Insurance and Imperfect Competition in LTC market

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Introduction

- Market for insurable services is not always competitive i.e. prices may react to the type of insurance coverage.
- Regarding LTC, some prices are regulated (nursing,...), negotiated, some others are not (accommodation...).
- Evidence of lack of competition between nursing homes in US (Grabowski, 2011) or France (see Martin, 2014):
  - barriers to entry.
  - concentration.
  - local monopoly ("cluster competition").

- Literature on insurance treats the price of the insurable good as fixed.
- Canonical model: Optimal level of insurance with ex-post moral hazard and **fixed** price: Zeckhauser (1970).
  - Individuals differ ex-post in their level of severity of illness.
  - The insurer fixes a premium and a linear coinsurance rate on medical goods maximizing the expected utility function.
  - Trade-off between risk sharing and efficiency due to ex-post MH.

- With endogenous price, any increase in reimbursement rate on one good may be followed by a change in the price.
- Not internalized by competitive insurers.
- Extreme example (Chiu, 1997):
  - Take an inelastic supply for one good: any increase in reimbursement rate is totally offset by an increase of the price.
  - The risk may not be insurable: the insuree is better off without insurance.
  - More generally, inefficient level of insurance.
- Generalized by Vaithianathan (2006) with elastic supply curves.

- The aim of this paper: study the outcome of a game where:
  - insurers and LTC providers compete (Nash equilibrium).
  - Insurers choose a premium and a reimbursement schedule for given level of LTC providers prices.
  - Provider (monopolist) chooses a price for given level of premium and reimbursement levels.
- Compare the outcome of 2 games:
  - Game A: the insurer chooses a coinsurance policy (ad valorem copayment).
  - Game S: the insurer chooses a copayment policy (specific copayment)

- Consider that an individual has an insurance package. Per quantity q, he pays a price $\tilde{P}$.
- The producer price is P.
- Consumer prices depend on the reimbursement type: ad valorem or per-unit.
- Ad valorem:
$$\tilde{P} = tP$$
where $t < 1$ (traditional coinsurance).
- Per unit:
$$\tilde{P} = P - c$$
where c is a "flat" reimbursement per quantity (e.g. see exogenous reference pricing mechanism).

- Related to previous work see Cremer, Bardey and Lozachmeur (2016, JPubE). A public insurer uses the two instruments and restores second best efficiency.
- Main difference is that insurers cannot commit to their insurance policy (Nash game versus Stackelberg game).
- Result:
  - copayment policy is generally welfare superior (leads to lower producer price)
  - copayment policy reduces the scope of inefficient provision of insurance.

The model

- Individuals differ ex-post: LTC needs $\theta \in \Theta$ with cdf $G(\theta)$ and pdf $g(\theta)$.
- VNM utility function: $u_\theta \equiv u(x + h(q, \theta))$
  - x : numeraire good (price =1).
  - q: LTC service (consumer price = $\tilde{P}$)
  - $u_x, h_q > 0$ and $u_\theta < 0$.....

- Regime A : $\tilde{P}^A = tP$.
- Regime S : $\tilde{P}^S = P - c$.
- $x = w - \pi - \tilde{P}q$.
  - w: exogenous income.
  - π: premium paid to the insurer.

Timing

1. In Stage 1, the regulator decides which regime A or S insurers have to adopt.
2. In Stage 2, insurers simultaneously choose the contract they offer and which is bought by consumers, while the producer sets the price P.
3. In Stage 3, the state of health is realized for each individual who choose the consumption of the LTC q given the consumer price implied the insurance contract bought in Stage 1.

Stage 3: individuals' *ex post* problem

- Once the state of nature θ is revealed policyholders choose their consumption of q to solve

$$\max_{q} w - \pi - \tilde{P}q + h(q, \theta)$$

which defines the standard Marshallian demand in state θ, $q^*_\theta \equiv q^*_\theta \left(\tilde{P}\right)$ a decreasing function.

- We denote by $\left|\varepsilon\left(\tilde{P}\right)\right|$ the elasticity of the demand.

- Indirect utility in state θ:

$$u(y^*_\theta) = u\left(w - \pi - \tilde{P}q^*_\theta + h(q^*_\theta, \theta)\right)$$

- y^*_θ is decreasing in θ.

Stage 2: The insurer's problem

- The statement of the insurer's problem is valid in both regimes A and S:

  $$\tilde{P}(P) = \arg\max_{\tilde{P}} E_\theta u_\theta = \int_\theta u(w - \left(P - \tilde{P}\right) E_\theta q_\theta^* - \tilde{P} q_\theta^* + h(q_\theta^*, \theta)) dG(\theta)$$

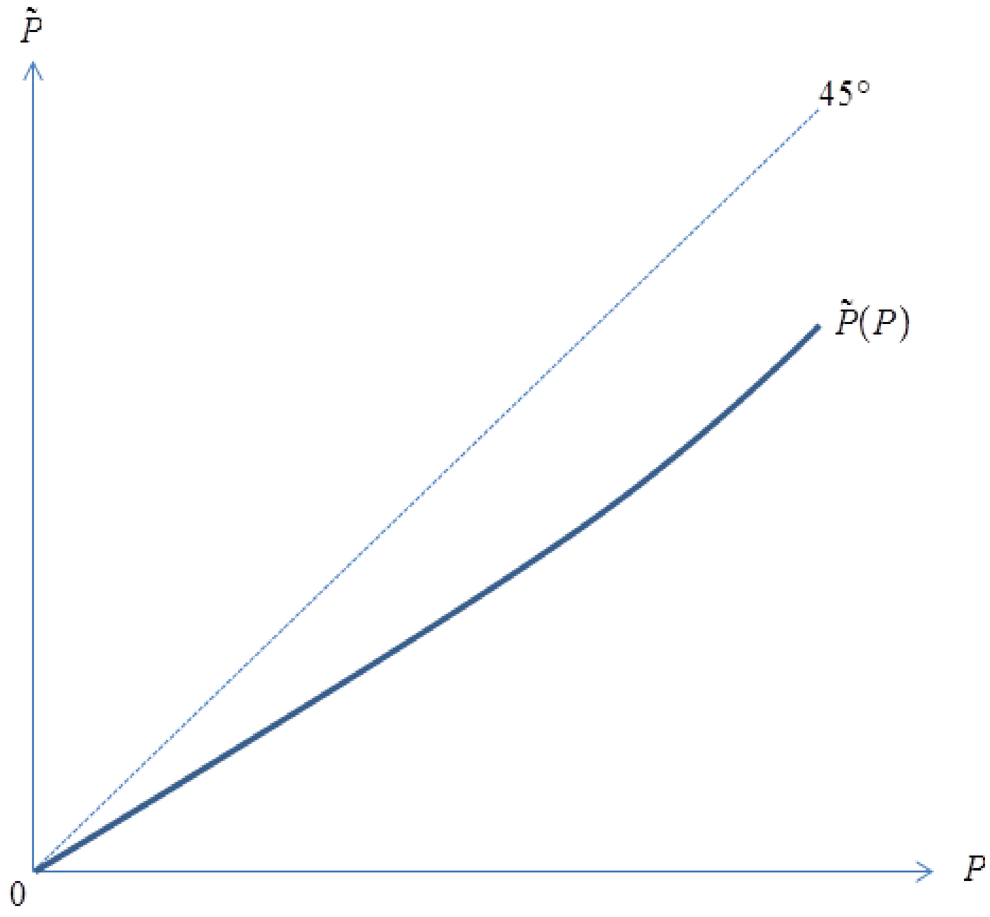
- This yields the (pseudo) best-response function $\tilde{P}(P)$ implicitly defined by:

  $$\frac{\left(P - \tilde{P}\right)}{\tilde{P}} = \frac{1}{\left|\varepsilon\left(\tilde{P}\right)\right|} \frac{\operatorname{cov}\left(q_\theta^*, u'\left(y_\theta^*\right)\right)}{E_\theta q_\theta^* E_\theta u'\left(y_\theta^*\right)}.$$

- We have $\tilde{P}(P) < P$ for any P.

- $\tilde{P}(P)$ is increasing if u is CARA or IARA (related to income effect of the premium).

- **Important thing**: welfare is decreasing in P (envelope argument).



The pseudo-reaction function of the insurer with CARA or IARA utility function

Stage 2 (continued) The Monopolist problem

- Construction of pseudo-reaction function of the monopolist.
- In regime A:

$$P^{*A}(t) \equiv \left\{ \begin{array}{c} \arg\max_P \ \ \Pi = (P-k)\,Q^* - F, \\ \text{s.t.} \quad Q^* = E_\theta q_\theta^*(tP) \end{array} \right\}$$

- In regime S:

$$P^{*S}(c) \equiv \left\{ \begin{array}{c} \arg\max_P \ \ \Pi = (P-k)\,Q^* - F, \\ \text{s.t.} \quad Q^* = E_\theta q_\theta^*(P-c) \end{array} \right\}$$

- As opposed to regime S, any price increase in regime A reduces demand Q^* by an amount that is proportional to the coinsurance rate

$$\frac{\partial Q^{*A}}{\partial P^A} = t\frac{\partial Q^*\left(\tilde{P}\right)}{\partial \tilde{P}}$$
$$\frac{\partial Q^{*S}}{\partial P^S} = \frac{\partial Q^*\left(\tilde{P}\right)}{\partial \tilde{P}}$$

$\Rightarrow$This amount is lower the higher the reimbursement rate.

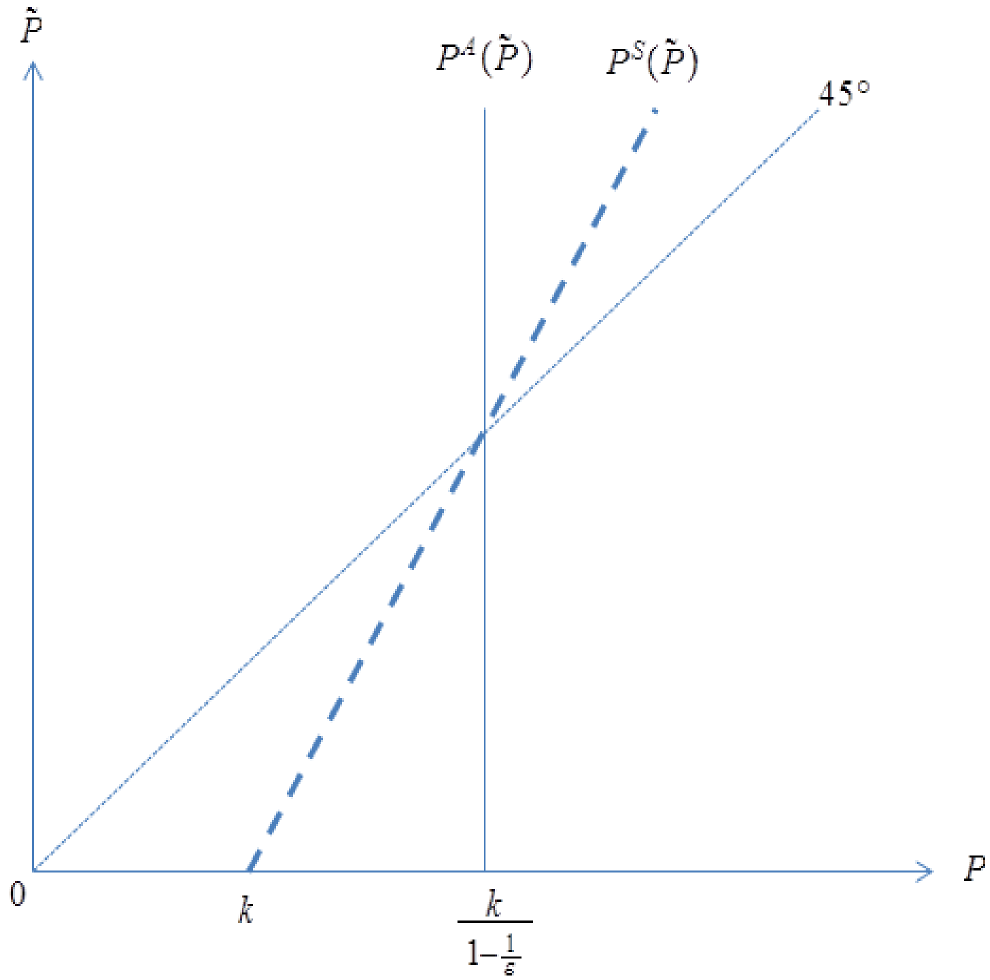
- For any given consumer price $\tilde{P} = tP = P - c$ associated with $t < 1$ or $c > 0$ we have:

$$P^A(\widetilde{P}) > P^S(\widetilde{P})$$

- Illustration: isolelastic demand curves

$$\begin{aligned} P^A\left(\tilde{P}\right) &= \frac{k}{1 - \frac{1}{|\varepsilon|}} \\ P^S\left(\tilde{P}\right) &= k + \frac{\tilde{P}}{|\varepsilon|} \end{aligned}$$

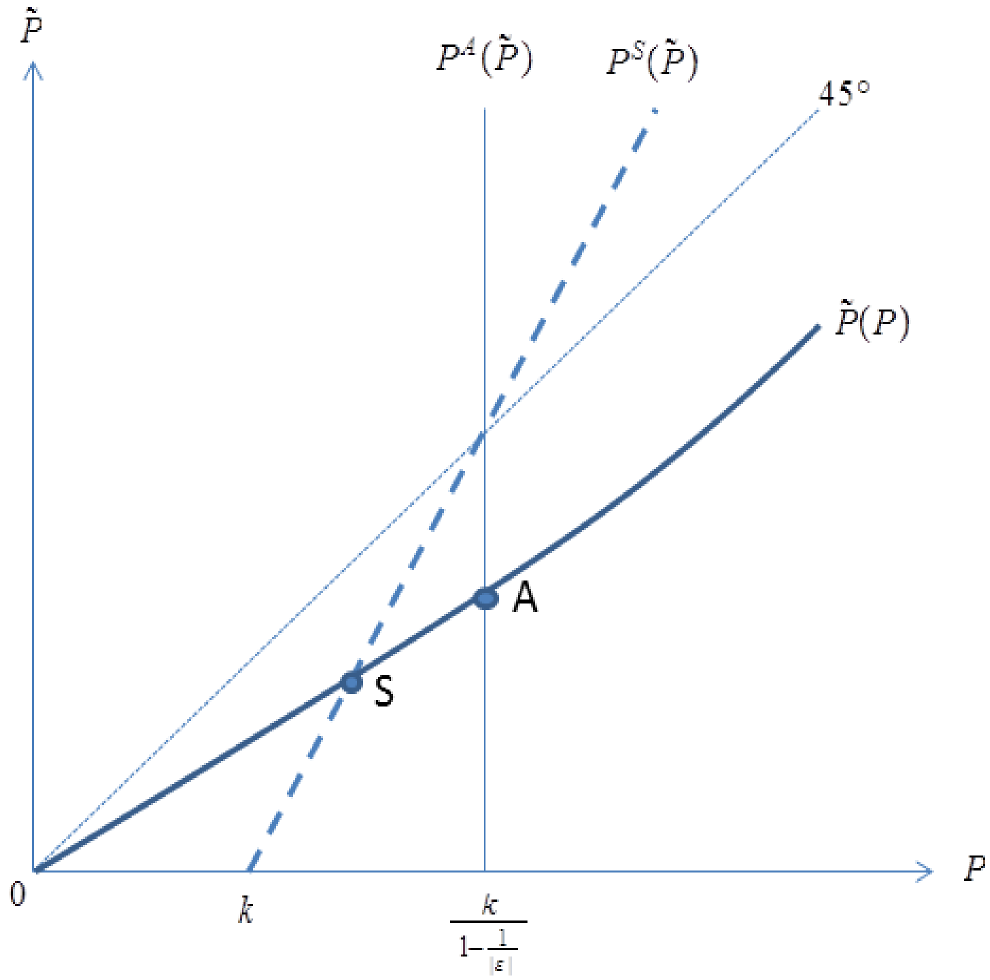
$\Rightarrow P^A\left(P\right) = P^S\left(P\right)$ i.e. prices are equal without insurance, P^A is fixed and P^S is increasing.



The pseudo-reaction function of the monopolist with isoelastic demand functions.

Stage 2: Nash equilibrium

- Under fairly general conditions, there exists a unique Nash equilibrium with $P^{A*} > P^{S*}$.
- Since welfare is decreasing in producer price, higher welfare under co-payment policy.



The Nash equilibrium with isoelastic demand and CARA and IARA utility function

Comments...

1. The equilibrium with copayment welfare dominates the equilibrium with coinsurance.
2. Holds in other settings with imperfect competition (ex: Cournot, Bertrand): Equivalent regimes as one tends to perfect competition.
3. Efficiency:
   (a) Still inefficient levels of reimbursements in both regimes (too high).
   (b) But more efficient with copayment!
   (c) Situations where the risk is uninsurable with coinsurance while it is under copayment.
4. Argument does not work if price is fixed by regulation...

(a) But the price is not fixed by chance...

(b) Result of a bargaining process involving the profits of suppliers.

(c) The resulted negotiated price still depends on the reimbursement schedule.

(d) Argument goes through with bilateral price negociation between insurer and supplier.

5. Other way to solve the problem of inefficient provision of insurance is vertical integration?