Competition, Vertical Relationship and Countervailing Power: Empirical Evidence from the UK Airport Industry.

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Research Questions

- What is the role played by market structure in shaping airports' behavior?
- In particular, does competition between airports (upstream competition), concentration in the airlines industry (countervailing or buyer power) and intensity of competition among airlines (downstream competition) affect airport's aeronautical charges?
- Do downstream and upstream competition reinforce each other?

What We Do

- We consider a panel of the 24 largest UK airports observed over the period 1996-2008 to investigate whether an higher degree of product market competition tends to influence airports behavior:
  - We study whether an higher degree of concentration in the catchment area of each airport tends to increase airport fees;
  - We consider the possibility that the presence in an airport of an airline with a large market share (countervaling power) leads to lower airport fees;
  - We also analyse the role played by the intensity of downstream competition on aeronautical charges
  - Finally, we consider the joint role played by upstream and downstream competition on aeronautical charges.

Plan of the Talk

- Motivation
- Literature
- The UK airport industry
- Methodology
- Data
- Results
- Policy implications

Literature I

- The relationship between airport competition, airlines buyer power, airlines downstream competition intensity and aeronautical charges have been theoretically studied by Haskel et al (*J Urb Econ*, 2013). They have a model of an industry with upstream firms (airports) selling an intermediate input to downstream firms (airlines) that produce differentiated goods for consumers.
- They show that a more competitive airport industry always reduces airport fees
- Moreover, if the upstream sector is not monopolized, higher airlines countervailing power should reduce airport fees.

Literature II

- The model predicts that more intense downstream competition (proxied by the degree of route substitutability within the airport) should reduce aeronautical charges and this effect increases with the intensity of upstream competition.
- Scant evidence and conflicting results on the relationship between airport competition and airport fees (Van Dender, *J Urb Econ*, 2007; Bel and Fageda, *JReg Econ*, 2010; Bilotkach et al, *J Reg Econ*, 2012; Choo, *Tran Res Part A)* although the definition and measurement of competition could be criticized. Airlines concentration is found to increase airport fees in the first paper and to reduce it in the second.

The UK airport industry

- The UK airport sector is a mixed-ownership one, with a trend towards privatization. In 1995 there were 13 private and 12 publicly-owned airports, respectively; in 2008 14 private, 5 mixed and 5 publicly-owned airports, respectively.
- Only Gatwick, Heathrow, Stanstead and Manchester (the latter only up to 2007, because the CAA considered the existence of sufficient competition in the Manchester area) were regulated with a price cap formula. The other airports just need to communicate charges to the CAA.
- Massive entry in the 2000s of LCCs which targeted small and less congested former military airports.
- Recent Investigation by the UK OFT and Competition Commission which forced BAA (owner of the major London and Scottish airports) to divest Gatwick.

Methodology I

- We have estimated the following regression:

$$\begin{aligned} \ln CH_{it} &= \alpha + \beta HHI_{it} + \gamma CP_{it} + \delta LCC_{it} \\ &\quad + \eta RS_{it} + X'\theta + a_{jt} + e_i + u_{it} \end{aligned}$$

where CH are airport charges; HHI is the Herfindahl Index of concentration in the CA of airport i; CP and LCC are airport countervailing power and the share of LCC pax in airport i; RS is route substitutability in airport i, while X is a vector of controls. Finally a_{jt} are region-by-year fixed effects, e_i is an airport fixed effect and u_{it} is an error term.

Methodology II

- The equation above has been estimated with the Within Group (WG) estimator which eliminates the e_i via the within transformation. With T sufficiently long (T=13), the WG estimator should yield estimates that are consistent even with sequentially exogenous regressors, i.e. we can allow for feedback between past shocks to charges and current values of HHI.
- The inclusion of the a_{jt} is important because they proxy for changes in the NUTS2 regions where airports are located. They can pick up, among other things, local changes in the degree of intermodal competition (brought about by changes in road and railways infrastructure, for instance).
- We however try to address possible concerns of endogeneity of HHI, by using an external instrument, namely a proxy for spare capacity in the other airports belonging to the catchment area of airport i and, as a robustness check, the growth of GDP in the airport's catchment area.

Data I

- Our sample covers the largest 24 airport in Great Britain over the period 1996-2008. In terms of size the sample is skewed due to Heathrow and Gatwick. Main results robust to dropping them.
- The source of airport balanced sheet data is the Centre for the Study of Regulated Industries at the University of Bath. The data used in this paper have been explained in Bottasso and Conti (*J Tr Econ&Pol*, 2012) and Bottasso et al (*ICC*, 2013). Data on gdpg in the airport catchment area comes from UK Statistics.
- The other data come from the CAA. In particular, LCC is defined as the share of passenger in each airport that used LCCs: we consider as LCCs Raynair, Flybee, EasyJet and Jet2. Buyer power is proxied by the largest share of a single carrier in airport i, be it LCC or FSA.
- Charges are defined as aeronautical charges divided by atm.

Data II

- The construction of HHI deserves more discussion. We have defined the CA of each airport i as the area which falls within a circle with a radio of 90 KM (about 1.5-2 hours of driving distance in the UK). We have then considered which airports are in the CA of airport i.
- We have computed, for each route served by airport i, the market share of each airport in the CA of airport i, after taking into account the fact that some airports can be under common ownership.
- **NB**: we considered the route at the city-pair level. E.g.: if Luton is in the CA of Stanstead, we consider that Stanstead-Pisa competes not only with Luton-Pisa, but also with a possible Luton-Firenze, if Firenze is considered by the CAA as belonging to the same area of Pisa.

Data III

- We have then computed the HHI at route level for the CA of every airport i. We have then constructed an overall HHI for the CA of airport i by computing a weighted average of the route-level HHIs, with weights given by the share of total passengers accounted for by each route for airport i.
- $0<HHI<1$ has a mean of about 0.72 (declining over time from 0.74 to 0.69) and a st. dev. of 0.17; LCC has a mean of 0.26 and a st.dev. of 0.17; CP has a mean of 0.39 and a st. dev. of 0.17.
- RS is measured as the HHI of routes defined at the country level (in terms of destinations): it is the sum of the squared market shares of each country c served from airport i as of time t. $0<RS<1$ (mean 0.28, s.d. 0.18, declining over time): a low level of RS means that an airport is serving many countries.

Data III

- If many countries are served, it is possible that each airline flying from airport i to those countries enjoys some market power, which the airport could extract through high landing fees.
- Conversely, if only a limited number of countries are served, then the products sold by airlines are poorly differentiated, the intensity of downstream competition will be high, profits low and landing fees lower.

Table 1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Method	WG	WG	WG	WG-IV	WG-IV	WG-IV	WG-IV	WG-IV	WG-CF
HHI	-0.187	-0.214	-0.233	2.641	2.925	2.778	2.863	2.899	0.11
	0.503	0.434	0.465	1.60*	1.48**	1.605*	1.407**	1.69)*	1.35
CP_1	-0.999	-	-0.845	1.133	-1.114	0.986		0.953	-0.79
	0.529*	-	0.38**	0.59*	0.588*	0.467**		0.437**	0.48*
LCC	0.257	-0.187	0.210	0.491	0.514	0.461	-0.044	0.683	0.53
	0.267	0.242	0.236	0.332	0.329	0.306	0.215	0.322**	0.40
RS			-1.161			-1.036	-1.370	-0.791	-6.09
			0.50**			0.36***	0.379***	0.384**	3.2*
CP_2		-0.680					-1.283		
		0.289**					0.588**		
hhi*rs									6.80
									3.7*
R-Y-fe	yes	yes	yes	yes	yes	yes	yes	yes	yes
Airp fe	yes	yes	yes	yes	yes	yes	yes	yes	yes
Contr.	yes	yes	yes	yes	yes	yes	yes	yes	yes

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- Countervailing power. Let us consider regressions (1-3): a one standard deviation increase in CP (largest airline market share) is associated to a reduction in charges by about 15% when CP is measured at the airport level and of about 8% when measured at the catchment area level

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- Rationale: Higher values of other airports' spare capacity should reduce the incentives to collude: by competing more aggressively, some airports could increase their market shares and, if they had low market shares to start with, the HHI should go down (the variance of market shares goes up and HHI is an increasing function of the variance)

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- In column 9 we include an interaction between HHI and RS: Haskel et al (*JUrbanEcon*, 2013) note that the negative impact of higher RS on charges is stronger in the case of a more competitive upstream airport market. We test for this effect by using the control function approach as proposed by Wooldridge (2012).

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- A one standard deviation increase in RS reduces aeronautical charges by 40% when HHI is at the 25^{th} percentile (strong competition) and by 20% when HHI is at the median and it is not statistically significant when HHI is at the 75^{th}percentile.

Concluding Remarks: Summary and Main Results

- We estimate various econometric models to investigate the effect of upstream airport competition, downstream airlines competition and airlines countervailing power on airport charges.
- We find evidence that, once we instrument HHI, higher upstream concentration in the airport catchment area is associated to higher airport charges.
- We also find evidence that higher downstream competition (measured by higher route substitutability) reduces aeronautical charges.
- Higher airlines countervailing power is robustly correlated to lower aeronautical charges.
- Our results suggest that higher downstream competition reduces aeronautical charges but only when the upstream market is sufficiently competitive.

Concluding Remarks: Policy implications

- In some areas airports are under common ownership (e.g. SEA airports in Milan, ADR in Rome, etc.). Regional alliances between airports are often discussed. Because our results suggest that more upstream competition is likely to lead to lower aeronautical charges, common ownership of airports in nearby areas should be discouraged.
- Our results might suggest that price regulation of airports might be limited to those cases where there is not sufficient restraints brought about by other nearby airports or by strong carrier's countervailing power. However, Haskel et al. (2013) note that lower aeronautical charges induced by stronger airlines ocuntervailing power are not necessarily clawed back to consumers.