„Estimating the market power of airports - a European-wide approach”

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Structure

- **Research background and question**
- Existing approaches
- European approach
- Results and discussion

Research background & question

- Airports are heavily regulated: Prices, quantities, market access
- Existence of market power a necessary condition for market regulation
  - So how to assess airport market power?
    - Existing approaches: Detailed studies on specific airports or airports of specific countries
    - In most cases no universally-applied, transparent methodology, comparison of airports difficult
    - **Objective: Development of a transparent approach for airport market power assessment which can be applied on a European-wide scale**

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Airport market power assessment - Existing approaches

Airport Market power: usually applied 2-step approach

- **Market segregation**
  - **Product markets**
    - Aviation versus non-aviation activities
    - Scheduled versus LCC versus charter traffic
    - Long versus medium versus short haul traffic
    - Pax versus cargo traffic …
  - **Geographical markets**
    - Catchment areas
- **Market power assessment**
  - Intramodal substitutes (passenger and airline view)
  - Intermodal subsitutes (passenger view)
  - Sunk and switching costs
  - Capacities, congestion, network effects
  - …

Airport market power assessment - Existing approaches

Study	Approach	Geographical focus	Temporal focus	Assessed market segments
German Airport Performance 2010	Empirical / mainly qualitative	**Amsterdam Schiphol airport**	Today / recent years	all aviation activities (local passenger traffic, transfer traffic, cargo traffic, local flights/Flight trainings) all activities "closely related to aviation services" (provision of access to the airport infrastructure for passenger, freight and aircraft handling; catering, and refuelling services).
Productivity Commission 2002	Empirical, mainly qualitative	**Australian airports**	2002	aircraft movement facilities passenger processing facilities Non-aeronautical services
Malina 2006 / Malina 2010	Empirical, mainly quantitative	**German airports**	2004	passenger air traffic (except general aviation)
Niemeier et al. 2009	Empirical, mainly qualitative	**Paris airports (ADP)**	2000-2007	aeronautical and similar services (landing, passenger handling, lightning, parking and gasoline provision) ground handling non-aviation activities
CAA (UK) 2007	Empirical, mainly qualitative (+ SSNIP test to define relevant markets)	**UK airports (Stansted, Manchester)**	2007 and before	aeronautical services
Competition Commission (UK) 2009	Empirical, mainly qualitative	**UK airports (BAA airports)**	2009 and before	aircraft landing secondary products (aircraft parking, passenger handling, …)

Airport market power assessment - Existing approaches

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Malina 2007	Empirical, mainly qualitative	German airports	2007	aircraft movement facilities passenger processing facilities Non-aeronautical services
Niemeier et al. 2009	Empirical, mainly qualitative	Paris airports (ADP)	2000-2007	passenger air travel (excl. general aviation)
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- Market power assessments have been done for numerous airports (in Europe)
- Focus mainly on aviation-related services
- Partly outdated
- Very detailed studies either on specific airports (PAR, AMS) or on the airport landscape in specific countries (Australia, Germany, UK)
- In most cases no transparent methodology which could easily be applied to assess other airports' market power

Transparent, European-wide applicable methodology for the assessment of airport market power might be of use

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Airport market power assessment - European approach

Criteria

- Transparency
- Easy application
- Easy adjustment
- Contact with reality

Considered product markets

- Public, commercial passenger air traffic
- Local passenger (O&D) market (no transfer markets)
- Only actual competition (existing airports)
- No consideration of intermodal substitutes

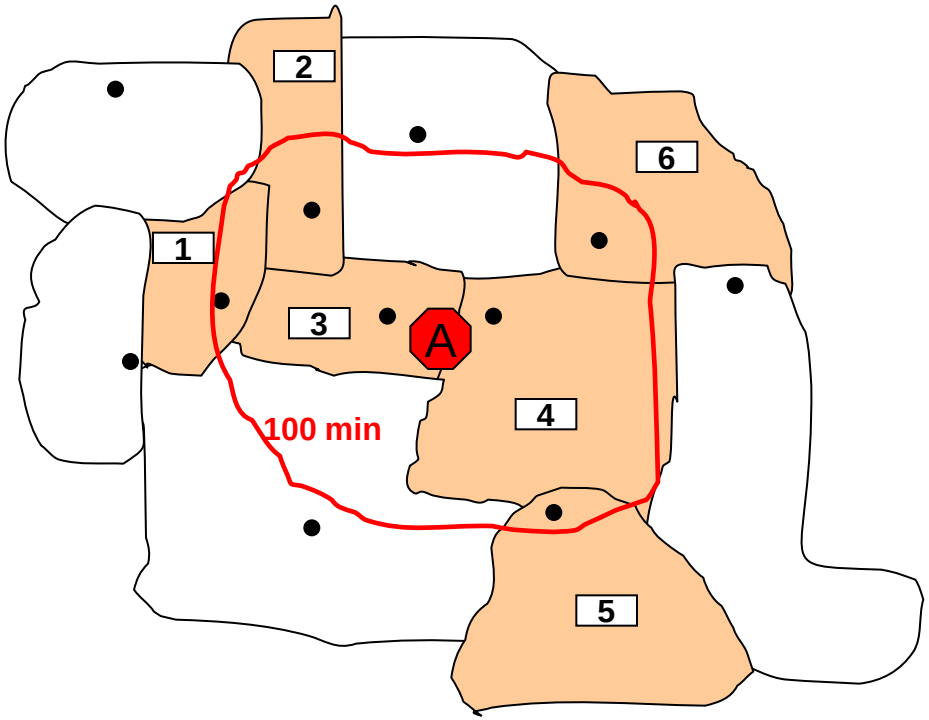
Airport market power assessment - European approach

Considered geographical markets

- Catchment areas difficult to estimate
- They may differ between market segments
- Empirical observation (for Germany): in average, passengers originating from the same region fly from 7 different airports
- Our approach:
  - Catchment of Airport A = Sum of all NUTS 2 regions whose respective largest city is accessible by car within 100 min from A
  - In countries with geographically very large NUTS 2 regions, NUTS 3 regions are referred to (Spain, Finland, partly Norway)
  - Other access modes and/or different maximum accepted access times by market segments could be considered in future research

Airport market power assessment - European approach

Considered geographical markets



Legend

NUTS 2 region NOT part of the catchment of airport A

NUTS 2 region part of the catchment of airport A

● Largest city of a NUTS 2 region R

A Airport A

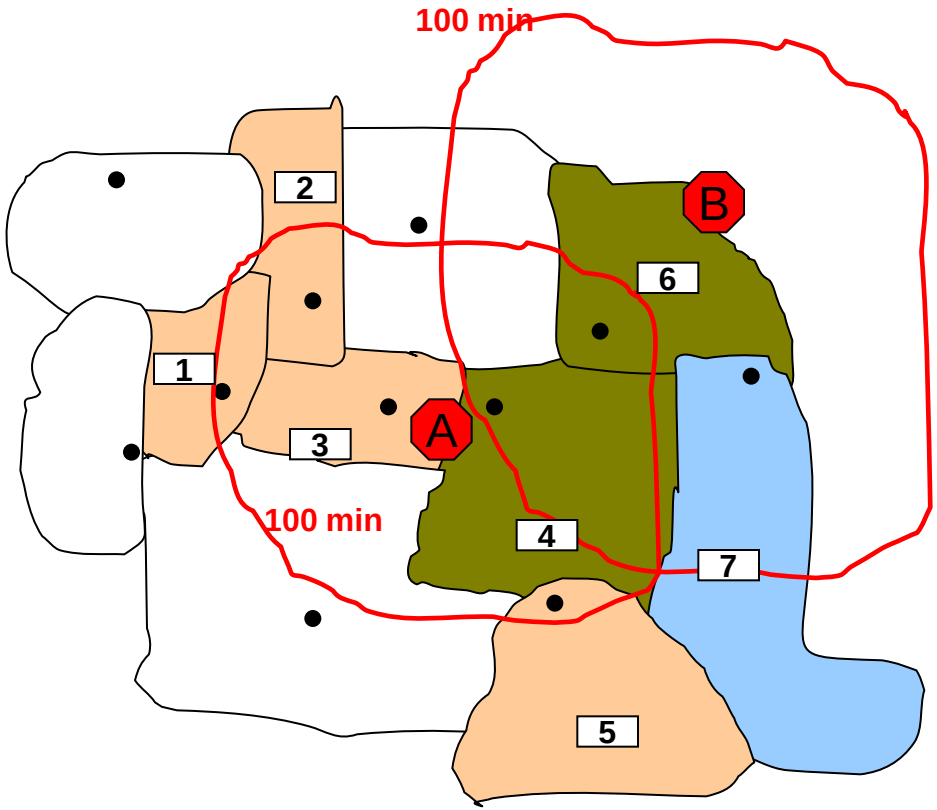
Airport market power assessment - European approach

Market power assessment

- **Passenger and airline view** (see Malina 2006/2010)
- **Passenger view:** If an airport has no competitors in its relevant catchment, it might possess market power because passengers have no alternative airports to choose from.
  - **Operation:** Does an airport have a high share of the total flight supply available in its 100 min catchment? If yes, it might c.p. have a relatively high degree of market power!
- **Airline view:** If an airport has no competitors in its relevant catchment, it might possess market power because airlines have no alternative airports they could switch operations to.
  - **Operation:** Are there any other airports accessible from an airport's 100 catchment which are regarded as suitable alternatives by the airlines with regard to their technical infrastructure?
- **Market Power limitating factors** (Countervailing power…)

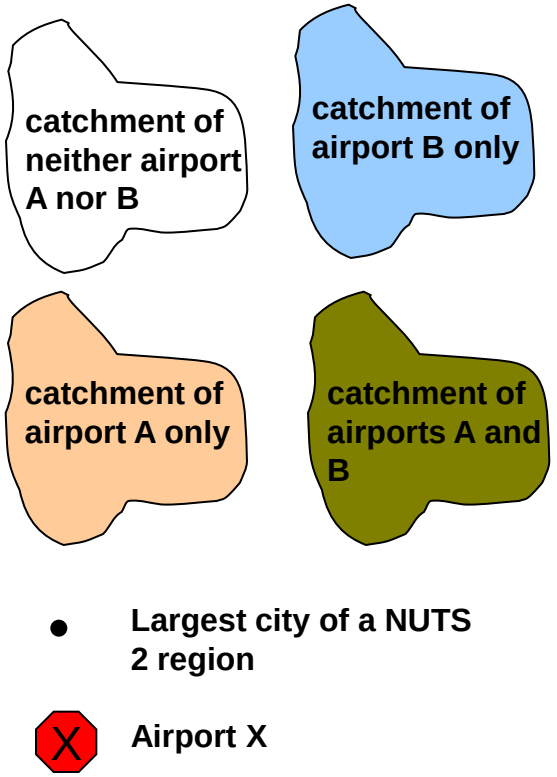
Airport market power assessment - European approach

Catchment areas and airport competition



Competition between A and B in green NUTS 2 region(s)

Legend



Airport market power assessment - European approach

Market power assessment: Passenger view:

- Does an airport have a high share of the total flight supply available in its 100 min catchment? If yes, it might c.p. have a relatively high degree of market power!
- GDP-weighted sums of the market shares of an airport‘s supply in the NUTS 2 regions it serves = market power degree indicator
- Total GDP = proxy for catchment area size
- Formula:

$$MP_{AC(A)} = GDP_{C(A)excl.} / GDP_{C(A)}$$

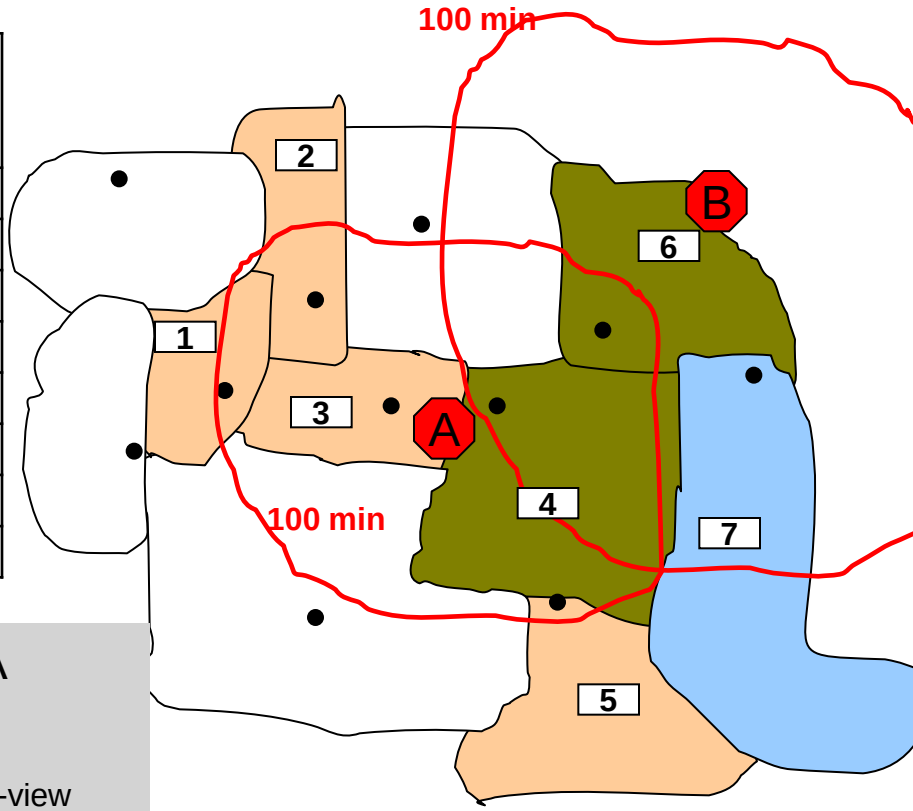
$MP_{AC(A)}$ = Market power indicator for airport A in its catchment C(A)
$GDP_{C(A),excl.}$ = GDP of C(A) which is exclusively attributable to airport A
$GDP_{C(A)}$ = total GDP of C(A)

$GDP_{C(A),exd.}$ = SUM ($GDP_{R(A)}$ * $MS_{R,A}$) for all regions R(A) out of C(A)
GDP_R = GDP in region R
$MS_{R,A}$ = Market share (based on seats offered per month) of Airport A in region R(A)

Airport market power assessment - European approach

Market power assessment: Passenger view

Airport	NUTS Region R	Airport Supply		$MS_{R,A}$	GDP R	$GDP_R * MS_{R,A}$	MP_A
		A	in R				
A	1	100	100	1	100	100	100%
A	2	50	50	1	80	80	100%
A	3	200	200	1	200	200	100%
A	4	100	300	0,33	300	100	33%
A	5	50	50	1	50	50	100%
A	6	100	300	0,33	600	200	33%
A	7	0	300	0	200	0	0%
A	All				1330	730	55%



GDP-weighted market share of A in its catchment = 55%
= market power indicator $MP_{A/pax\text{-}view}$

Airport market power assessment - European approach

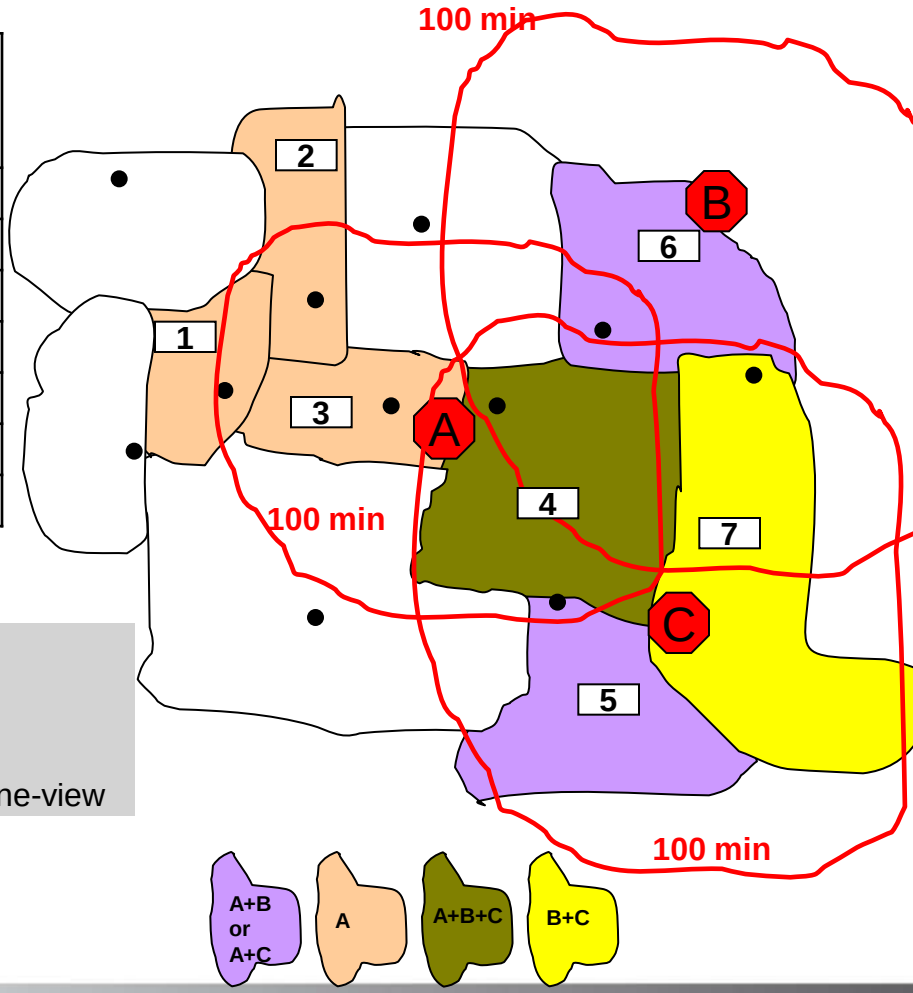
Market power assessment: Airline view

- Are there any other airports accessible from an airport's 100 catchment which are regarded as suitable alternatives by the airlines with regard to their technical infrastructure (RWY > 2,000m, ILS)…
- … and which are neither congested nor in the same ownership than the reference airport?
- GDP-weighted sums of the share of the reference airport in its NUTS 2 regions = market power degree indicator
- Market share of Airport A in region R = 1 / (1+Number of suitable alternative airports for A in R)

Airport market power assessment - European approach

Market power assessment: Airline view

Airport	NUTS Region R	# of alternative airports in R	Share of A in R	GDP_R	$GDP_R * MS_{R,A}$	MP_A
A	1	0	1	100	100	100%
A	2	0	1	80	80	100%
A	3	0	1	200	200	100%
A	4	2	0,33	300	100	33%
A	5	1	0,5	50	25	50%
A	6	1	0,5	600	300	50%
A	All			1330	805	60%



GDP-weighted share of A in its catchment = 60%
= market power indicator $MP_{A/airline\text{-}view}$

Airport market power assessment - European approach

Factors reducing potential market power

- **Countervailing power by the airlines**
  - Presumingly high for carriers with high market shares uncongested airports…
  - … if threat to withdraw operations is plausible

- **Countervailing power by passengers**
  - If airport regions are replaceable from the pax view
  - Might be valid for some/most (?) leisure destinations
  - If Ibiza is too expensive, choose Malta!

- **Airport-internal factors**
  - $G_{MAX} = MAX (G_{aviation} + G_{non\text{-}aviation})$ -> see Starkie!
  - Uncongested monopoly airports might charge fees below monopolistic levels in order to maximize the number of customers for non-aviation goods.

Airport market power assessment - European approach

Factors reducing potential market power

- **Countervailing power by the airlines**
  - Presumingly high for carriers with high market shares uncongested airports…
  - … if threat to withdraw operations is plausible, i.e. if the carrier can easily switch its operations elsewhere.
- Basic formula:

$$CVP_{A/C} = s * MS_{A/C} * (1-MS_{C/A})$$

with

$CVP_{A/C}$ = Countervailing power of carrier C at airport A

$MS_{A/C}$ = Market share of carrier C at airport A (e.g. based on seats or frequencies)

$MS_{C/A}$ = Market share of airport A (inbound + outbound) in the whole network of airline C (e.g. based on seats or frequencies)

s = sunk costs indicator

$$\text{with } s = \begin{cases} 0{,}2 & \text{if carrier C is a network carrier and has its hub at airport A} \\ 0{,}5 & \text{if carrier C is a network carrier and has no important hub at airport A} \\ 0{,}8 & \text{if carrier C is a LCC and has its base at airport A} \\ 1 & \text{if carrier C is a LCC or a network carrier and has no aircraft based at airport A} \end{cases}$$

Airport market power assessment - European approach

Factors reducing potential market power

⇀ Countervailing power by the airlines

$CVP_{A/C} = s * MS_{A/C} * (1-MS_{C/A})$

with

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s = sunk costs indicator

with s =
- 0,2 if carrier C is a network carrier and has its hub at airport A
- 0,5 if carrier C is a network carrier and has no important hub at airport A
- 0,8 if carrier C is a LCC and has its base at airport A
- 1 if carrier C is a LCC or a network carrier and has no aircraft based at airport A

$CVP_{FR/NRN} = 0,8 * 0,91 * (1-0,039) = 69,2\%$

$CVP_{LH/FRA} = 0,2 * 0,6 * (1-0,446) = 6,7\%$

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European approach – Results and Discussion

Rank	Airport	Market Power (100 min. catchment)		CVP of largest carrier	Comment
		PAX view	Airline view		
1	London LHR	57.07%	54.43%	1,2%	Limited capacity at nearby airports (STN,LTN,LGW)
2	Paris CDG	70.27%	92.23%	4,7%	CTO (AMS)
3	Frankfurt	88.80%	42.24%	6,7%	CTO (MUC, VIE, ZRH)
4	Madrid	100.00%	100.00%	2,5%	
5	Amsterdam	73.95%	61.25%	0,0%	CTO (CDG)
8	Barcelona	80.40%	100.00%	6,2%	but high CVP of easyJet
9	London LGW	24.48%	40.81%	21,6%	
10	Paris ORY	31.54%	96.81%	7,2%	
11	Palma	100.00%	100.00%	17,7%	COD medium
14	Düsseldorf	52.39%	22.03%	16,7%	
15	Copenhagen	97.36%	50.00%	4,5%	
16	London STN	23.51%	53.85%	39,7%	
17	Dublin	87.77%	100.00%	2,2%	but high CVP of Ryanair
18	Milan MXP	58.70%	32.61%	16,0%	
19	Athens	100.00%	100.00%	0,9%	
20	Brussels	62.80%	29.57%	0,0%	
25	Malaga	100.00%	100.00%	13,9%	COD high

Legend:
CTO = Competition in the transfer market by other hubs of the same airline
COD = Competition by other destinations (incoming flights)

European approach – Results and Discussion

- Most large hubs seem to have a high degree of market power; CVP only existent if hub carrier operates multiple hubs.
- Airports like Malaga or Ibiza (100%/100%/15,6%) might not raise their fees too much because tourists could choose other destinations.
- Many mid-size airports do not seem to possess market power, such as Cologne/Bonn (27%/21%/15,7%) or Birmingham (26%/29%/13%).
- Does DUS really have a low degree of MP (52%/22%/16%)? Network or density effects are not considered, so the 22% airline view value might not tell the truth!
- Ideas for future research:
  - Improvement of catchment area modelling (NUTS 3 instead of 2 regions, other access modes, …)
  - Better modelling of airline behaviour
  - Consideration of different passenger types
  - …

Thank you!