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Analysis of the Variabilization of Airport Charges, in Germany

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Outline

- Background
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  - Variability, Trend and Levels
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  - Relative weight of aircrafts
  - Countervailing power of airlines
- Correlations
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  - Congestion
  - Ownership (or Regulation?!)
  - Cost Structure
- Effects
- Conclusions

Background – **Liberalization and Deregulation**

- First, the Airlines
- Competition, survival
- Race to the bottom, cut costs
- Pressure on the airports
- Not only levels, but also structure important

- Then, the Airports
- Some competition, but debate
- More business oriented
- Non-aviation revenues gain importance
- But still aviation revenues most important

Background – **Sample of Airports**

Aprox. 90% of total passenger traffic

Airport	Passengers, 2007
FRA	54,161,856
MUC	33,959,422
DUS	17,831,248
TXL	13,357,741
HAM	12,780,631
CGN	10,471,657
STR	10,321,438
HAJ	5,644,582
LEJ	2,719,256
BRE	2,232,018
DRS	1,849,836
FMO	1,606,425
TOTAL	**166,936,110**

Source: ADV

Background – **Fleet Mix**

Share of the fleet mix,
in the total number of flights

Small Airports

Airport	Aircraft Family	Average	2007
BRE	B737	37,7%	51,7%
DRS	A320	49,9%	58,0%
FMO	CRJ	40,1%	52,1%
LEJ	BAE146	46,9%	60,0%

Medium-sized Airports

Airport	Aircraft Family	Average	2007
CGN	B737	51,2%	67,5%
HAM	A320	50,0%	59,4%
STR	CRJ	58,9%	60,1%
TXL	BAE146	73,9%	81,5%

Big Airports

Airport	Aircraft Family	Average	2007
FRA*	B737	58,3%	61,9%
MUC	A320	64,7%	67,5%
DUS	CRJ	68,6%	73,1%
	BAE146		

Four aircraft families cover a significant share of flights, for all airports

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Representative fleet mix

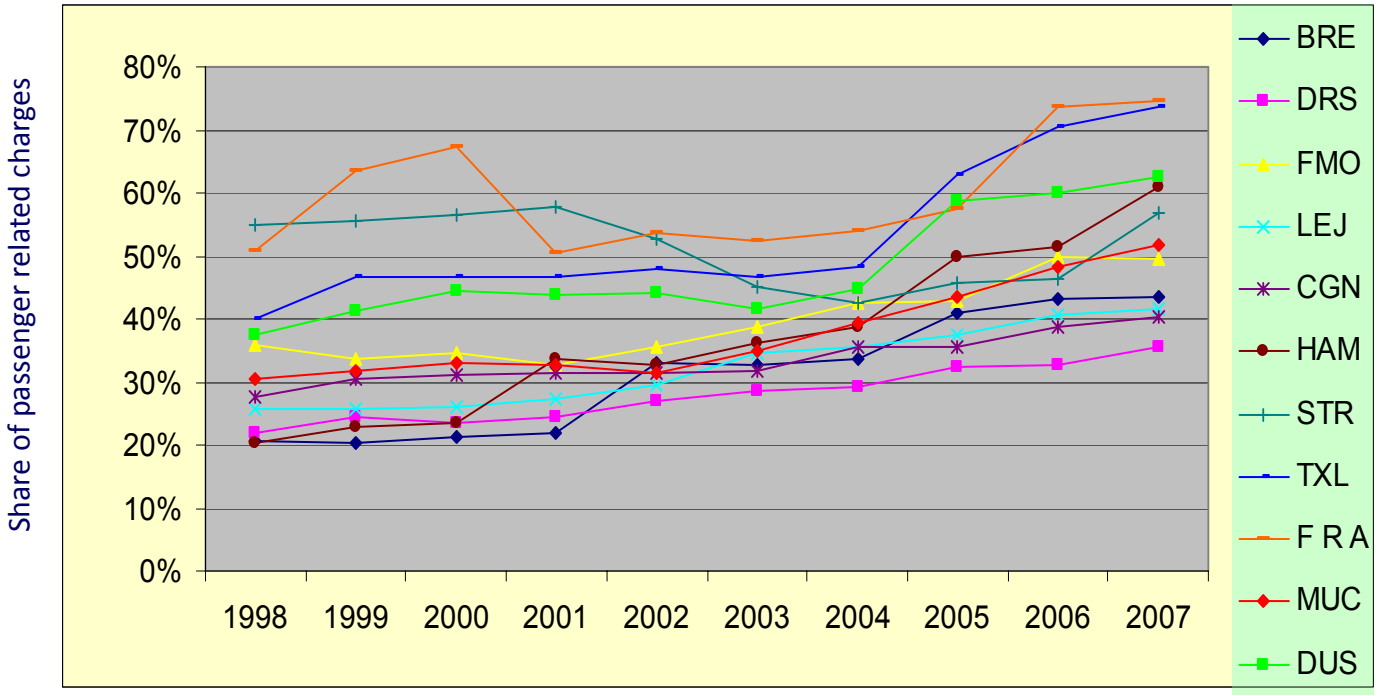
* For Frankfurt Airport, the B747 also an important source of revenue

Source: Own calculations using data from *Arbeitsgemeinschaft Deutscher Verkehrsflughäfen* (ADV)

Background – **Definitions**

- Variable charges = passenger related charges
- Fixed charges = weight/aircraft related charges
- Variability = share of passenger related charges in total charges
- Variabilization = the process by which the share of passenger related charges is increasing

Background – **Variability, Trends**



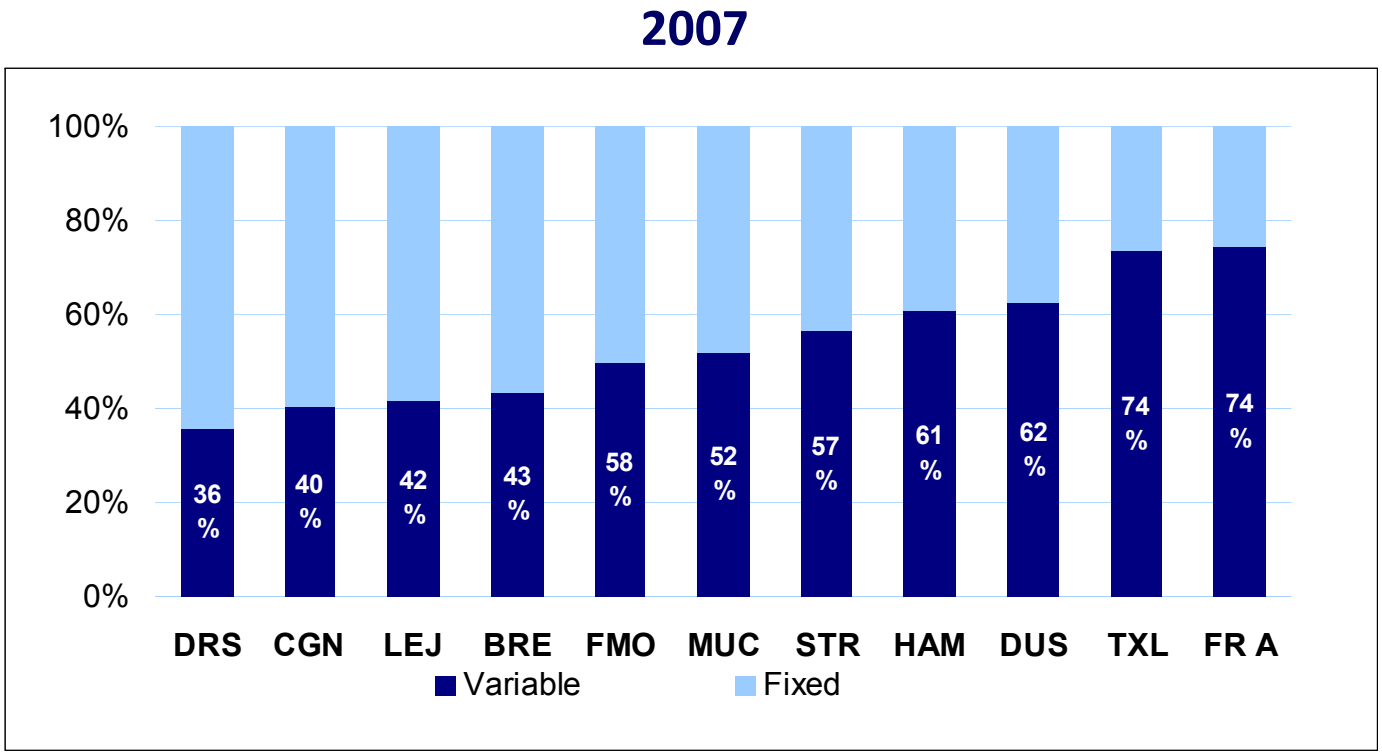
Doesn‘t cover the cargo market

Source: Own calculations using Published Charges Manuals
Aircraft characteristics from manufacturer‘s official webpage

Assumptions: Seat Loading Factor = 80%
Ground Handling was excluded

General trend towards variabilization

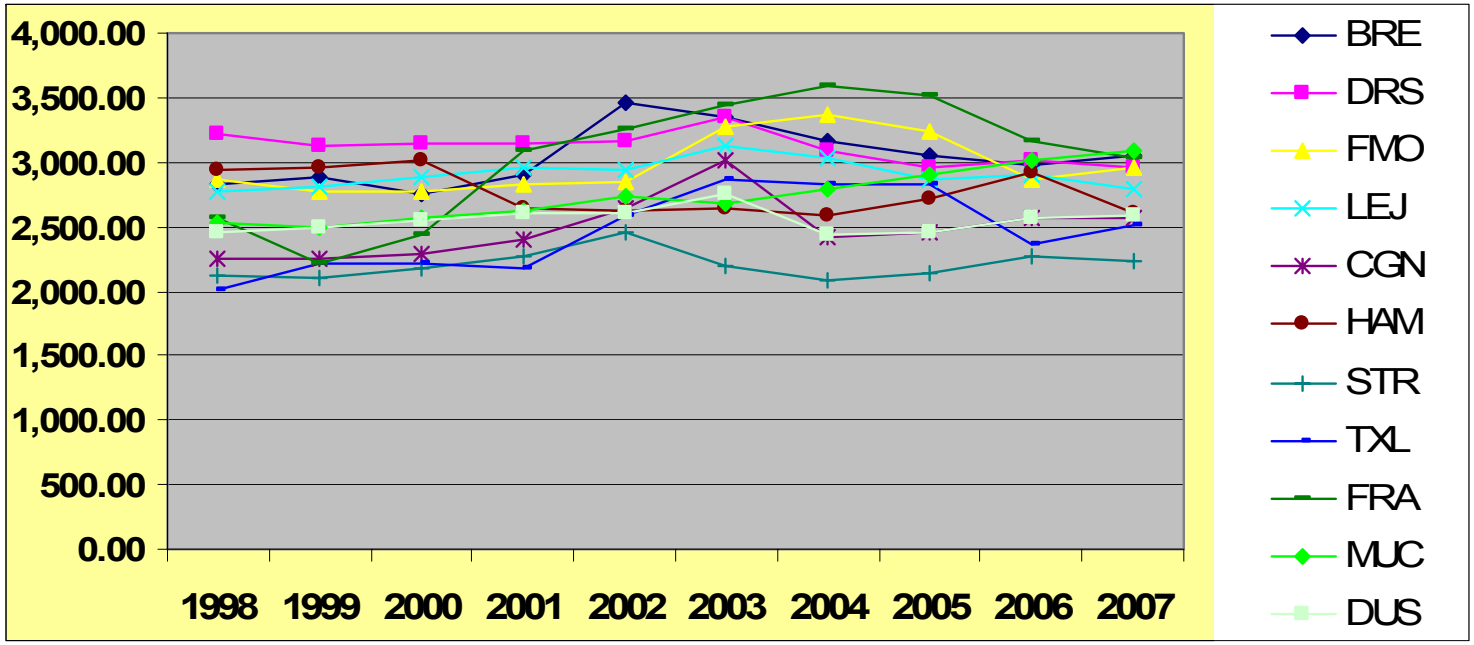
Background – **Variability, Levels**



- Although it varies among different airports, the share of passenger related charges has reached already very high levels, for some airports

Background – **Expensiveness, Trends**

Weighted average costs per turn-around flight



- No significant price increase over the period

Average inflation rate **1,5%**

Reasons – **Airline efficiency**

Old More Weight based	New More Passenger based
• Passenger traffic ↑↑ + • Seat Load Factor ↑	• Passenger traffic ↑↑ + • Seat Load Factor ↑ + • Variable Charges ↑
Revenues ↑	**Revenues ↑↑**

Reasons – **Aircraft's weight**

Assumption: Technological advancements made that aircrafts become lighter. Airports switched towards more passenger related charges to compensate for relative loses

Aircraft	Typical Seating	MTOW	Tonnes /Seat	Year of First Delivery
A320	150	73.5	0.490	1987
A321	185	83	0.449	1993
A319	124	64	0.516	1995
A318	107	59	0.551	2002
A330/300	335	230	0.687	1993
A330/200	293	230	0.785	1997
A340/300	295	275	0.932	1991
A340/200	239	275	1.151	1992
A340/600	380	372	0.979	2001
A340/500	313	372	1.188	2002
A380	525	560	1.067	2007

Source: Airbus Official Website

Aircraft	MTOW	Seats	Tonnes /Seat
Airbus A-300-600	172	*267*	0.64
Airbus A-319-100	68	*121*	0.56
Airbus A-320-100	68	*145*	0.47
Airbus A-321-100	**93**	***145***	**0.64**
Airbus A-321-200	**89**	***173***	**0.51**
Boeing B737-300	67	*118*	0.57
Boeing B737-500	**62**	***99***	**0.63**
Boeing B737-800	**80**	***180***	**0.44**
CRJ-100	24	*49*	0.49
CRJ-700	35	*70*	0.50
FK10	45	*101*	0.45
DHC8-400	29	78	0.37

Source: ADV

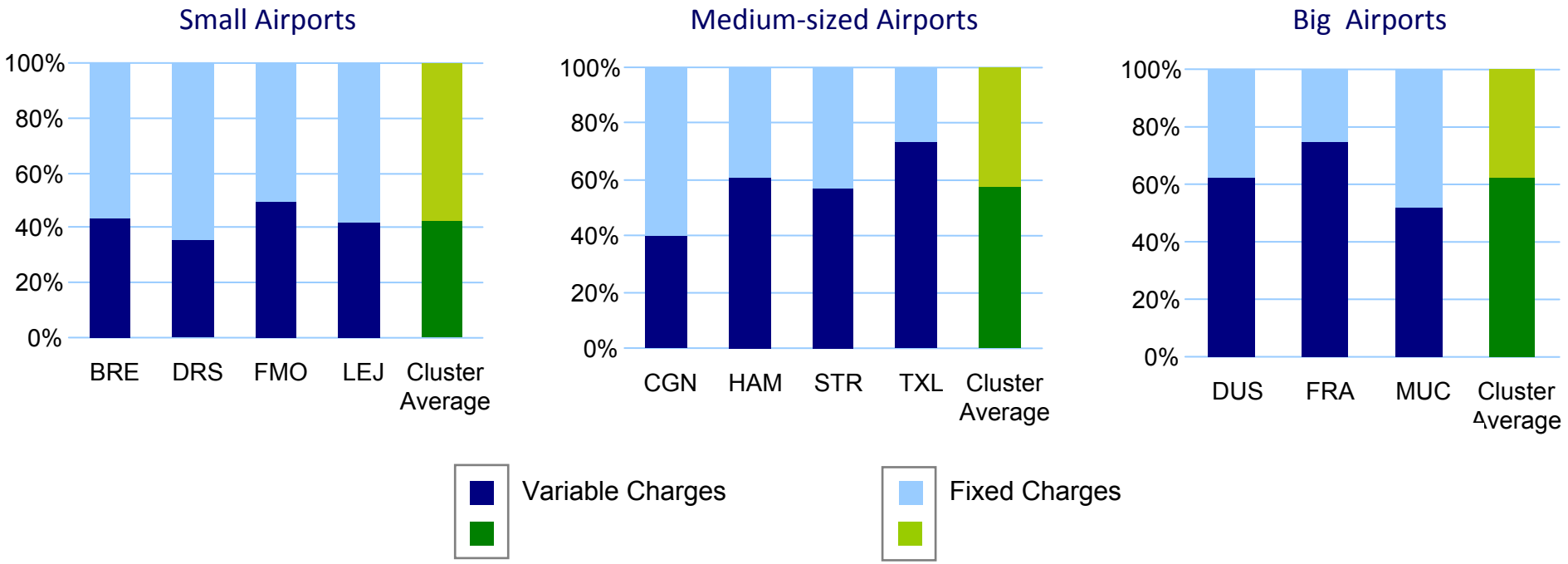
- More investigation needed

Reasons – **Countervailing Power of Airlines**

- Traditional thinking is airports are natural monopolies
- However:
  - If the sunk cost characteristic is clear
  - It is not clear at which point the economies of scale stop to exist
- Moreover:
  - Germany has a dense network of airports (average distance 77km)
  - And very good roads and rail infrastructure
- Additionally:
  - Airlines - large, sophisticated companies – might be able to threaten convincingly with a withdrawal from an airport

Correlations – **Scale, Levels**

2007

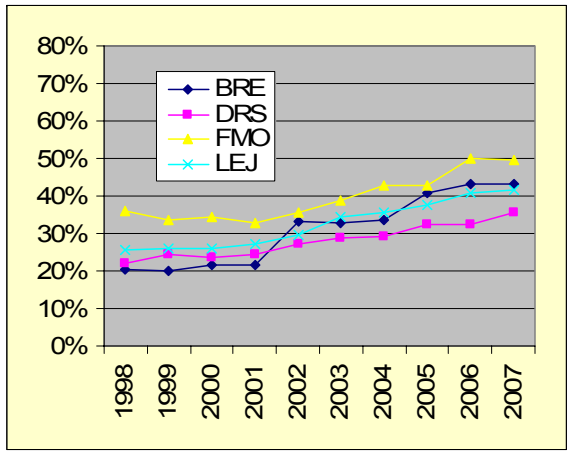


- It is clear that smaller airports tend to have a lower variability

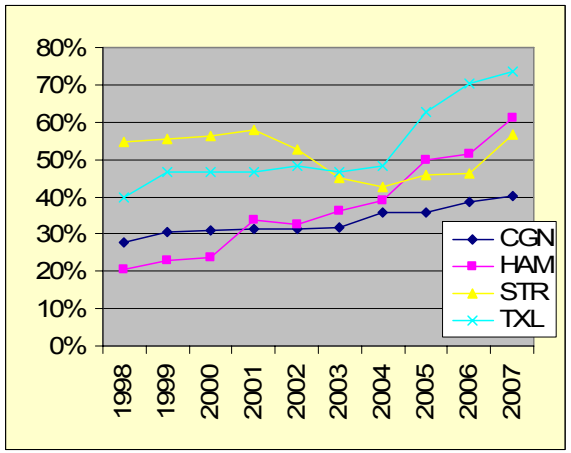
Correlations – **Scale, Trends**

1998 - 2007

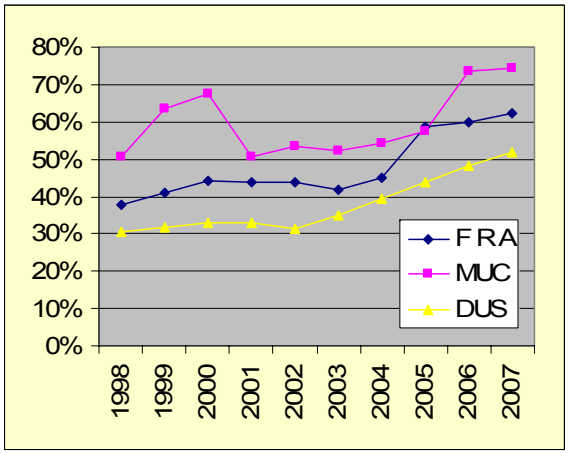
Small Airports



Medium-sized Airports

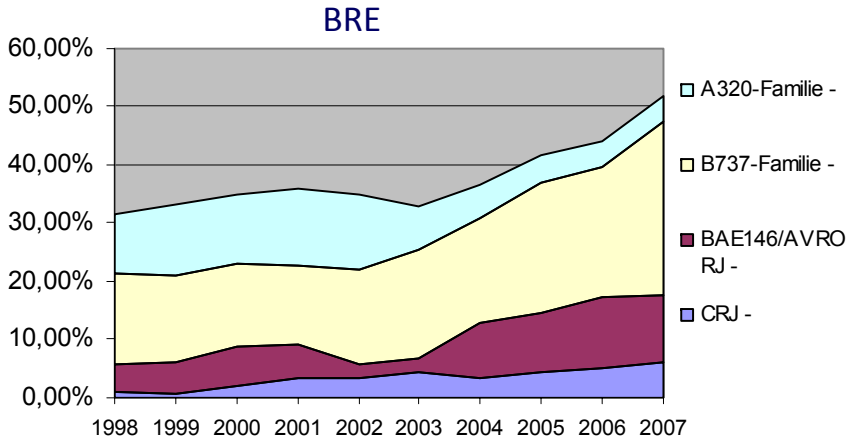


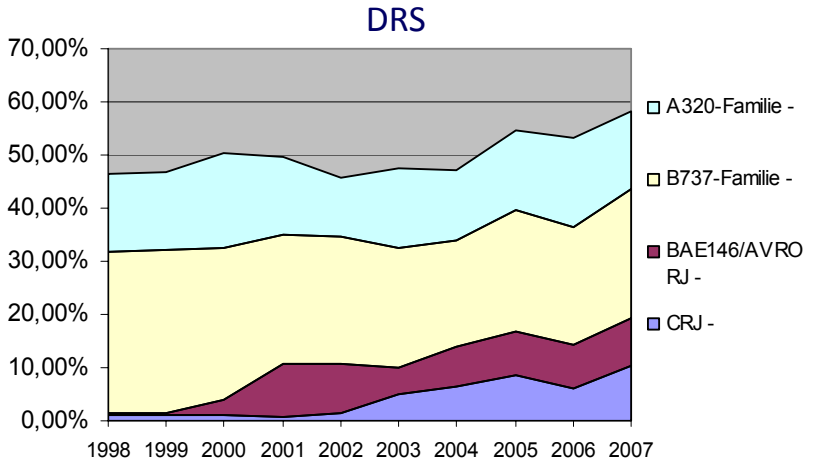
Big Airports

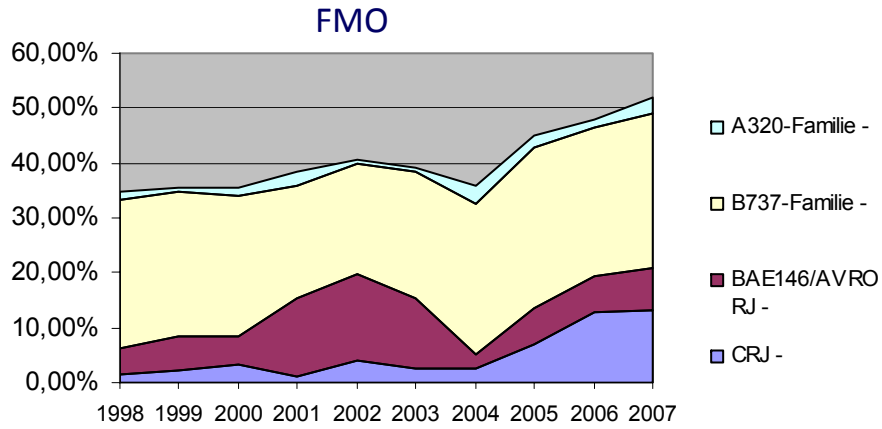


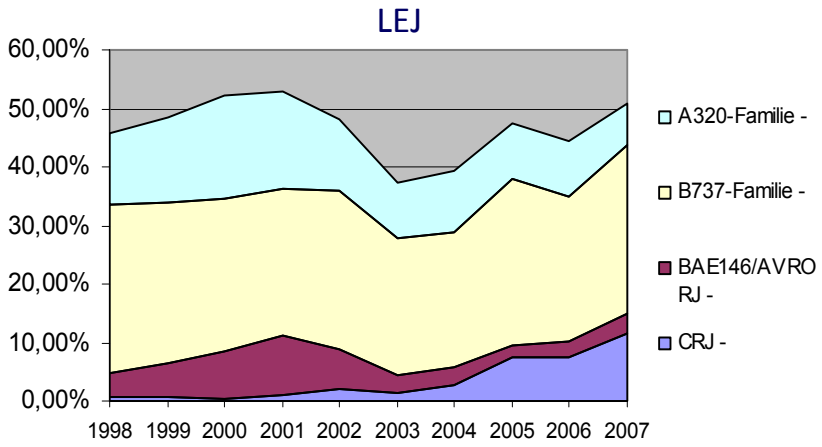
- Small airports tend to increase the share of variable charges at a slower pace compared to medium- and big-sized airports

Correlations – **Scale, Fleet Mix Changes**





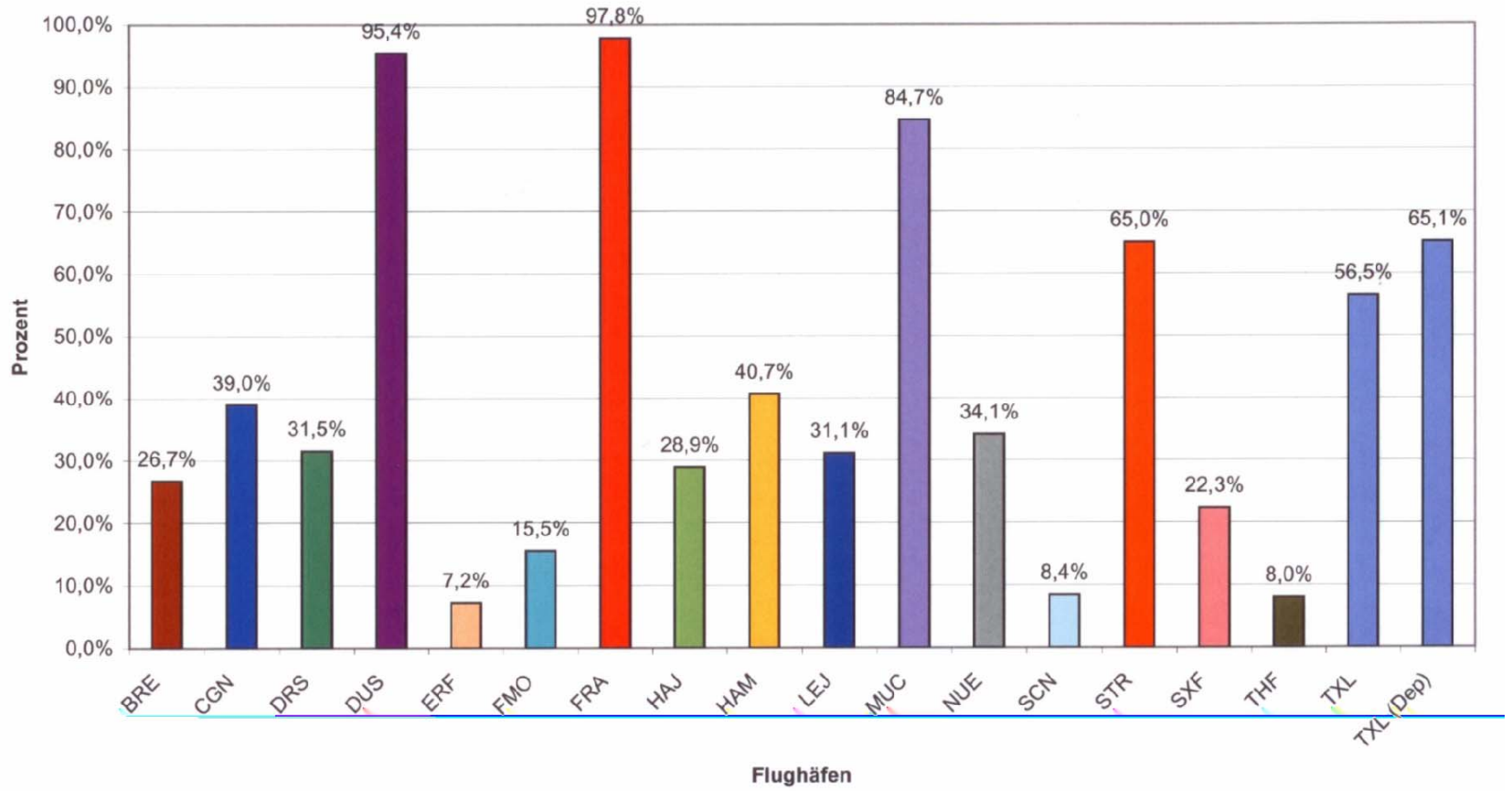




- The share of smaller aircrafts (here, especially CRJ) is expading
- This could counterbalance the desire of small airports to hurry up with the process of variabilization

Congestion – **Congestion I**

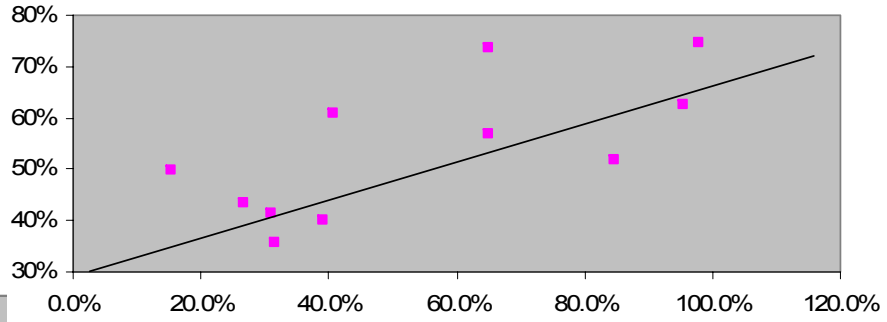
Peak Hour Analysis, 2007 R60M, Day 1-5, 6-22 (local)

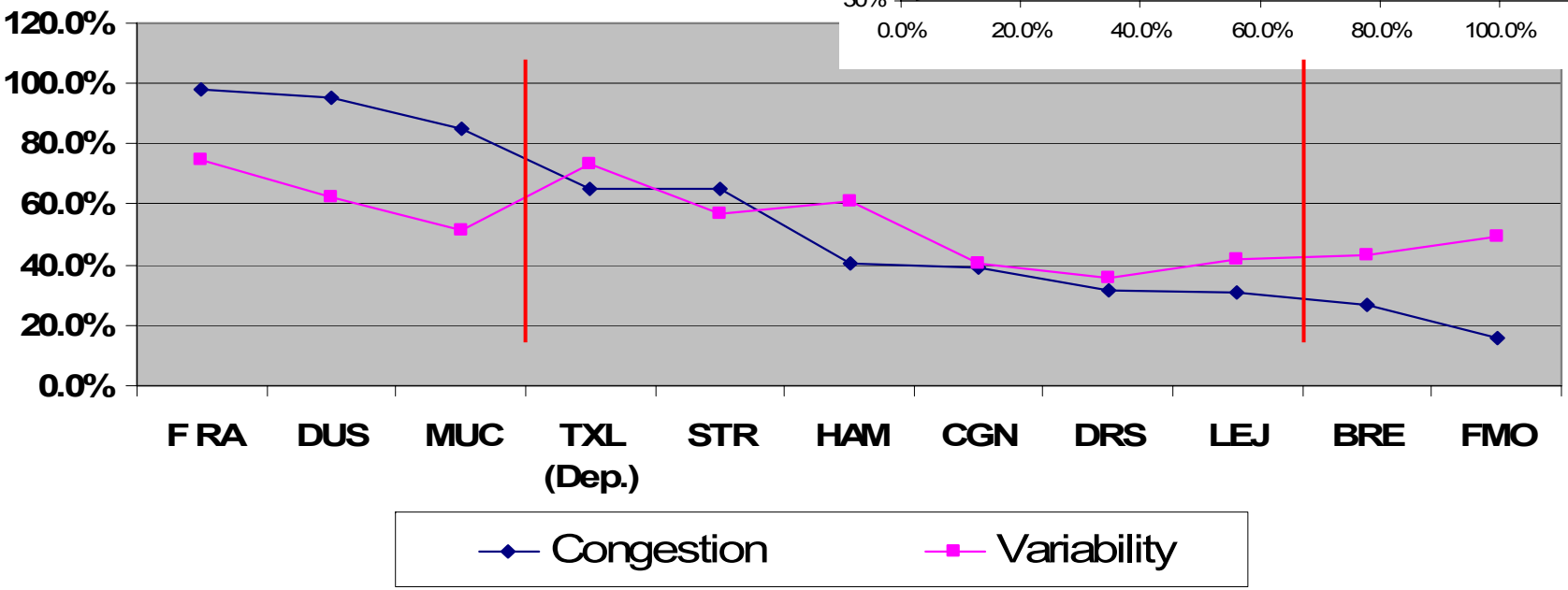


Source: fhkd – German Airport Coordinator

Correlations – **Congestion II**

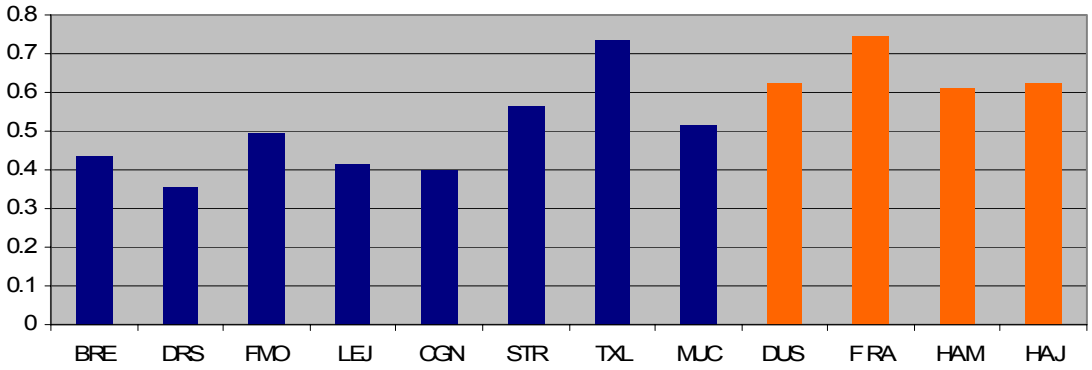
There seems to be a connection between the level of variabilisation and congestion





However,
congested airports (to certain degrees) are only 4 or 5 in Germany, the others have free capacities.
So, in the end, is there any real connection between the two?

Correlations – **Ownership**



Public	Partially Privatised
BRE	DUS
DRS	FRA
FMO	HAM
LEJ	HAJ
CGN	
STR	
TXL	
MUC	

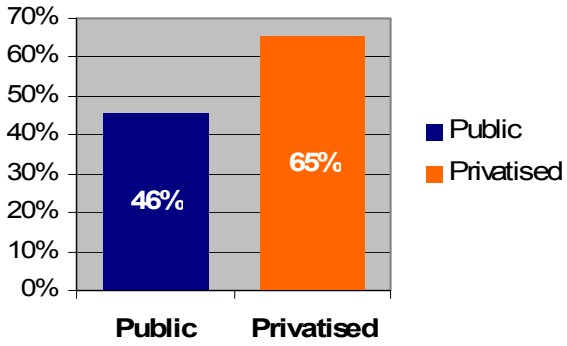
Source: ADV

- It seems that there is a connection also between the ownership structure and the level of variability

- All the partially privatised airports are in the high variability club

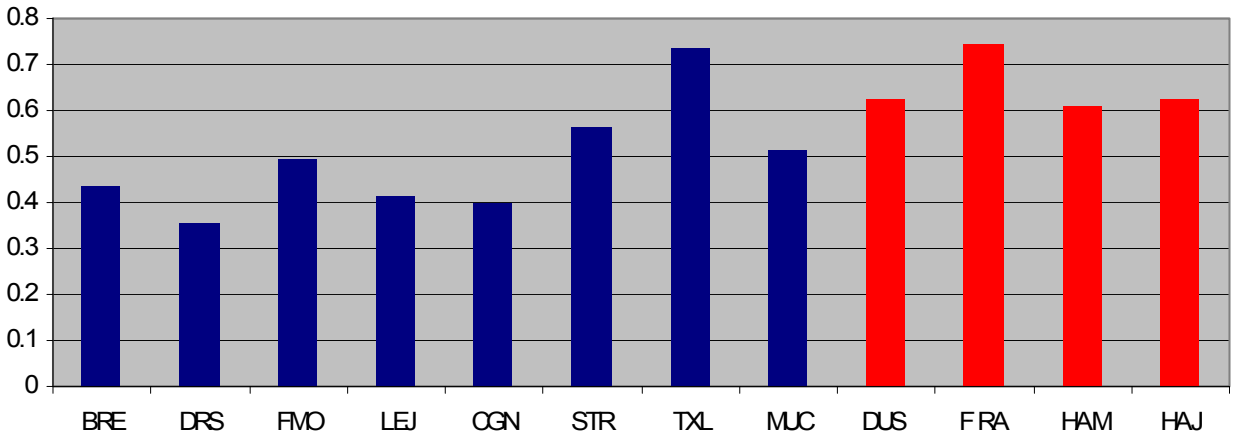
- The only exception is TXL

BUT,



Correlations – **Regulation**

- The partially privatised airports have, all of them, a price-cap regulation



Cost-based	Price-cap
BRE	DUS
DRS	FRA
FMO	HAM
LEJ	HAJ
CGN	
STR	
TXL	
MUC	

- It becomes increasingly difficult to distinguish the exact correlation
- Possible reason: ownership and regulation are linked
- However, variabilization seems more directly connected to regulation

Correlations – **Cost structure**

- The assumption is that airports simply adapted to the cost structure
- Data availability constraints did not allow us to test this statement, but:

I. Cost structure changed, so charges followed the same development Variabilization

Doubtless!
It is hard to believe that cost structure changed so much in only 10 years

or

II. Cost structure did not change much, just that now airports having new incentive scheme, adapted to that structure

More credible.
But, if so, what were the factors that did not allow them to adapt in the past?

Effects – **General**

- As long as passenger demand will increase, everyone would have only to profit out of this situation

- Risk of an exogenous demand shock
  - Short-term, risk may exist as SLF decreases, and smaller aircrafts
  - Medium-term, it is expected that airlines restore SLF.

- More sensible to market fluctuations means more market risk
  - May increase the over-all cost of raising capital, needed for infrastructure developments

Effects – **Demand Shock**

Airport \ Shock	0%	5%	10%	15%	20%	25%
BER	1.16	1.12	1.09	1.05	1.01	0.98
BRE	1.06	1.02	0.99	0.95	0.91	0.88
DRS	0.83	0.79	0.75	0.71	0.67	0.63
DUS	1.27	1.23	1.20	1.17	1.13	1.10
FRA	1.17	1.13	1.10	1.06	1.03	0.99
HAM	1.16	1.12	1.09	1.05	1.01	0.98
MUC	1.02	0.99	0.97	0.94	0.91	0.88
STR	1.10	1.07	1.03	0.99	0.96	0.92
CGN	1.23	1.19	1.14	1.09	1.05	1.00

2005 (or **2004**)

Total Revenues

Total Costs

Source: Own made calculations

Assumptions: Only aeronautical revenues are affected
The impact on the different segments of demand (LCC, charter, business) equally distributed

Total Revenues = Aviation Revenues + Non-aviation Revenues

↑

Shock here

Opinions about variabilization

- Graham Anne, 2003
    - Such situation is desirable as airport charges become more related to the revenue stream of the airlines
- Klenk Michael, 2004
    - Airports should bring a greater participation to the market risk, by incorporating more of the real market conditions
- We are not saying that this is necessarily a bad thing. But, in all cases, it should not be ignored.

Conclusions

- Identifying the precise reason for airport charges variabilization proves to be a challenging task
- But, most probably there is a constellation of factors which concurred to create such a development
- Risk - The main concern is how to avoid critical situations. When conditions are bond the decisional outcome may be suboptimal
- **Further research**
  - Look also at LCC - an indicator of competition
  - Interesting to study also the situation in other countries
  - Find better risk estimations

Questions

- What are other hypothesis to test?
- Is variabilization a natural process?
  Should IATA adapt?

Thank you for your attention.

GERMAN AIRPORT PERFORMANCE

A Joint Project of:
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Comments and Feedback from the Audience (1)

- Seat Loading Factor of 80% might be too high (this is usually valid for charter operators, but for others is less). Recommendations:
  - Use a lower SLF
  - Use SLF different each year (try get SLF yearly estimations)
  - Or apply a sensitivity analysis and see how variabilization changes (70-80%)
- Leisure and Charter did not like variabilization under a price-cap regime
- To test the aircrafts become lighter hypothesis - need the declared data of airlines, about aircraft characteristics – analysis relevant
- True LCC airports (HAHN) may have 100% passenger charges. Construct a separate sample of LCC airports and analyze them.
- Price elasticity doesn't allow airlines to pass on the whole tax-box.
- IATA is already aware of variabilization and acts accordingly. After all, every shift in charges structure goes through them. IATA acts as a second regulator.
- With variabilization, if an airline fails, it is easier for another airline to replace it. Does this represent a diminished risk? – (Risk of a failing airline)

Comments and Feedback from the Audience (2)

- Leave out scale correlation. Better try to test competition. But how to assess competition?
- Other hypothesis to test
  - Share of main carrier at the airports. Correlate with the level of variabilization.
- Congestion. Differentiate between full-time excess demand and temporary excess demand
- From the congestion correlation chart it comes out that current charges structure do not contribute to allocate capacity efficiently.
- How to phase out small aircrafts? ie. Fraport used min. tonnage
- Price-cap regulation survived only in HAM. The others discontinued (did not extend the contracts). It matters a lot how you design the formula.
- HAM, probably the most successful airport in Germany. The price-cap formula worked. But also consider the investment environment in which HAM exists.