

**cpb**

**Incentives for sabotage in telecoms**

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# Incentives for sabotage in telecommunications

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6th Infraday Conference, Berlin  
October 6, 2007

# Outline

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- Research questions
- Model
- Results
- Conclusions and further research

(Preliminary results based on ongoing research)

## Problem

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- Telecoms: vertical relationship where a few downstream companies use an intermediate input (e.g. wholesale broadband access)
- A previous policy question: when is foreclosure an optimal strategy for a network?
- Currently:
  - ▶ Is it still relevant in case of competing networks?
  - ▶ Technological innovations (QoS and packet shaping) => Prioritization => Non-pricing anti-competitive strategies (net neutrality debate)
  - ▶ Sabotage: (non-verifiable) activities that negatively affect downstream rivals' abilities to compete (raising rivals' costs, diminishing rivals' demand)

# Research questions

	monopoly network	oligopoly networks
access regulation	<p>Laffont-Tirole (2001) de Bijl-Peitz (2002)</p> <p>sabotage: Economides (IJIO 1998) Mandy-Sappington (JRE 2007)</p>	<p>foreclosure: Bijlsma-van Dijk (2007) Brito-Peirera (2007) Bourreau et al. (2006) Ordover-Shaffer (2006)</p>
no access regulation	<p>foreclosure: Rey-Tirole (2006) Bijlsma et al. (2007)</p> <p>investment: Foros (IJIO 2004)</p> <p><b>sabotage: ???</b></p>	<p><b>sabotage: ???</b></p>

# Research questions (cont.)

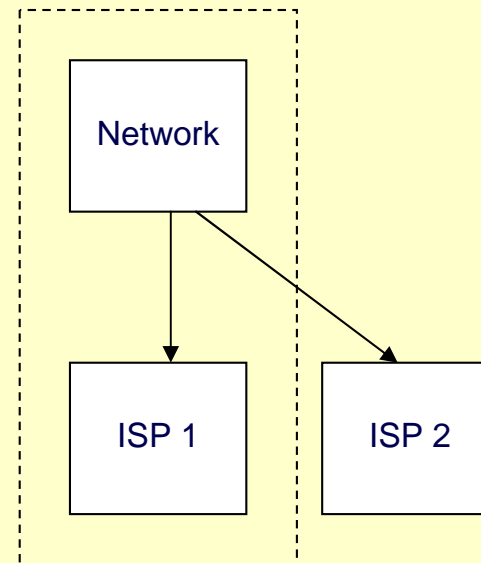
	monopoly network	oligopoly networks
asymmetric access regulation		<p><b>foreclosure: ???</b></p> <p><b>sabotage: ???</b></p>
vertical separation	<p>Vickers (RES 1995) de Bijl (JNI 2005)</p> <p><b>sabotage: ???</b></p>	<p>Bonanno-Vickers (JIE 1988)</p> <p><b>sabotage: ???</b></p>

## Research questions (cont.)

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Currently we analyze:

- When is sabotage an equilibrium strategy for a monopoly network?
- Do existing policy tools (unintentionally) provide incentives for the network to engage in sabotage?
- How does it depend on characteristics such as cost of sabotage, level of service differentiation and type of contract offered to the entrant?



- Decision structure:
  - ▶ Stage 1: incumbent offers an access contract to the entrant
  - ▶ Stage 2: entrant accepts the contract
  - ▶ Stage 3: incumbent chooses the level of sabotage
  - ▶ Stage 4: Cournot retail competition
- linear demand with product differentiation
- linear v. non-linear contract

## Model (cont.)

- Profit functions:

$$\pi_1 = (1 - q_1 - \gamma q_2)q_1 + pq_2 + F - C\delta$$

$$\pi_2 = (1 - q_2 - \gamma q_1 - (p + \delta))q_2 - F$$

where

- $\gamma$  level of product differentiation ( $0 \leq \gamma \leq 1$ )
- $q$  retail quantity
- $(F, p)$  wholesale contract;  $F=0$  if linear contract
- $\delta$  level of sabotage (either demand or cost)
- $C$  cost of sabotage



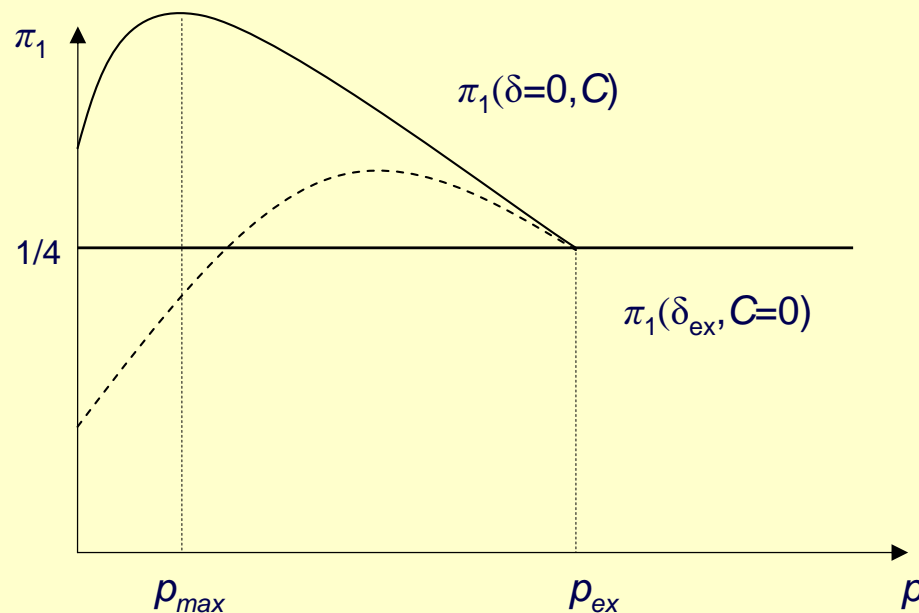
## Results: Access regulation

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- Due to nature of regulation, linear contract only
- Confirming Economides (1998), Mandy and Sappington (2007): access regulation gives an incentive to incumbent to engage in sabotage when cost of sabotage is low and services are strong substitutes
- When cost of sabotage is high, and services are weaker substitutes, the incumbent will benefit from not engaging in sabotage
- The closer the regulated access price to the non-regulated, the less profitable it is to commit sabotage

# Results: No access regulation

- If services are perfect substitutes, the incumbent forecloses its rival
- Under low sabotage costs and non-linear contract the incumbent cannot commit not to do sabotage
- But its optimal choice is a linear contract with no sabotage



# Results: No access regulation (2)

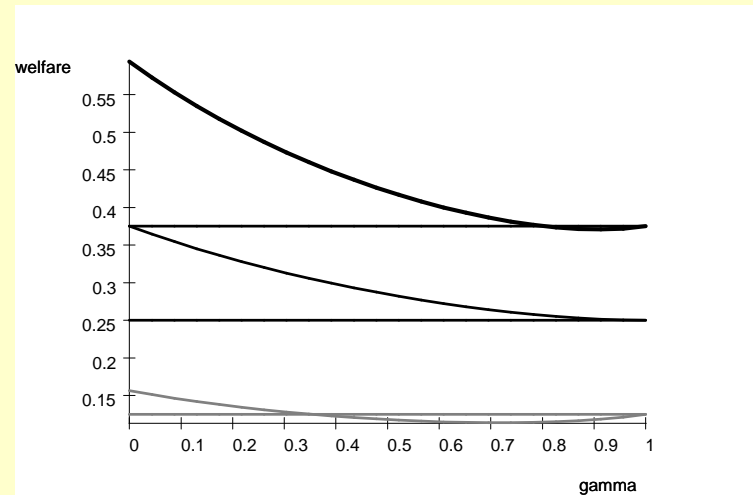
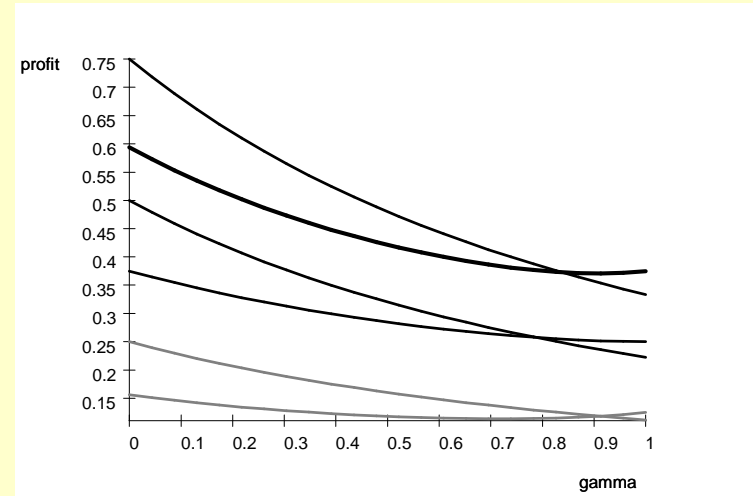
## Welfare comparison

### Expensive sabotage:

- and services are weak substitutes: better to have non-regulated linear contract
- and services are strong substitutes: access regulation is better (due to foreclosure)

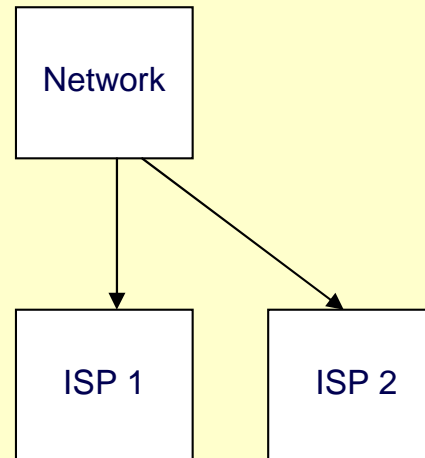
### Cheap sabotage:

- opposite results due to sabotage in case of access regulation which leads to foreclosure



## Results: Vertical separation

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- Symmetric contract: it is never optimal to commit sabotage (even if access is regulated; incumbent always earns non-positive profit with sabotage)
- Asymmetric contracts: also no sabotage
- Incumbent always prefers non-linear contract
- Regulator only if products are differentiated

# Conclusions

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- Access regulation gives incentives to engage in sabotage
- If access is not regulated:
  - ▶ incumbent will not engage in sabotage
  - ▶ foreclosure in case of homogenous services
  - ▶ if services are weak substitutes and sabotage is cheap: non-regulation increases welfare
  - ▶ if services are weak substitutes and sabotage is expensive: access regulation may increase welfare
- In case of vertical separation incumbent will also not engage in sabotage

## Further research

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- Analyzing robustness of monopoly models
  - ▶ different types of competition, e.g. spatial differentiation
  - ▶ general demand
  - ▶ non-linear cost of sabotage
  - ▶ other types of access contract, e.g.  $(T, q)$
- Considering ex ante investment decisions
- Extension to upstream oligopoly