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The Determinants of Long-haul Flights from Secondary Airports and their Implications for Airport Planning and Management

GARS Workshop

"EU Liberalization of Air Transport – Experiences and Next Steps Forward"
and
"Current Developments in Airport Benchmarking"

London, NOV 10-11, 2006

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Structure

Introduction

- Problem: Inefficient allocation of airport infrastructure designed for longhaul flights
- Research methodology
- Definition of „secondary airports“

Factors influencing airport choice on longhaul flights

- Explanation of airline route and network choice
- Derivation of factors that might determine the number of longhaul flights at secondary airports
- Empirical test of the identified factors

Conclusion

Inefficient allocation of infrastructure for longhaul flights

Problem

- Indispensable condition for longhaul flights: minimum runway length and strength allowing for widebody aircraft
- As absolute minima can be regarded:
  - a PCN value of 60
  - a runway length of 2,500 m

Inefficient allocation of infrastructure for longhaul flights

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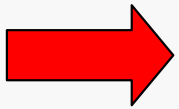
Specifications of German airports with regard to the handling of longhaul flights

Airport	RWY	PCN	Longhaul flight capability	Airport	RWY	PCN	Longhaul flight capability
Berlin-Schönefeld	3000	140RBWU	restricted	Hannover-Langenhagen	3800	068RBWT	slightly restricted
Berlin-Tegel	3023	120FAXT	restricted	Karlsruhe/Baden-Baden	2983	050RBXT	very restricted
Berlin-Tempelhof	1840	077FAWT	no	Köln/Bonn	3815	075FBWT	unrestricted
Bremen	2040	080FBXT	no	Leipzig-Halle	3600	080RCXT	unrestricted
Dortmund	2000	049FCWT	no	Lübeck	2102	055RBWT	no
Dresden	2508	060RAWT	very restricted	München	4000	090RAWT	Unrestricted
Düsseldorf	3000	100RBWT	restricted	Münster/Osnabrück	2170	068FBXT	no
Erfurt	2600	085FCWT	very restricted	Nürnberg	2700	065FAXT	very restricted
Frankfurt	4000	090RAWT	unrestricted	Paderborn/Lippstadt	2180	070FBXT	no
Friedrichshafen	2356	060FCWT	no	Saarbrücken	2000	058FAXT	no
Hahn	3045	072FCXT	restricted	Weeze (Niederrhein)	2440	045RBWT	no
Hamburg	3666	065FAWT	slightly restricted	Stuttgart	3345	080RCXT	slightly restricted



11 German airports are – some subject to restrictions – capable of handling longhaul flights

Inefficient allocation of infrastructure for longhaul flights

Problem

- Indispensable condition for longhaul flights: minimum runway length and strength allowing for widebody aircraft

  → 11 German airports are – some subject to restrictions – capable of handling longhaul flights

- Concentration of longhaul flights at hubs (more than 90% of all longhaul passengers departing from Germany)
  Longhaul flighs are defined as flights from Europe to all non-European destinations except countries around the Mediterranean and including East-Uralian Russia.

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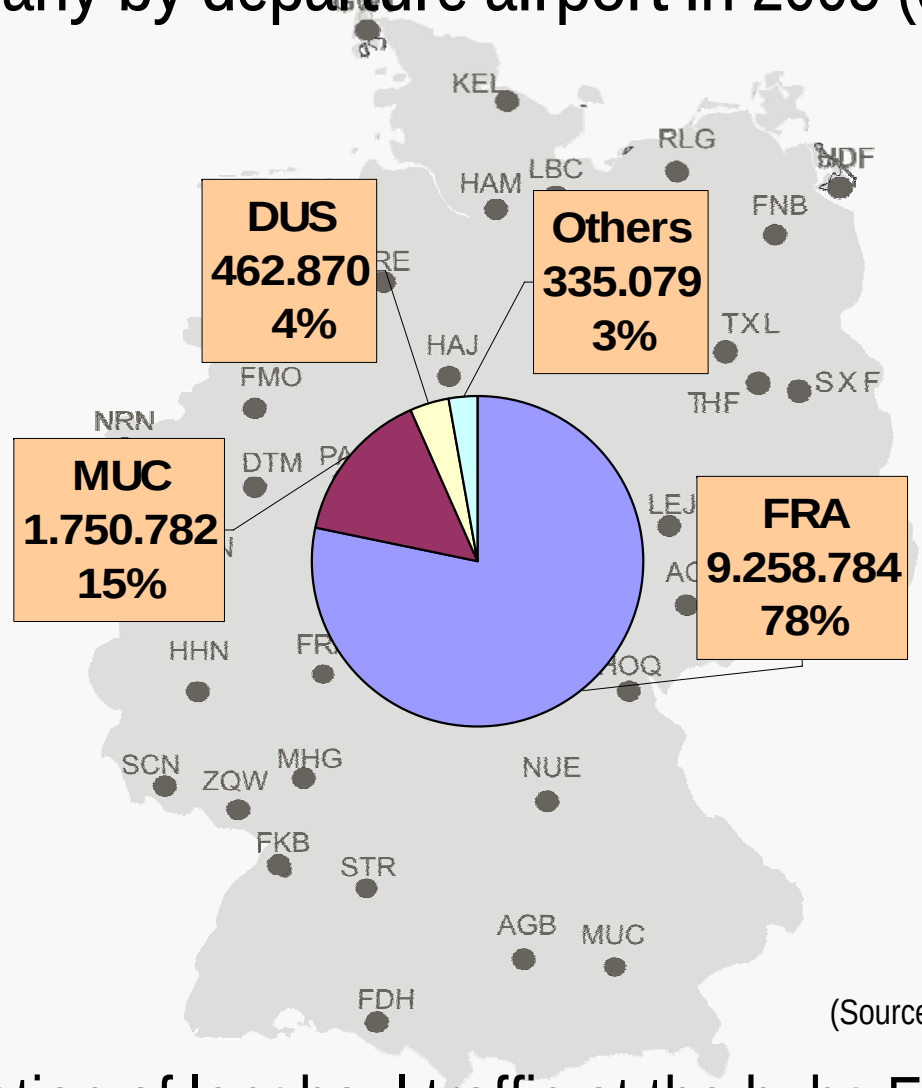
Inefficient allocation of infrastructure for longhaul flights

Distribution of longhaul passengers departing from Germany by departure airport in 2005 (direct flights only)



(Source: Federal Statistical Office Germany)

➡ Concentration of longhaul traffic at the hubs FRA and MUC

Inefficient allocation of infrastructure for longhaul flights

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  → 11 German airports are – some subject to restrictions – capable of handling longhaul flights

- Concentration of longhaul flights at hubs (more than 90% of all longhaul passengers departing from Germany)

- Some additional longhaul flights at some of the non-hubs (Düsseldorf: 57 flights/week, Berlin: 20, Leipzig: 2 despite an unrestricted capability due to its 3,600m RWY)

Inefficient allocation of infrastructure for longhaul flights

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Problem

Many secondary airports handle almost no longhaul flights although they possess a sufficient infrastructure.

Others would possibly welcome additional longhaul services if their runway were extended.

Misallocation of airport (runway) infrastructure

- What factors determine the supply of longhaul flights at Europe‘s secondary airports?
- What are the consequences for European airport operators and public institutions deciding on the provision of airport infrastructure ?

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Research methodology

Research question:
Which factors influence airport choice
for intercontinental flights from non-hubs in Europe?
At which secondary airports could longhaul flights be viable?

Empirical (multiple regression) analysis of test these factors

Derivation of possible internal *(runway length, airport fees, marketing...)* and external *(GDP, population and industry structure in the catchment area, distance to the next hub, ...)* factors on the supply of longhaul flights at secondary airports

Approach
Explanation of route and network choice of different types of airlines
(Legacy, Low-Cost, Leisure carrier)

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Definition of „secondary airports“

Richard de Neufville, M.I.T.:
Secondary airports “complement primary airports in metropolitan multi-airport systems“
Examples: Frankfurt-Hahn, Rotterdam

ICAO case study “The impact of low-cost carriers in Europe”, 2003:
Ryanair links “London’s third airport, Stansted, with over 50 under-utilized, secondary airports in a number of countries…”

Eric Heymann, db Research, 2006:
“Secondary airports: They have an attractice catchment area, an important feeder function for the big hubs and offer a certain number of direct scheduled connections, although intercontinental flights are the exception here. Secondary airports do not have a hub function (e.g. Geneva, Hamburg or Valencia).”

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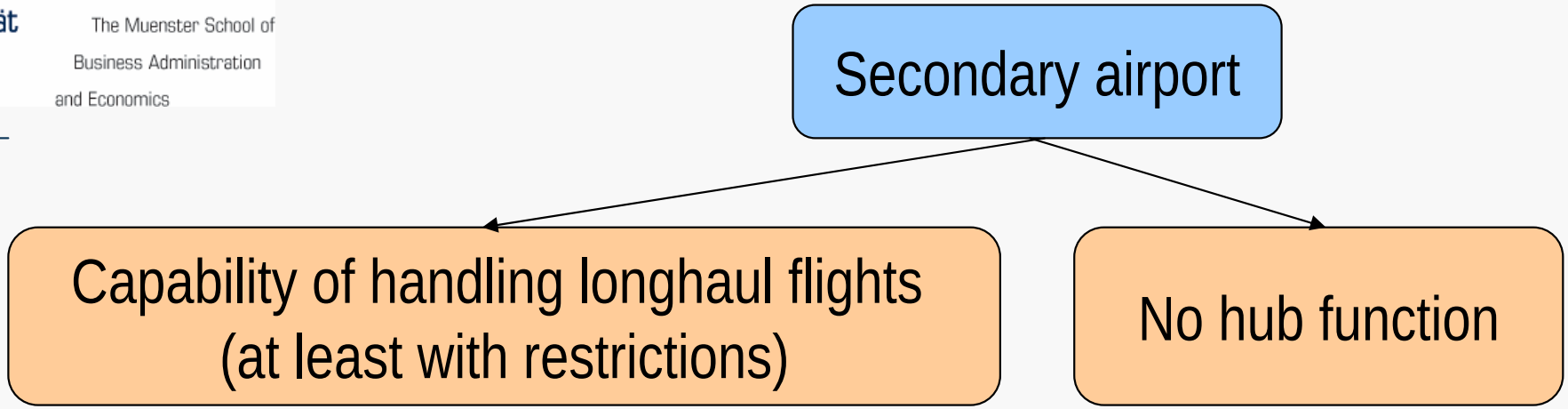
Definition of „secondary airports“



→ All commercial European airports with a RWY length > 2,500m and a RWY PCN > 60 which are not used as a longhaul hub

→ But what is a hub? Use of typical hub criteria!

Definition of „secondary airports“

Hub-criteria

Transfer rate > 20 %	Yes / No
Passenger numbers > 20 Mio.	Yes / No
Wave structure	Yes / No
Main airport of the national flag carrier	Yes / No
Not only European connections	Yes / No

→ All airports which do not fulfill at least 4 of these criteria are secondary airports!

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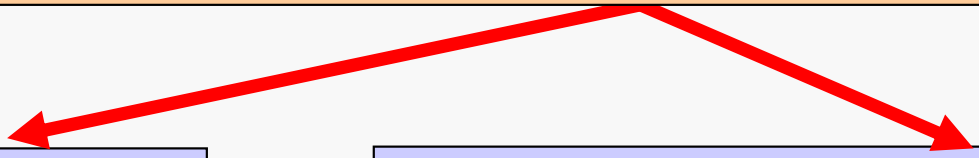
Route choice by airlines

Most airlines are privatized,
profit maximising companies

Route and network must be profitable

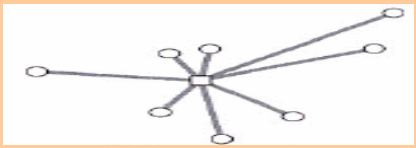
Which network strategies are applied in the longhaul sector
by different airline types?



„classic“ scheduled traffic	leisure traffic	ethnic traffic
	low-cost traffic	
HUB & SPOKE	Point-to-Point	

Route choice by airlines

Scheduled airlines: Hub-and-Spoke Networks

	**Advantage**	**Disadvantage**
Production view	• **Economies of Density** Concentration of given air travel demand on a small number of flights means higher load factors • **Economies of Scale** larger aircraft help the airline achieve cost (per seat) degression • **Economies of Scope** overhead cost synergies *(stations, maintenance, backup aircraft...)*	• **Higher coordination costs** • **Lower aircraft utilization** longer aircraft waiting time • **Congestion and delays** Wave structure at hubs
Strategic view	• **Market development** Large product range achieved with few flights, possibility of adding new markets with low demand • **Hub as entry barrier (Hub dominance)** • **Hub premium**	• **Longer flight times** *detour factor* • **Risk of selling seats at marginal cost**

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Route choice by airlines

Hub-and-Spoke is a superior business model
for (scheduled) longhaul carriers

In all market segments (business, VFR, holiday), longhaul flight passengers are more flexible with regard to total flight time and frequency than shorthaul travellers.

Many O&D combinations with low point-to-point demand

Long aircraft range necessary

Competition and low prices

Geographical and temporal concentration of passenger demand necessary and accepted (widebody aircraft flying from and to hubs)

Limited prospects for longhaul flights apart from the hubs
(strong demand and willingness to pay, hub congestion, ...)

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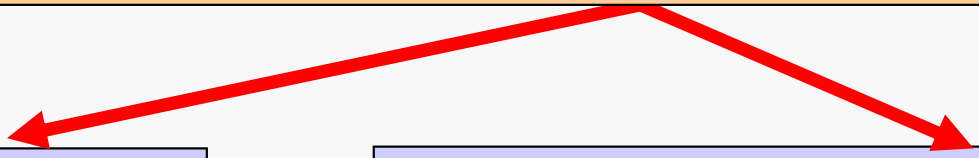

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Route choice by airlines

Leisure and ethnic travel, LCC

- Sufficient local demand necessary for direct longhaul flights from secondary airports!
  - Not many longhaul destinations are typical places for package tours (Carribean, Florida, Maledives, Thailand...)
  - Certain demand for ethnic longhaul flights from the UK (Africa, Pakistan, India) and France (Africa)
- The low cost model is not really compatible with longhaul air traffic because of a different cost structure

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Derivation of possible factors on longhaul flights at secondary airports

External factors *(not controllable by airport managements)*

- **Hub congestion:** Non-hubs as suitable alternative for carriers without a sufficient number of "grandfather rights"
- **Hub distance:** Secondary airports might benefit from a large distance to the nearest hub and from a remote location
- **Local demand:** An attractive catchment area could boost the chance of attracting longhaul services

Internal factors *((in)directly controllable by airport managements)*

- **Political involvement** (Deregulation of bilateral air service agreements, undertaking of infrastructure investments, improvement of airports' intermodal connectivity, allowance of nightly flights)
- **Marketing** (Market research, Pricing, PR)

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Empirical test of the identified factors

Conduction of a multiple regression and/or panel analysis

- Dependent variable: seats or cargo capacity offered on direct longhaul flights from the respective airport per unit of time (year)

- Independent variables must describe the factors derived above

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Empirical test of the identified factors

Definition und quantification of the variables

Variable	Indicator(s)
Distance to the nearest hub	**km**
Utilization of the nearest hub / congestion	**dummy (congestion / no congestion)**
Size of the catchment area	**Population in all NUTS 2 regions whose largest city is located less than 90 minutes from the airport Number of immigrants in the catchment area**
Economic power in the catchment area	**GDP/capita, unemployment rate**
Runway length and strength	**m (length) or dummy for different classes of longhaul capability**
Airport curfew	**dummy**
Intermodal connectivity	**dummy**
Pricing and marketing	**landing fee in EUR / t for typical widebody aircraft and marketing support**
Market research	**dummy**

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Empirical test of the identified factors

Conduction of a multiple regression analysis

First results

- Analysis so far conducted for Germany only
- Not many significant variables because of a small sample (only 16 airports)
- GDP/capita relatively stable

→ When the necessary data have been collected, the sample will be extended.

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- Factors that might influence the supply of longhaul flight supply at secondary airports have been derived and will be empirically tested.

- Results might be used to give recommendations to airport planners: Will a runway extension boost longhaul flights at my airport?

- In case studies, the economic viability of forthcoming airport extensions at FMO, HHN or SXF (BBI) will be analysed.

→ Possible contribution to the prevention of further misallocation of airport infrastructure

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Thank you!