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The effect of insurance on pricing strategies and fraud in markets for repair goods

ASSA Annual meeting

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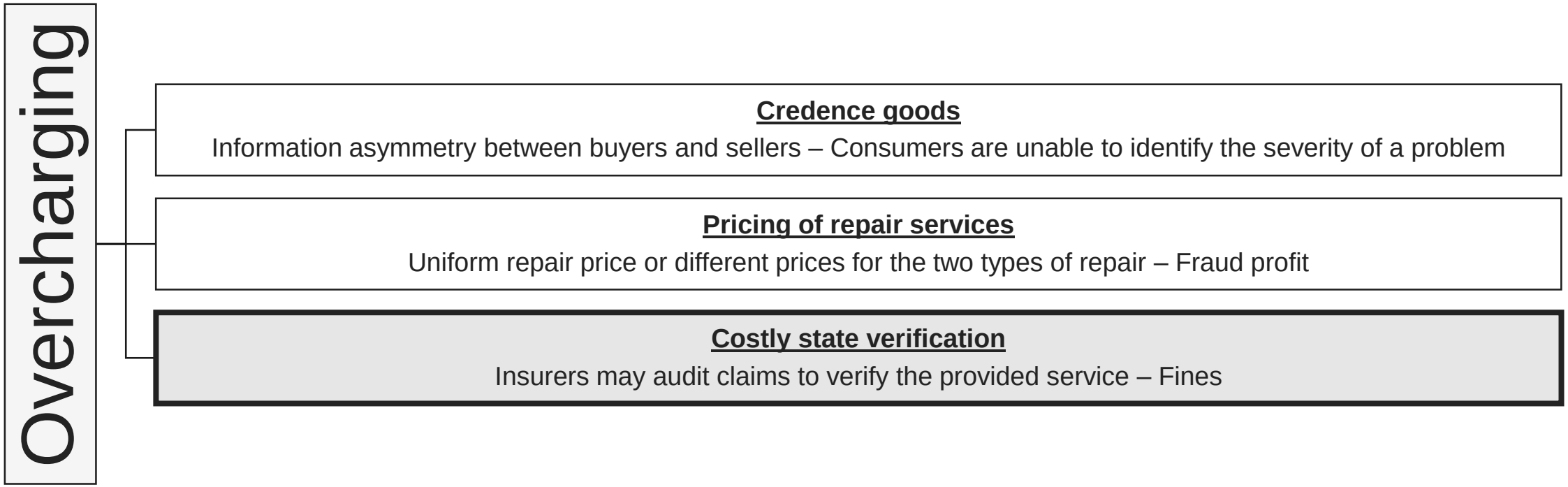
Motivation and Related Literature

Motivation and Research Question

Credence goods and insurance – Impact of insurance on overcharging in credence goods markets



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Related Literature

Credence goods

- Dulleck and Kerschbamer (2006)
- Sülzle and Wambach (2005)
- Information asymmetry between buyers and sellers
- Result: **Overcharging**
- Under assumptions Homogeneity, Commitment and Liability: Uniform price setting and no overcharging

External moral hazard

- Nell et al. (2009)
- Gaynor et al. (2000)
- Interaction between insurance and repair markets
- Imperfect repair market and incomplete insurance contract
- Price for repair good increases in the insurance coverage
- Partial insurance optimal

Insurance fraud

- Picard (2000)
- Boyer (2000)
- Schiller (2006)
- Insurer: Audit ↔ No audit
- Insured: Fraud ↔ No fraud
- Equilibrium in mixed strategies
- Overinsurance optimal → Creation of auditing incentives

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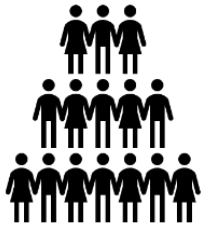
Model framework

Model

Sequential game with three players: Consumers, repair firms, and monopoly insurer



- Risk-averse consumers
- Loss lottery:
  - No loss $1 - \pi_s - \pi_l$
  - Small loss π_s
  - Large loss π_l
- Cannot identify loss size
- Visit one repair firm
- Repair firms need to repair the loss adequately

- Risk-neutral repair firms
- Operate in an oligopoly (Salop)
- Offer two types of repair (small and large)
- Set prices for both repairs
  - Uniform repair price $\bar{p}$ or
  - p for small repair, $2p$ for large repair
  - **Overcharging** probability η
  - Fine after fraud detection $r > 0$

- Risk-neutral monopoly insurer
- Offers insurance coverage for consumers
  - Partial coverage $\boldsymbol{\alpha} \in [\mathbf{0}, \mathbf{1})$
  - Indemnity depends on invoice issued by repair firm
- **Auditing** to prevent fraud
  - Auditing probability v
  - Audit costs $k > 0$

Model - Sequence of the game

Stage 1

Consumers purchase insurance with partial coverage $\alpha \in [0, 1)$

Stage 2

Repair firms enter repair market and determine profit-maximizing tariffs:

-- Uniform price or

-- Prices acc. to repair size

Stage 3

(Insured) consumers incur loss

Stage 4

(Insured) consumers visit repair firm

Stage 5

Repair firm repairs loss and issues (possibly overcharging) bill

Stage 6

Insurer decides on claims audit

Stage 7

Payoffs are distributed

Optimization problem – Maximization of consumers' expected utility

$C(\alpha)$: Retention in case of a large loss

$c(\alpha)$: Retention in case of a small loss

$\bar{t}$: Average transportation costs

$$\max_{\alpha \in [0,1)} EU(\alpha) = \underbrace{(1-\pi_s-\pi_l)u\big(w_0 - P(\alpha)\big)}_{\text{No loss}} + \underbrace{\pi_l u(w_0 - P(\alpha) - C(\alpha) - \bar{t})}_{\text{Large loss}}$$

$$+ \underbrace{\pi_s\big(1-\eta(\alpha)+\eta(\alpha)v(\alpha)\big)u(w_0 - P(\alpha) - c(\alpha) - \bar{t})}_{\text{Small loss: No fraud or detected fraud}}$$

$$+ \underbrace{\pi_s\eta(\alpha)\big(1-v(\alpha)\big)u(w_0 - P(\alpha) - C(\alpha) - \bar{t})}_{\text{Small loss: Undetected fraud}}$$

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Results

Benchmark situation – No insurance

- Insurance coverage $\boldsymbol{\alpha = 0}$
- No involvement of insurance auditing

Credence goods market with

- Consumers facing the same loss lottery
- Liability of experts
- Commitment of consumers

Solution: (Dulleck and Kerschbamer, 2006)

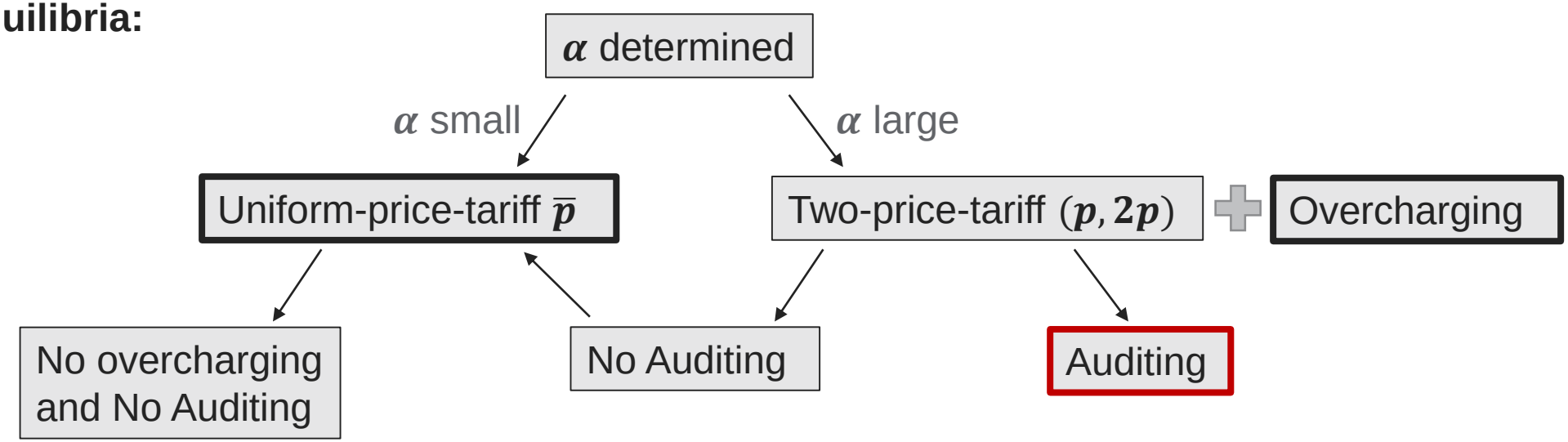
- Uniform price for the minor and the major repair
- No overcharging

Problem:

- Risk-averse consumers aim to transfer their loss risk
- Insurance against possible losses
- Insurance via annual fee to repair firms possible, but typically prohibited by regulation

Repair market with insurance

- Insurance coverage $\alpha > 0$
- α is determined at the first stage of the game → The insurance coverage defines the **resulting equilibrium**
- **Possible equilibria:**



Auditing is worthwhile (given $\eta > 0$) if

- The fraud profit p is sufficiently large
- The insurance coverage α is sufficiently large

Repair market with insurance

- Insurance coverage $\alpha > 0$
- α is determined at the first stage of the game → The insurance coverage defines the **resulting equilibrium**
- There exists a **threshold** $\hat{\alpha} \in (0, 1)$ such that

$\alpha \leq \hat{\alpha}$ (Low insurance coverage):

- Repair firms **set a uniform price**
- No auditing

$\alpha > \hat{\alpha}$ (High insurance coverage):

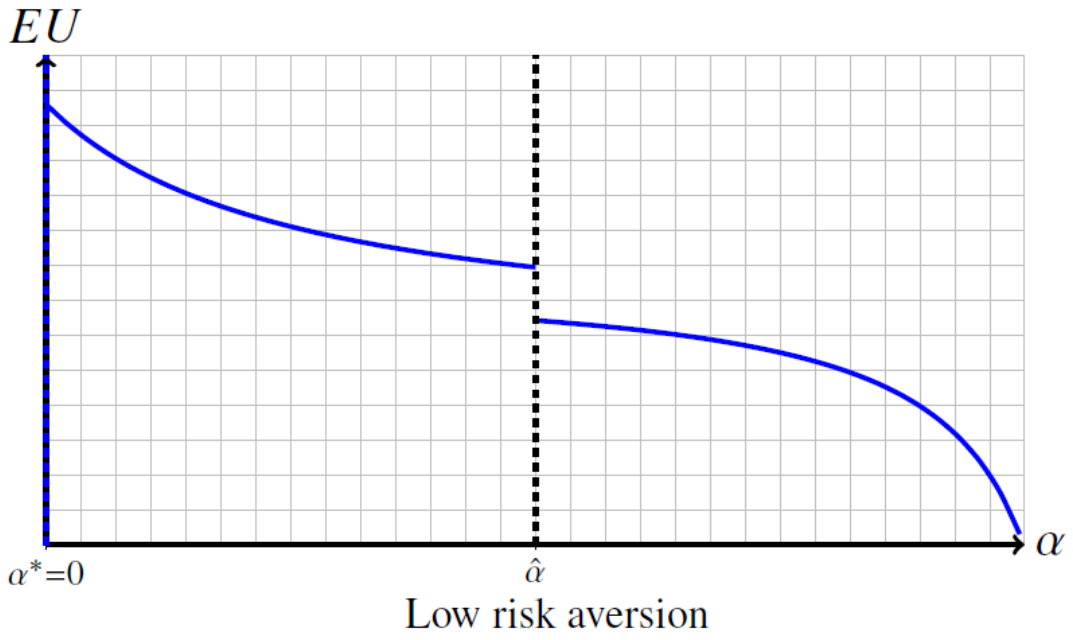
- Repair firms set a **two-price-tariff**
- Overcharging and Auditing
- **Mixed-strategy-equilibrium** in the claiming game

Trade-off between risk allocation and incentives → How should α be chosen?

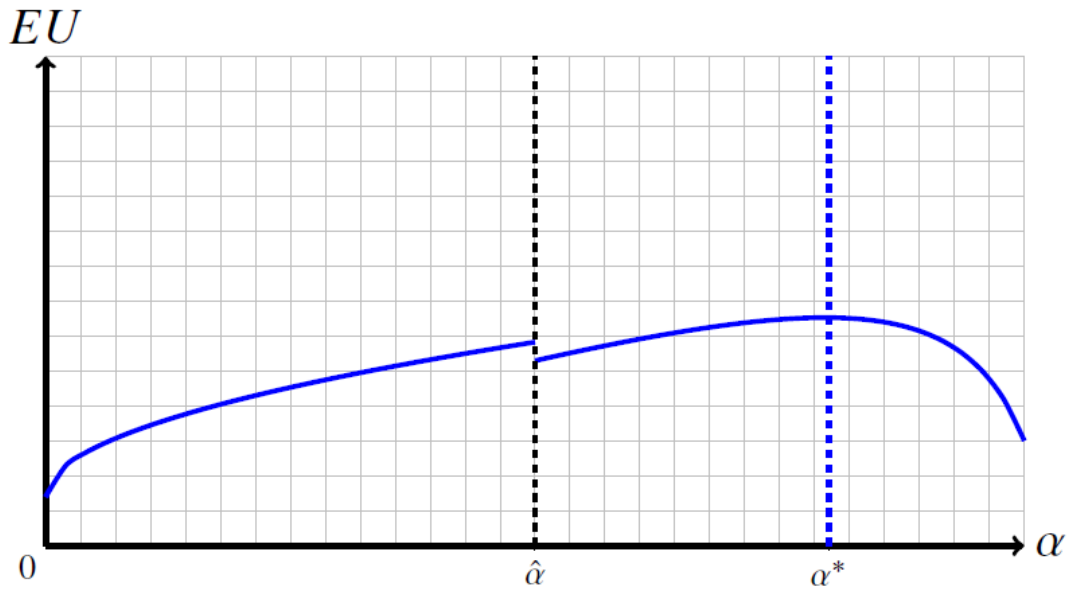
Optimal coverage schedule

- $\alpha > 0$ is only optimal if consumers are sufficiently risk-averse
- A coverage level $\alpha > \hat{\alpha}$ is only optimal if
  - Consumers are sufficiently risk-averse
  - Audit costs k are sufficiently small
  - Probability for a loss $\pi_s + \pi_l$ is sufficiently large
- Otherwise, a coverage level $\alpha \leq \hat{\alpha}$ maximizes consumers' utility

→ **Inefficiency of market insurance**
→ **Starting point for vertical integration or contracting between insurers and repair firms**



Low risk aversion



High risk aversion, low audit costs, high loss probability

Vertical integration or contracting with repair firms

- Real-world example: Managed care (HMO) in health insurance

- Aim: Prevention of overcharging in repair markets
  - Use of **capitation** instead of bill-dependent reimbursement and claims auditing → No overcharging
  - Higher insurance coverage for more risk-averse individuals

- In our model:
  - The insurer negotiates a fixed price for any repair with the repair firms
  - No auditing needed
  - Insurer can offer any level of insurance coverage (depending on consumers' risk aversion)
  - Same result as in the **benchmark situation** without insurance

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Consequences and Implications

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Consequences and Implications

Our model explains…

- how repair markets perform/work when **insurance contracts** are **incomplete**

→ Impact of incomplete insurance contracts on pricing/billing behavior of repair firms

- the trade-off between risk allocation and efficiency
- why insurers and regulators frequently **intervene** in repair markets

What do we learn from the model?

- **Vertical integration or contracting with repair firms** is desirable
- Use of **capitation** instead of bill-dependent reimbursement and claims auditing

→ Improvement of efficiency and risk allocation

Thank you for your attention!

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