COMPAIR: Economic Modelling Governance

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compair

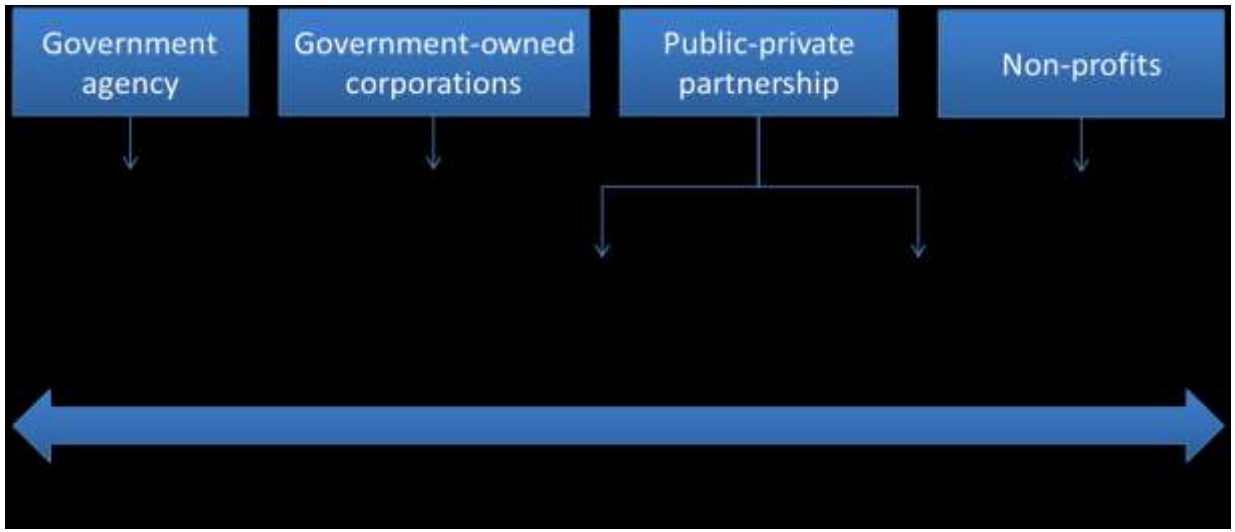
Competition for Air Traffic Management

Outline

- Ownership models today in ATM
- Influence of ownership
    - Literature
    - Small economic model
    - Data
- Conclusions

Ownership models today

- Ownership and governance models
    - A large variety over countries
    - Increased involvement of ATM customers -> higher customer focus



Organisation form ANSP

Country	ANSP	Towers	Centers	Employees	Organization
Australia	Airservices Australia	29	2	4,204	Gov't-owned corporation
Belgium	Belgocontrol	5	1	919	Public company
Canada	NAV CANADA	42	7	4,832	Private company
Finland	Finavia Corporation	25	1	1,612	Gov't-owned public limited corporation
France	DSNA France	86	5	7,846	State agency
Germany	DFS Deutsche Flugsicherung GmbH	16	4	5,938	Gov't-owned company
Greece	Hellenic Civil Aviation Authority	18	2	680	Civil service agency
Ireland	Irish Aviation Authority	3	2	642	Commercial state-sponsored body
Italy	ENAV, S.p.A.	40	4	3,276	Joint-stock company
Mexico	SENEAM	58	4	2,254	Gov't agency
New Zealand	Airways New Zealand	29	1	761	Gov't-owned corporation
Poland	Polish Air Navigation Services Agency (PANSA)	13	1	1,771	"Certified legal entity"
Portugal	NAV Portugal	10	2	993	Gov't-owned company
Romania	Romanian Air Traffic Services Administration (ROMATSA)	16	1	1,516	Self-financed government administration
Russia	State ATM Corporation	250	57	9,500	Gov't-owned corporation
Slovenia	Slovenia Control, Slovenian Air Navigation Services, Ltd.	4	1	215	Independent gov't-owned company
South Africa	Air Traffic & Navigation Services (ATNS)	23	2	1,050	Gov't-owned corporation
Spain	AENA	22	5	4,249	Publicly owned company
Switzerland	skyguide	14	2	1,330	Nonprofit joint-stock company
Turkey	State Airports Authority & ANSP (DHMI)	36	2	4,822	Gov't-owned enterprise
United Kingdom	NATS UK	16	2	4,440	Public-private partnership
United States	Federal Aviation Administration (Air Traffic Organization)	512	21	34,911	Federal agency (separate organization)

Source: Civil Air Navigation Services Organization, *CANSO Members*, available at http://www.canso.org/canso-members.

What does literature say?

- ANSPs
    - Elias (2015): no evidence one is better than the other
    - Button & Neiva (2014): DEA analysis: more efficient if closely linked to government ("counterintuitive")
    - Robyn (2015): "A cooperative approach, such as the NavCanada case, has shown to be superior, in theory and in practice"
- Airports
    - Adler & Liebert (2014): DEA analysis: public airports operated less cost efficiently than fully private airports (EU & Australia)
- General economic literature
    - Focusses on incentives
    - Laffont & Tirole (1991) : Cannot know a priory which one is better
    - Sappington & Stiglitz (1987): role of transaction costs

What does theory have to say?

Assume the following mixed goal function for ANSP

$$Goal^{ANSP} = \gamma_1^{ANSP_i} CS + \gamma_2^{ANSP_i} \pi^{ANSP} + \gamma_3^{ANSP_i} NI$$

- With consumer surplus (CS), with weight parameter $\gamma_1^{ANSP_i}$
- Maximization of profits (π^{ANSP}), with weight parameter $\gamma_2^{ANSP_i}$
- National interest (NI), with weight parameter $\gamma_3^{ANSP_i}$

ANSP has operating costs

$$OC_{ANSP} = D \cdot c = D \cdot (a + \theta - e)$$

- With D demand
- A fixed cost per flightkm controlled
- θ ANSP dependent cost (eg. Complexity)
- e imperfectly observable cost reduction potential – which comes at a cost $C_e = D \cdot \frac{\emptyset \cdot e^2}{2}$

ANSP receives income via charges, $p_{charge} = A + Bc(e)$

What does theory has to say?

The first order condition leads us to the following choice of efficiency

$$e^* = \frac{\gamma_2^{ANSP_i} + B(\gamma_1^{ANSP_i} - \gamma_2^{ANSP_i})}{(\gamma_2^{ANSP_i} + \gamma_3^{ANSP_i})\emptyset}$$

Hence we find that

- Effort is increasing in the weight attached to consumer surplus ($\gamma_1^{ANSP_i} > \gamma_2^{ANSP_i}$) and ($\gamma_1^{ANSP_i} > \gamma_3^{ANSP_i}$) – except if pure price cap.
- Effort is decreasing in the weight attached to national interest
- The effect decreases with the weight attached to profit

Assuming that public firms care more about national interest, this could lead to a lower effort level than a private firm with consumers in the board.

If the private firm is mainly interested in profit, it is not clear if the effort would be larger or smaller than in the case of a public firm/private firm with board.

And if we look into the data?

Estimation of

- Cost function
- Production function

Separately for En Route & Terminal

Using a dataset 2004-2014

- Data quality testing
- Missing data
- Construction of variables

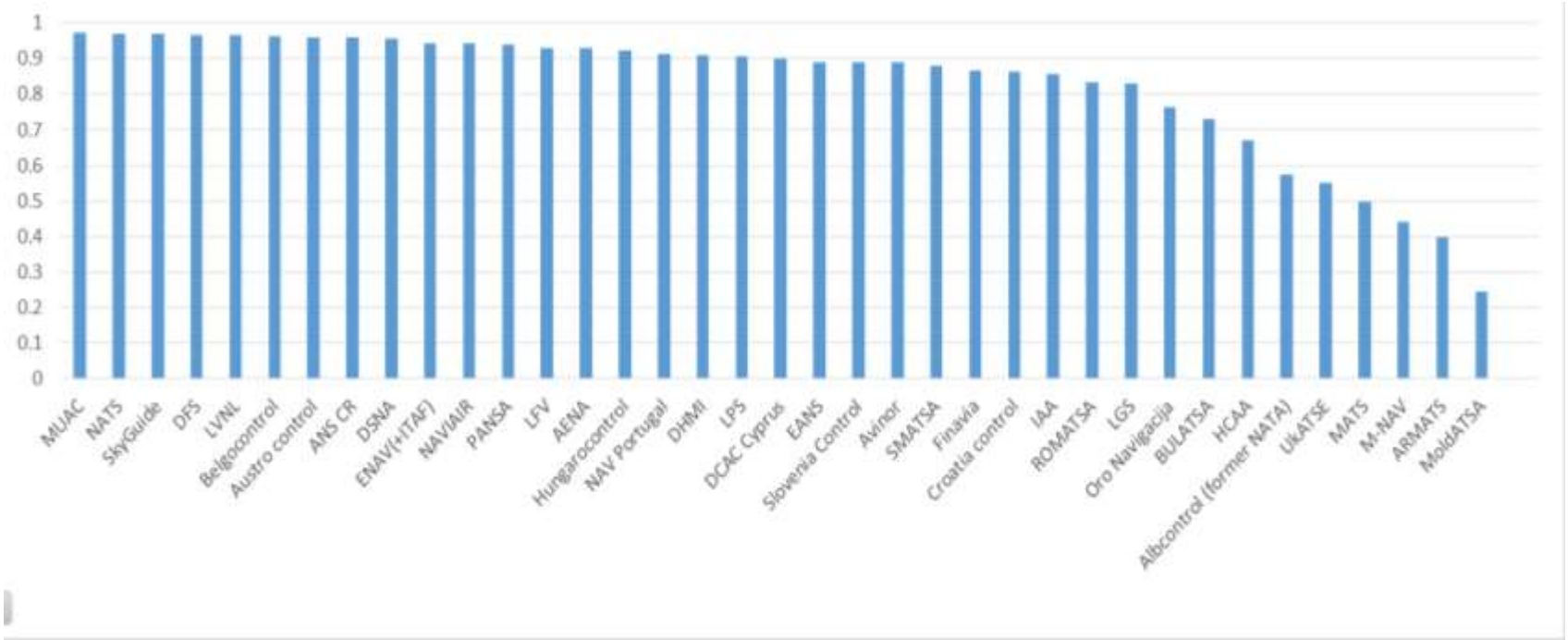
Used STATA – Stochastic Frontier Analysis

- Different specifications
- Different explanatory variables/sets of explanatory variables

And if we look into the data? (costs - En Route)

Variable	Coefficient	Std. Err.	P-value
W_ATCO	0.169	0.138	0.22
W_support	0.143	0.143	0.32
Kcost	0.019	0.024	0.42
Y_enroute	0.609	0.347	0.08
VAR	0.307	1.29	0.81
BUS	-1.03	0.359	0.00
DENS	0.473	0.448	0.29
COMPLEX	0.607	0.277	0.03
SIZE	0.231	0.249	0.36
trend	-0.013	0.016	0.41
CORP	0.474	0.293	0.11
PUBL-PRIV	0.581	0.556	0.30
σ^u/σ^v	2.88	0.560	0.00

And if we look into the data (average productivity efficiency – en route)?



No relationship ownership -> lack of variability?

Conclusion

In theory, one would expect positive effects (higher effort to control costs) of

- privatisation with stakeholders as shareholders
- inclusion of a board of stakeholders

This is also observed in the case of airports

But data is inconclusive

- Parameters with respect to ownership are not significant (but small variation)
- Parameters seems to suggest government owned is more efficient (also in Button & Neiva)
    - Linked to cross-subsidization?

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