazard problem on curative care is not too serious, no fault systems are optimal