



Privatization, Commercialization, Ownership Forms and their Effects on Airport Performance

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Outline

- ◆ Introduction
 - ◆ Privatization, Ownership and Firm Performance:
 - General Literature; Airports
 - ◆ Modelling the Effects of Airport Ownership
 - ◆ Data Sources, Sample Airports and Variable Construction
 - ◆ Empirical Results
 - ◆ Summary and Further Research Needs
- **Comments on performance of privatized ANS**

Introduction

- ◆ Worldwide Trend - **Corporatization, commercialization, and privatization of airports**
 - Access to private sector capital
 - To improve productive efficiency
- ◆ Different models of ownerships and governance:
 - 100% privatized
 - mixed ownership with private majority
 - mixed ownership with government majority
 - public corporation
 - independent airport authority
 - multi-level government corporation
 - Government branch ownership and operations
- ◆ U.S. Airports have remained mostly as government-owned and operated



Objective of the Paper

To examine the effects of ownership forms, and institutional structures on airport performance in terms of their productive efficiency, profit, and user charges.



Literature Summary on Firm's Performance



- ◆ **Agency theory and strategic management literature** suggest that ownership form influences firm performance because different owners
 - pursue different goals;
 - design different incentives for managers;
- ◆ **A common view:** government-owned firms are less efficient than their private sector counterparts operating in similar environment.



Literature summary on firm's performance – cont'd



- ◆ Government firm's efficiency performance depends heavily **governance structure, and degree of management autonomy**;
 - E.g., Some say that many US airports enjoy high degree of autonomy, and thus, are “among the most privatized in the world”.

- ◆ Privatized firm's efficiency performance depends heavily on **whether or not its product market is competitive**.
 - privatized airlines and telecom firms became very efficient since they face competitive market;
 - but not sure about **monopoly infrastructure like airports, ANS; performance depends partly on type of regulation**



Modelling the Effects of Airport Ownership and Governance Structure

◆ Productivity levels as a function of:

- Ownership and Governance Form
- Management Strategy Variables
- Airport Characteristics and Business Environment
- **The remainder: Technical (residual) efficiency**

◆ Ownership forms investigated:

government department, public corporation,
independent airport authority, mixed ownership with
a government majority, mixed ownership with
private sector majority, multi-level government
corporation.



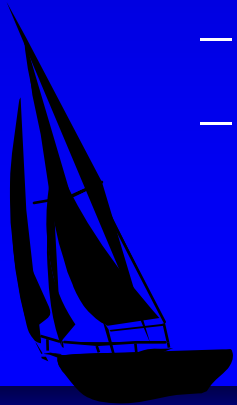


◆ Management Strategies

- Extent of business diversification (non-aviation commercial activities)
- Degree of outsourcing

◆ Airport Characteristics (beyond managerial control):

- Airport size
- Average size of aircraft
- Composition of airport traffic.
- Capacity Constraint





Variable Factor Productivity (VFP)

Index number approach:

$$\text{TFP} = \text{Output Index} / \text{Input Index}$$

$$\text{VFP} = \text{Output Index} / \text{Variable Input Index}$$

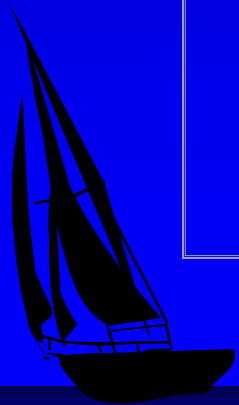
- * Alternative methods of measuring efficiency are being compared for our 2006 airport benchmarking report.





Airport Inputs and Outputs

Inputs	Outputs
<ul style="list-style-type: none">- Labor- Other non-capital (soft cost) inputs	<ul style="list-style-type: none">- Aircraft movements (ATM)- Passengers handled- Non-aviation output including commercial services- (Cargo could not be included – revenue not available separately)



Data Sources

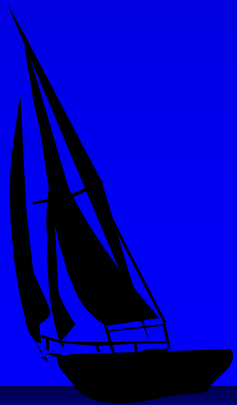


- ◆ Airport Annual Reports and direct requests;
- ◆ US FAA, DOT statistics;
- ◆ ICAO Digest of Statistics:
 - annual financial data -- not for all airports
- ◆ ACI; IATA
 - annual traffic statistics
 - Capacity information
- ◆ IMF and World Bank – various price indices including GDP deflators for service sectors and PPP





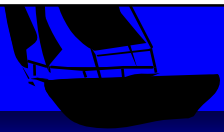
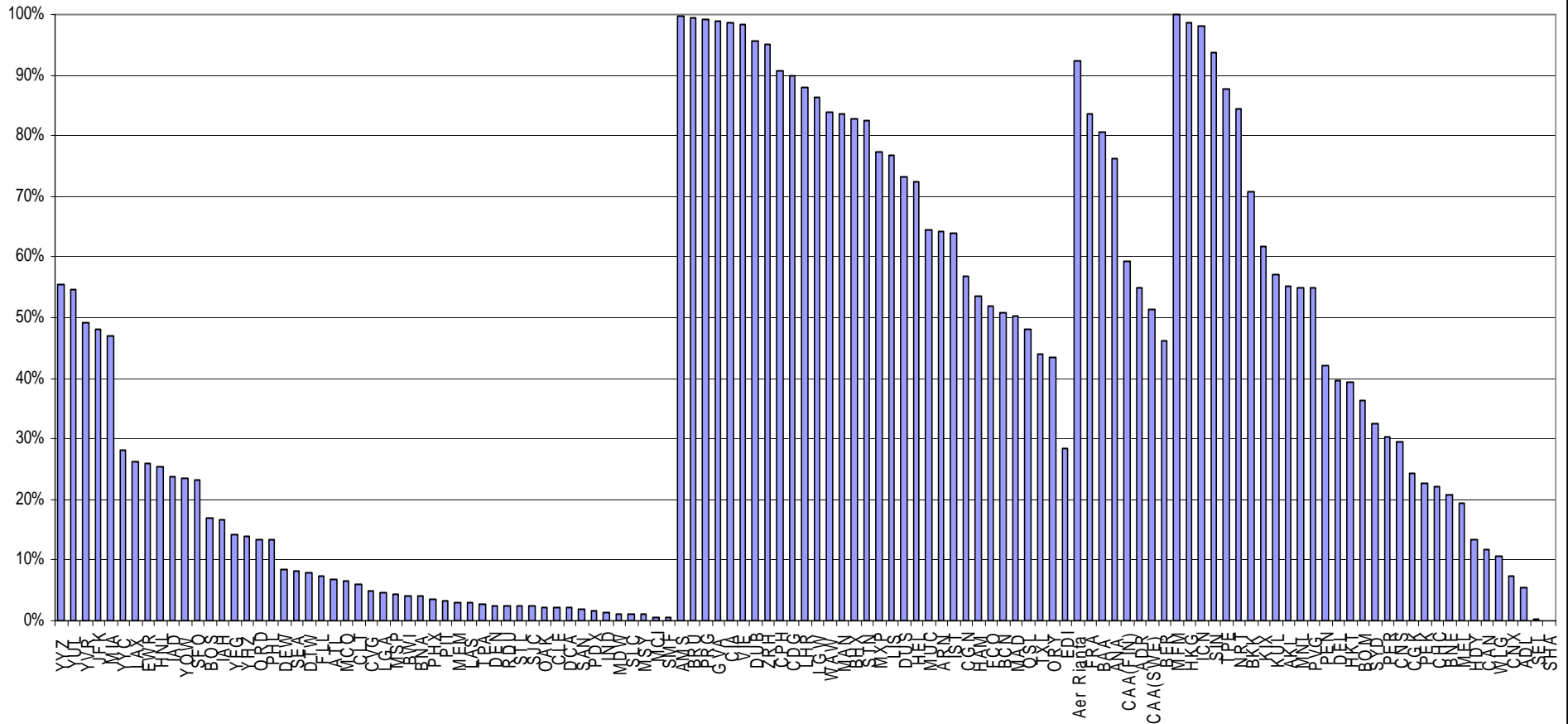
Selective Airport Characteristics



Sample airport characteristics

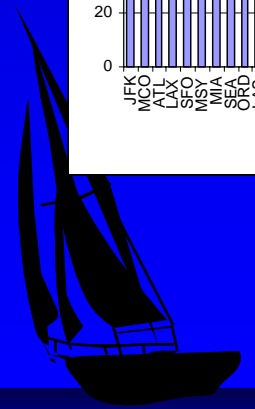
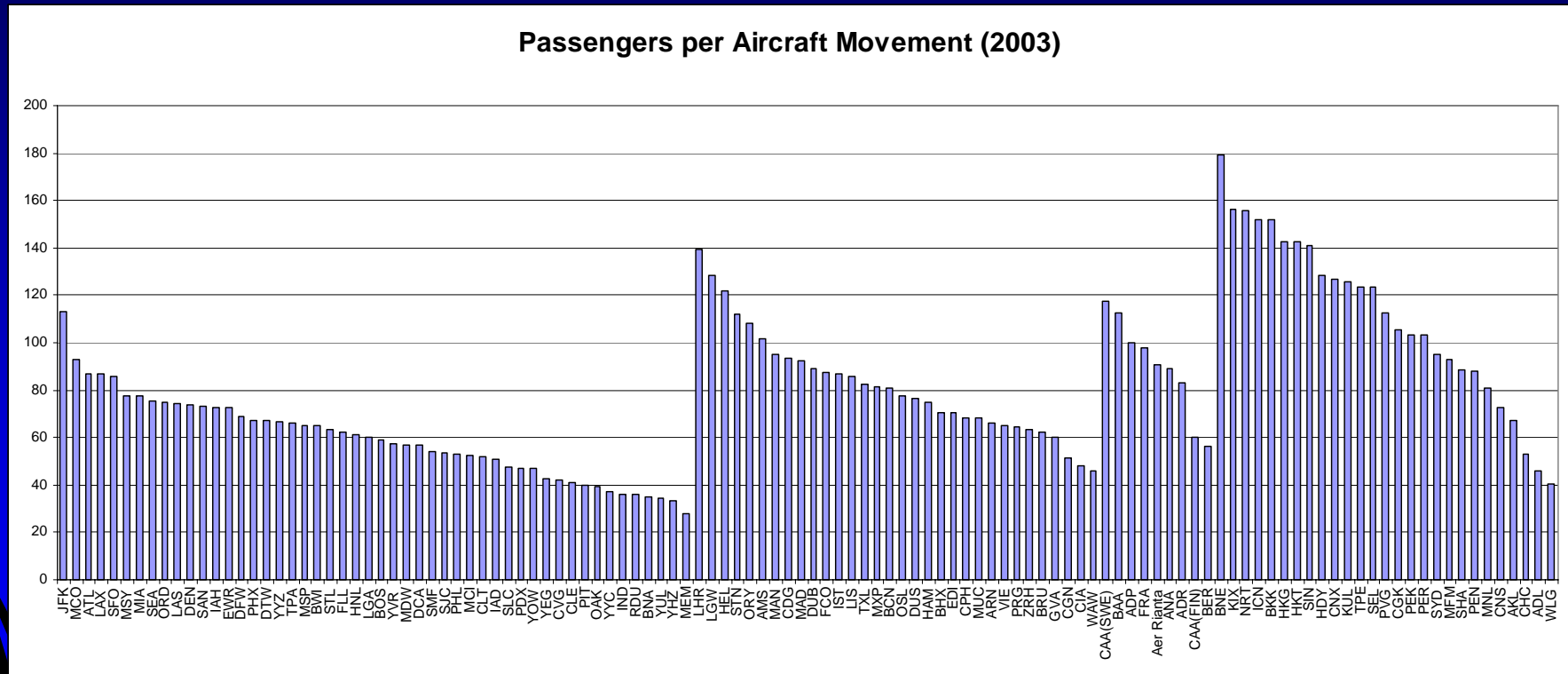


Share of International Passengers (2003)





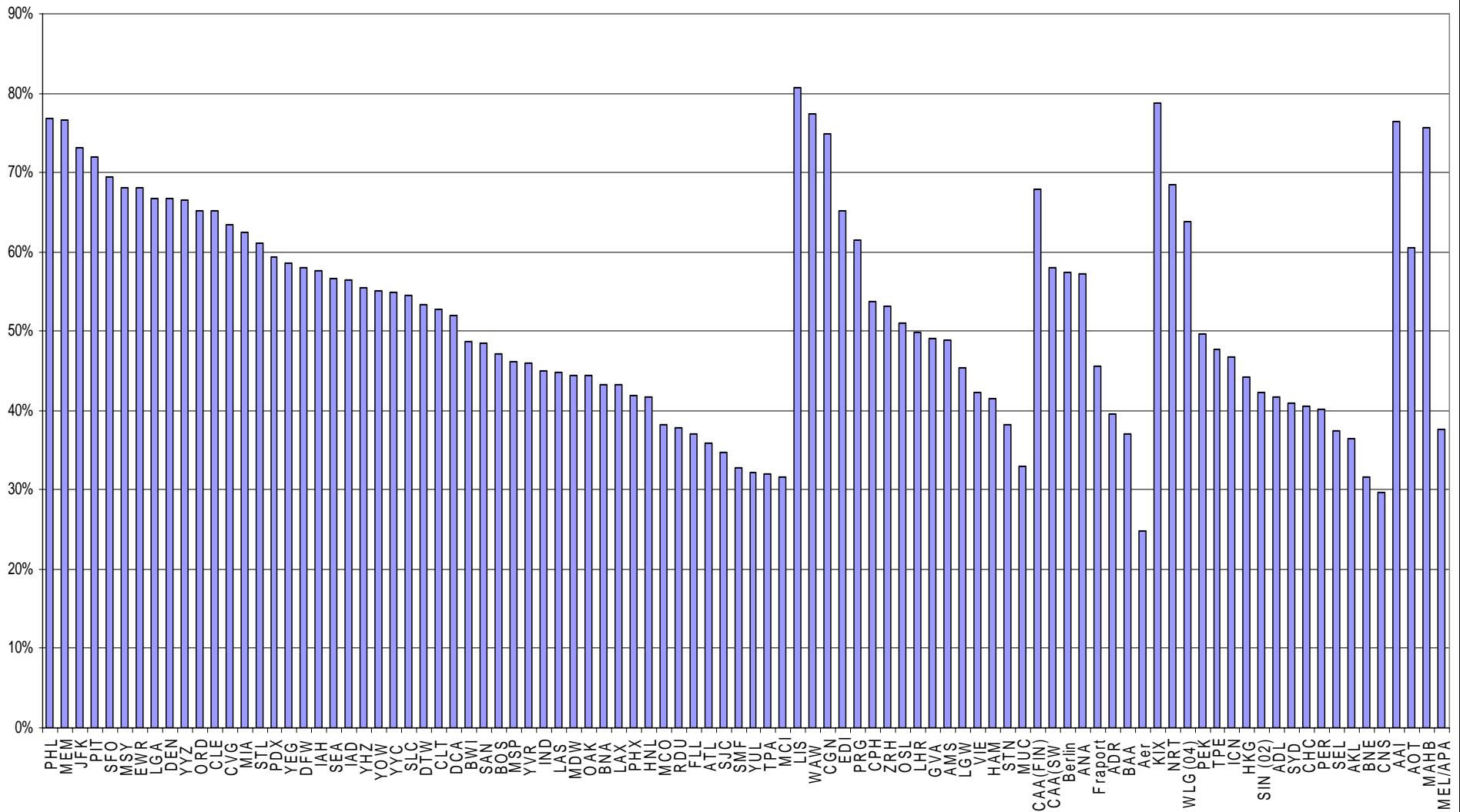
Sample airport characteristics



Sample airport characteristics

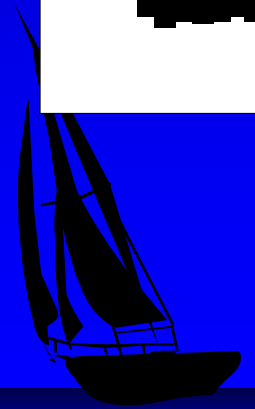
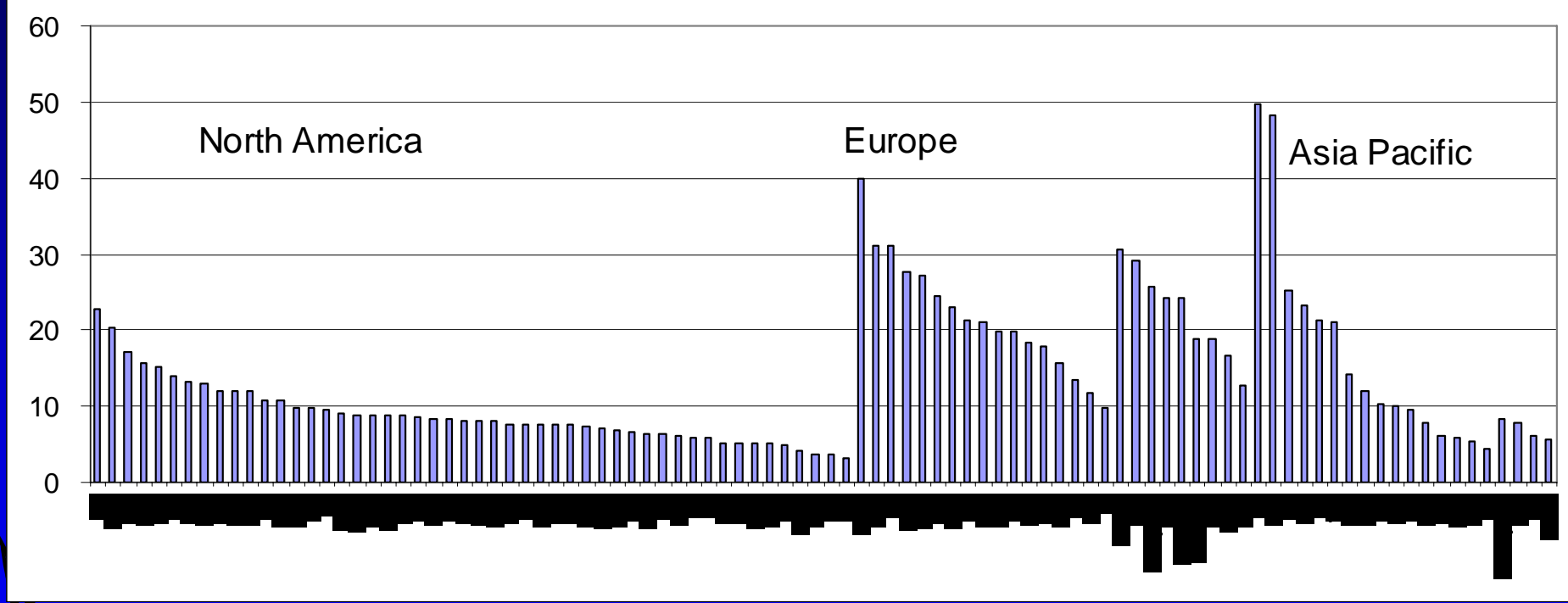


Figure S-5: Aeronautical Revenue Shares (2003)





**Figure S-6 Revenue per Passenger (2003)
US\$**



Results on Operating Efficiency -VFP

Table 3: Variable Factor Productivity Regression Results – Log-Linear Model
(Base ownership: airport with a private majority)

Model	1		2		3	
Dependent Variable	VFP		VFP		VFP	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Intercept	0.776	-	-0.531	-	0.689	-
Output Scale (Index)	0.080	1.99	0.029	0.58	0.076	1.56
Runway Utilization (ATM per Runway)	-	-	0.101	1.71	0.045	0.80
Aircraft size (Pax /ATM)	-0.161	1.94	-0.128	1.51	-0.303	3.19
* Europe	-	-	-	-	0.599	3.74
* Asia-Pacific	-	-	-	-	0.628	2.83
%International	-0.010	0.51	-0.008	0.38	-0.035	1.65
* Europe	-	-	-	-	-0.316	1.96
* Asia-Pacific	-	-	-	-	0.139	3.52
%Non Aviation	0.574	9.04	0.565	8.92	0.504	7.70
%Cargo	0.019	0.65	0.021	0.74	0.013	0.45
Asia	-0.623	4.60	-0.612	4.52	-3.403	3.17
Europe	-0.453	3.40	0.234	0.55	-2.720	3.03
Oceania	0.410	2.72	0.432	2.86	0.508	3.58
2002	-0.066	1.35	-0.060	1.22	-0.054	1.18
2003	-0.081	1.66	-0.069	1.40	-0.067	1.45
<i>Ownership/Governance Form Dummy Variables:</i>						
U.S. Govt Department	-0.046	0.34	-0.031	0.24	-0.056	0.44
N. America Airport Authority	0.026	0.18	0.047	0.34	0.0176	0.13
100% Public Corporation	-0.047	0.54	-0.038	0.44	-0.012	0.14
Mixed Ent. (majority-gov)	-0.341	2.95	-0.303	2.58	-0.225	1.98
Multi-Gov shareholders	-0.287	2.91	-0.264	2.65	-0.331	3.51
R ²	0.6846		0.6885		0.7336	
Adjusted R ²	0.6647		0.6674		0.7107	
Log-Likelihood Value	-57.27		-55.71		-35.84	
Observations (n)	254		254		254	

Private majority airports focus more on commercial revenue

Table 4 Ownership Form vs Shares of Non Aeronautical Revenue

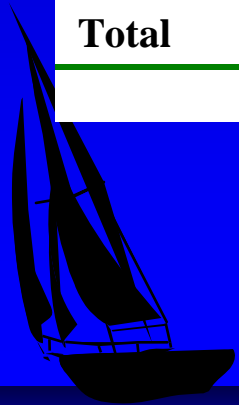
Groups	Count	Sum	Average	Variance
N. American Airport Authorities	78	35.87	46%	0.016
Public Corporation	44	21.02	48%	0.020
Government majority	14	5.25	37%	0.014
Private-Majority	32	18.20	57%	0.013
Multi-Government.	16	8.72	55%	0.018
US Government Dept	70	34.65	50%	0.014
Source of Variation	SS	df	MS	F
Between Groups	0.510	5	0.102	6.447
Within Groups	3.928	248	0.016	
Total	4.439	253		



Private majority airports achieve higher operating margin

Table 5 The Effects of Ownership on Operating Margin

Groups	Count	Sum	Average	Variance
N. American Airport Authorities	27	10.62	39%	0.012
Public Corporation	16	5.80	36%	0.153
Government majority	5	0.98	20%	0.092
Private-Majority	16	9.02	56%	0.016
Multi-Government.	6	1.37	23%	0.082
US Government Dept	26	8.09	31%	0.041
Source of Variation	SS	df	MS	F
Between Groups	0.975	5	0.195	3.771
Within Groups	4.653	90	0.052	
Total	5.628	95		



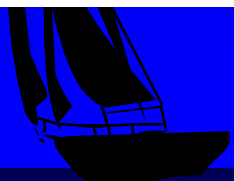
Private majority airports do not charge higher aeronautical fees



**Table 6b The Effects of Ownership on Airport Charges
Aeronautical Revenue per Work Load Unit***

Groups	Count	Sum	Average	Variance
N. American Airport Authorities	26	123.55	4.75	6.93
Public Corporation	16	125.67	7.85	47.13
Government majority	5	35.91	7.18	11.53
Private-Majority	15	90.07	6.00	9.20
Multi-Government.	5	49.56	9.91	28.30
US Government Dept	26	129.43	4.98	30.05
Source of Variation	SS	df	MS	F
Between Groups	206.019	5	41.204	1.867
Within Groups	1919.567	87	22.064	
Total	2125.586	92		

* A Work Load Unit (WLU) defined as one passenger or 100 kg of cargo.



Empirical Results on Ownership Forms

- ◆ Corporatized Airports owned/operated with govt majority is **less efficient than those owned by private majority or 100% gov't corporation;**
- ◆ NO statistical evidence indicating that **airports with private majority** are more efficient than airports owned/operated by **US. Government departments or 100% public corporations** (note: privatized airport also has monopoly power, not necessarily more efficient).
- ◆ Airports operated by *U.S. and Canadian Airport Authorities* are no more efficient than the airports operated by US government departments;
- ◆ Airports with government majority and airports owned/operated by multiple governments are **the least efficient.**

Empirical Results on Ownership Forms – cont'd

- ◆ Airports with private majority achieved **significantly higher profit margins** than others, despite the fact that they generally charge lower aeronautical charges (because of **their vigorous pursuit of commercial opportunities**).
- ◆ (Airports with extensive outsourcing achieve higher efficiency)



◆ Further research:

- Building more time-series data (longer panel data);
- Use of alternative measurement methods such as stochastic frontier cost functions, other cost function methods, and DEA.
- Structural modeling and other model-based research needed





Thank You

*2006 ATRS World Conference:
Nagoya Japan, 26-28 May;*

*2007 ATRS World Conference in Asilomar, Monterey, CA – to
hosted by UC-Berkeley (Mark Hansen and Nextor), 21-23 June*

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