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.

◆ 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.
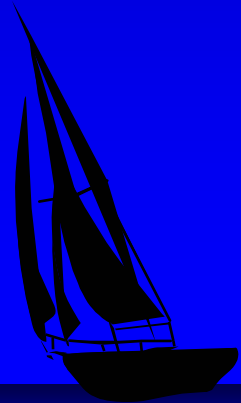
◆ **Management Strategies**

– 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:

    TFP = Output Index / Input Index

   **VFP = Output Index / Variable Input Index**

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

Airport Inputs and Outputs

Inputs	Outputs
- Labor - Other non-capital (soft cost) inputs	- Aircraft movements (ATM) - Passengers handled - Non-aviation output including commercial services - (Cargo could not be included – revenue not available separately)
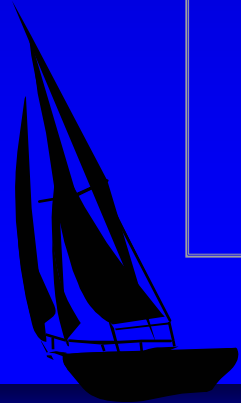
Data Sources

◆ 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
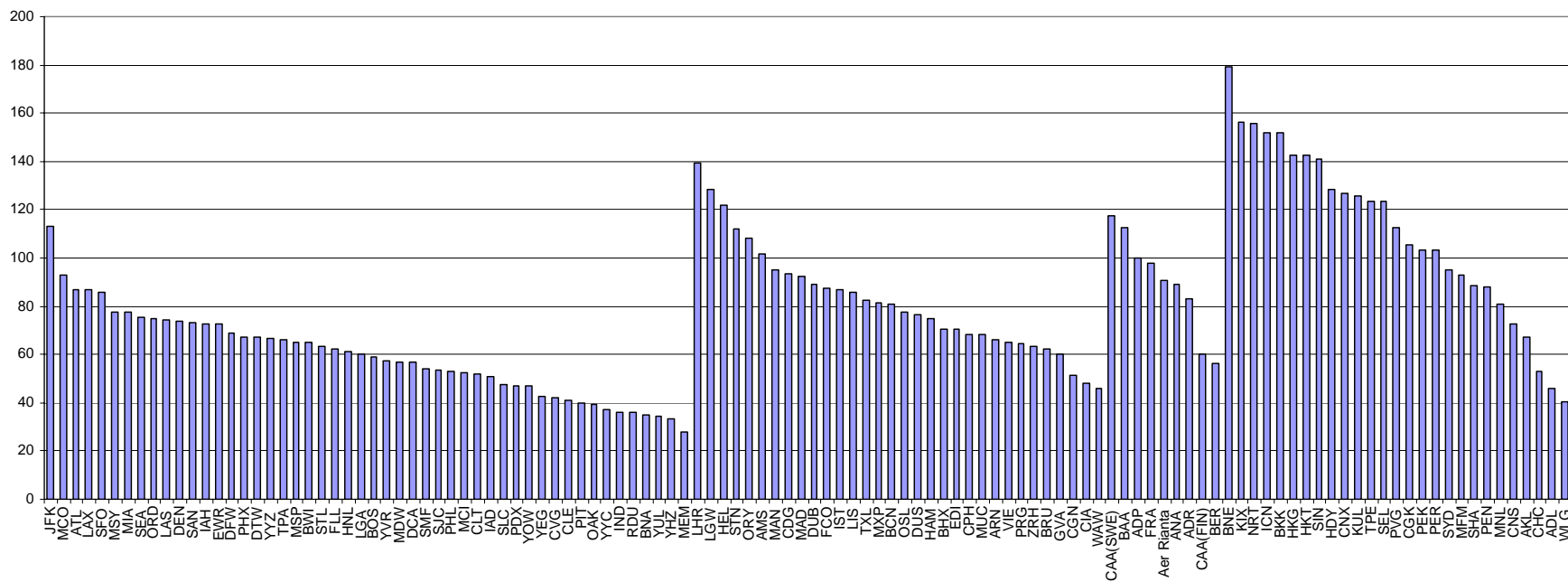
Selective Airport Characteristics

Share of International Passengers (2003)

Sample airport characteristics

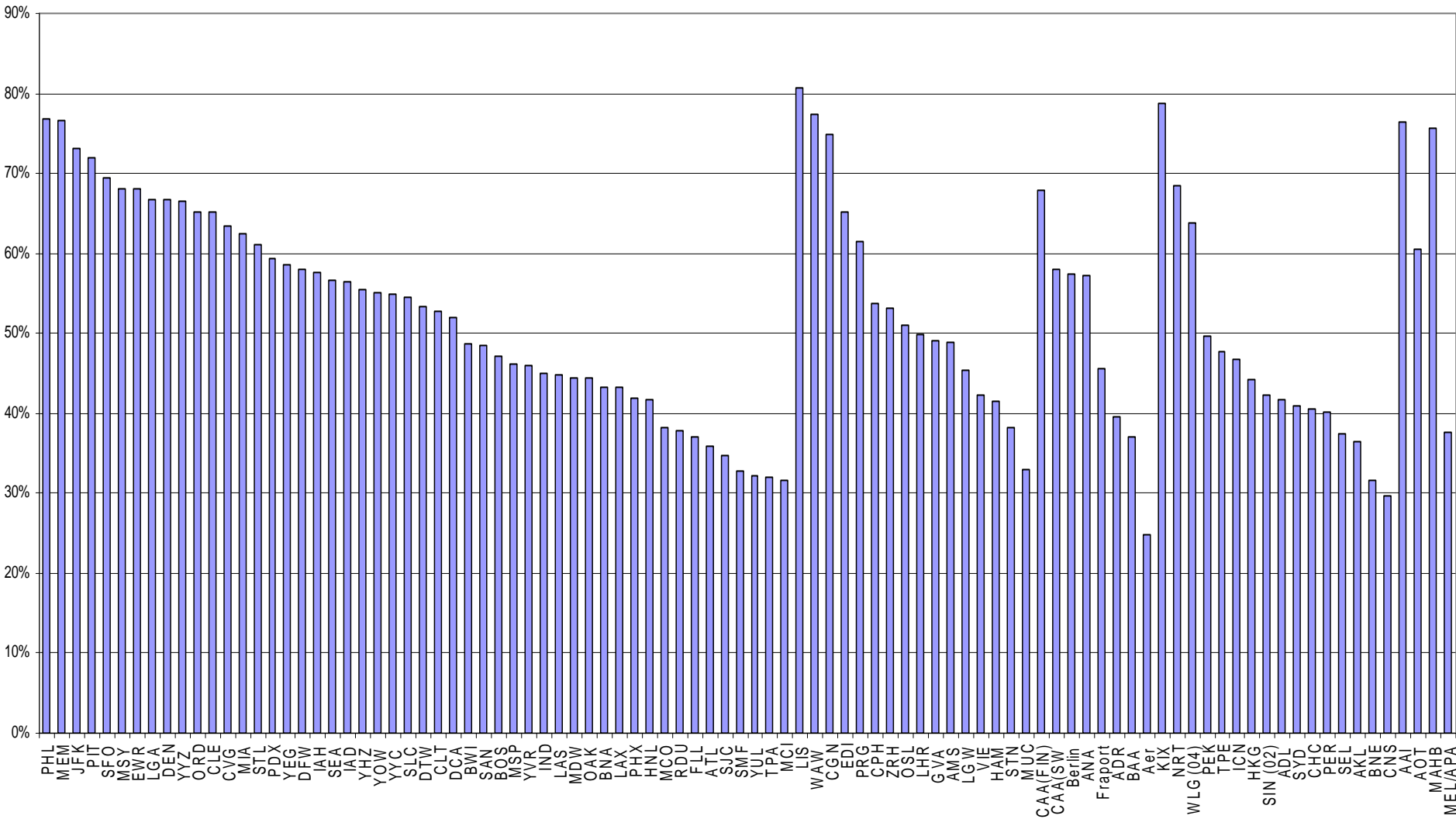Passengers per Aircraft Movement (2003)

Figure S-5: Aeronautical Revenue Shares (2003)

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

North America   Europe   Asia Pacific
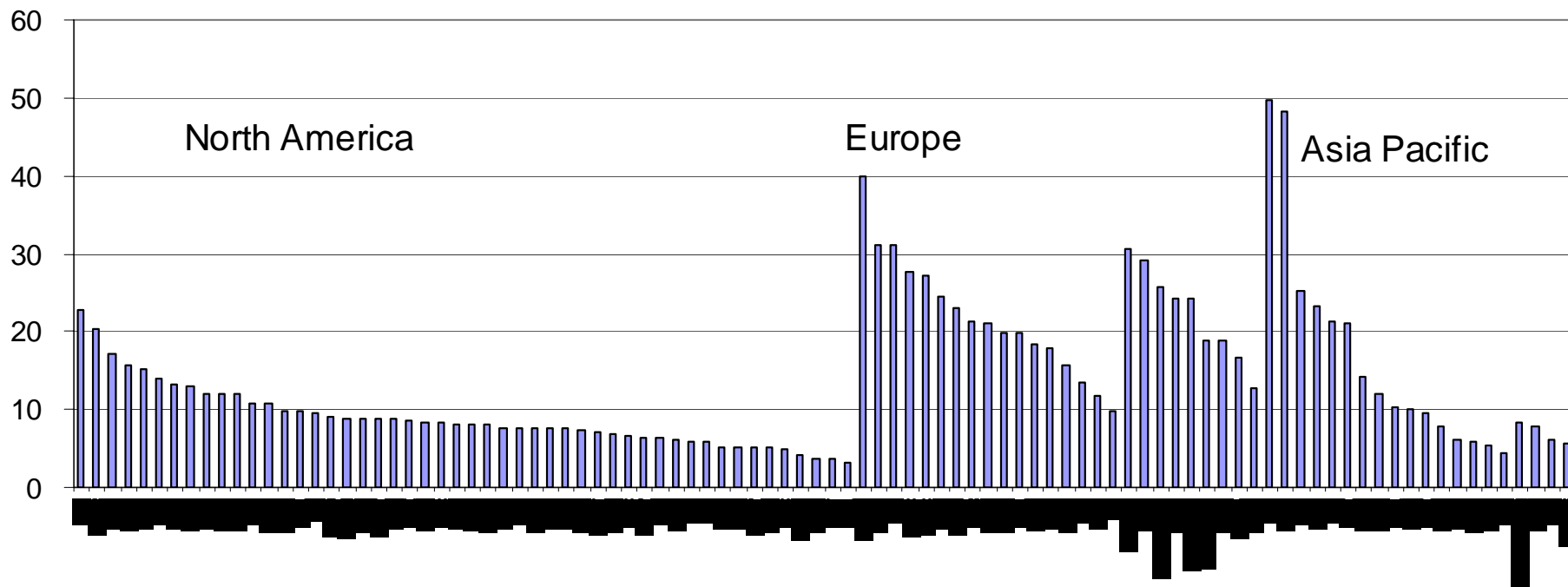
Results on Operating Efficiency -VFP

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
Ownership/Governance Form Dummy Variables:						
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

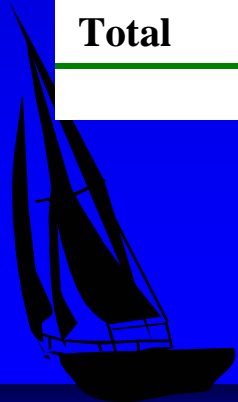| Groups	Count	Sum	Average	Variance
N. American Airport Authorities	78	35.87	46%	0.016
Public Corporation	44	21.02	48%	0.020
Government majority	14	5.25	37%	0.014
Private-Majority	32	18.20	57%	0.013
Multi-Government.	16	8.72	55%	0.018
US Government Dept	70	34.65	50%	0.014
Source of Variation	SS	df	MS	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		

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.
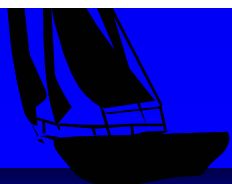
Empirical Results on Ownership Forms

◆ 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.**

◆ 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
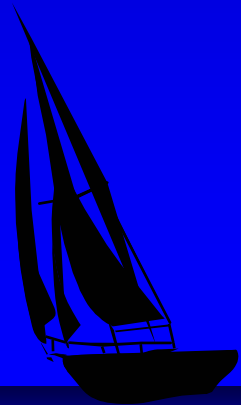
Thank You

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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