

# Airport monopoly regulation with downstream airline duopoly and vertical product differentiation

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# Introduction (1)

- Integrated view of the aviation industry
- In the past:
  - Airport competition feasible?
  - Is there a need regulation?
  - What kind of regulation?
  - Effects and benefits of airline deregulation
- Assessment was largely isolated

# Introduction (2)

- Airports are upstream suppliers to the airlines
  - Airlines carry passengers, the “final” consumers
- Integrated view is not novel, but rare
  - E.g. congestion literature by Brueckner or Zhang
- Increasing literature on vertical mergers issue
  - E.g. Barbot
- Why integrated?

# Introduction (3)

- Usual (textbook style) line of thought:
  - Airline business is competitive
  - Airports are monopolies
  - Charges might need to be regulation
  - Economic welfare is increased
- Airlines business is rather oligopolistic and marked by product differentiation
  - Need to make assessments on the basis of a more integrated view

# Introduction (4)

- **Research question:**
  - Does integrated view change our line of argumentation regarding airport monopoly regulation?
- Do we need to regulate airport monopolies?

# Outline

- The model
- Results
- Implications
- Conclusions

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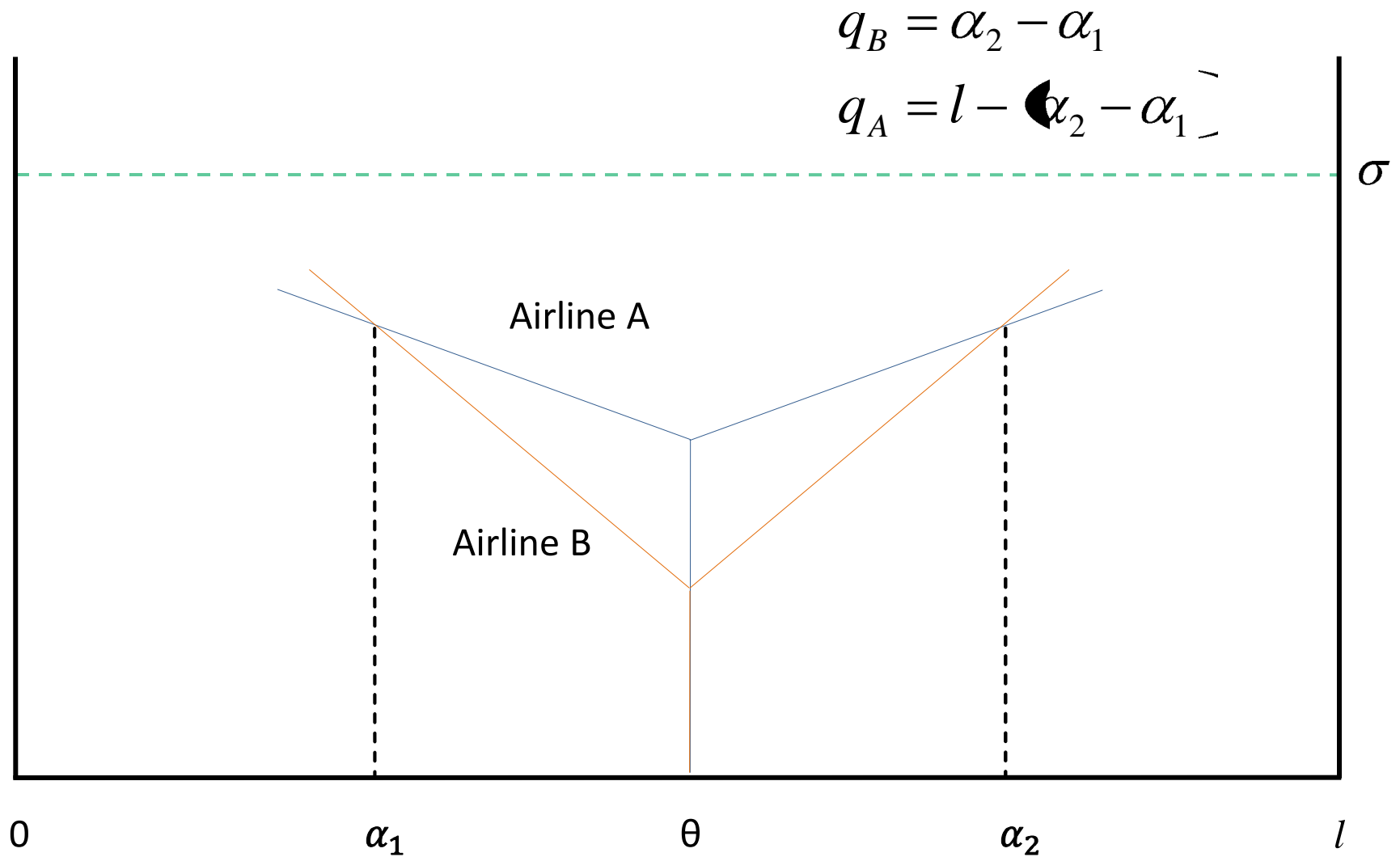
# The model (1)

- Airport monopoly, airline duopoly
- Airport charges airlines a PFC ( $\gamma$ )
- Airlines are vertically differentiated
  - Inverse quality indicator ( $\lambda_i$ )
  - Quality is costly:  $C(\lambda_i) = \frac{c}{\lambda_i}$
- Consumers have a fixed reservation price ( $\sigma$ )

# The model (2)

- Airlines fly on the **same** route at zero production costs
- Spatial model á la Hotelling
  - Airport and consumers are located on a straight street; consumers are evenly distributed and choose between either airline or not to fly

# The model (3)



# The model (4)

- Three stage game
  - First stage: Airport chooses  $\gamma$
  - Second stage: choice of quality
  - Third stage: competition in prices (Bertrand)
- **Two cases:** unfettered monopoly and first-best regulation

# Outline

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# Results (1)

- Incentive to differentiate in terms of quality as much as possible
  - But costs set a restraint
- There is a **unique** quality level for airline A, given by:

$$- \lambda_A^e = \frac{3\sqrt{2}\sqrt{c}}{2l}$$

# Results (2)

- Airline B's incentive is to offer the lowest possible quality, which is bound by  $\sigma$
- At a certain level of quality by airline B airline A switches to fixed price regime (commits to a fixed price)
  - Airline B loses incentive to lower quality
  - Level of quality is determined by:  $\lambda_B^e = \frac{3}{4} \frac{\sigma - \gamma}{\theta}$
- Preliminary!

# Results (3)

- How does the airport behave?
  - Under monopoly: profit maximization
  - Under regulation:  $\gamma = 0$  (first-best)
- Under profit maximization:
  - $$\gamma^{mon} = \frac{\sqrt{2}}{4} (\sqrt{2}\sigma - \sqrt{c})$$

# Results (4)

- More results:
  - Quality of B is lower under regulation
  - Airline profits are higher under regulation
  - Consumer and producer surplus are higher under regulation

# Results (5)

- Market requirements:

$$- \sigma \geq \gamma + \frac{1}{2}\sqrt{2}\sqrt{c} + \frac{1}{2}\sqrt{34}\sqrt{c}$$

$$- c \leq \frac{9 - \sqrt{17}}{64} (\sigma - \gamma)^2$$

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# Implications (1)

- Airline differentiation in terms of quality
  - $A \rightarrow \text{FSC}; B \rightarrow \text{LCC}$
- Genuinely higher profits for A
- $c$  places limit on A's quality
- $\sigma$  places limit on B's quality (indirectly through A fixed price regime)
- Increases in quality costs lower airline profits and decreases A's quality

# Implications (2)

- Rising reservations price moves up prices and profits
  - Lowers B's quality, but not A's
- Increases in  $l$  lead to better qualities and higher profits, but not higher prices
- Reservation price must be sufficiently large

# Implications (3)

- Producer surplus is greater under regulation
  - Increase in airport profits is not as large as foregone airline profits
- Consumer surplus also greater under regulation
  - Quantities are higher, prices lower, although B's quality is worse

# Outline

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- **Conclusions**

# Conclusion (1)

- Analyses effects of upstream monopoly regulation with downstream duopoly competition and vertical product differentiation

# Conclusion (2)

- In favor of airport regulation
  - Airport monopoly
  - Basic double marginalization argument
- No two sided market
- No other social costs or regulatory costs
- AP-AL relation only through PFC
- $\sigma$  usually differs between markets, thus airport sets PFC on average  $\sigma$

# Conclusion (3)

- Next steps:
  - Include more airlines and airports
  - More complex pricing schemes

# Thanks very much!

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