Single Till or Dual Till at Airports: a Two-sided Market analysis

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Séminaire Economie de l’Aérien
Fév. 2010
Activities of airports
Diversification

- Activities at (big) airports depart from core business
  - Fraport: aeronautical services stand for 60% of the revenues but 40% of the profits, while commercial activities yield 60% of the profits
  - ADP: increase of the operational profit explained by the commercial activity
### Good resistance of retail and services: +0.4%

<table>
<thead>
<tr>
<th>In euro millions</th>
<th>9M 09</th>
<th>9M 08</th>
<th>△ 09 / 08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retail and services</td>
<td>638.5</td>
<td>635.7</td>
<td>+0.4%</td>
</tr>
<tr>
<td>Commercial activities</td>
<td>275.8</td>
<td>273.2</td>
<td>+0.9%</td>
</tr>
<tr>
<td>Fees</td>
<td>185.9</td>
<td>185.7</td>
<td>+0.1%</td>
</tr>
<tr>
<td>SDA&amp;DFP revenue</td>
<td>139.3</td>
<td>134.8</td>
<td>+3.4%</td>
</tr>
<tr>
<td>Eliginations</td>
<td>-49.4</td>
<td>-47.3</td>
<td>+4.5%</td>
</tr>
<tr>
<td>Car parks / access</td>
<td>107.9</td>
<td>115.0</td>
<td>-6.2%</td>
</tr>
<tr>
<td>Industrial services</td>
<td>46.1</td>
<td>52.6</td>
<td>-12.3%</td>
</tr>
<tr>
<td>Rental revenue</td>
<td>74.7</td>
<td>59.3</td>
<td>+25.8%</td>
</tr>
<tr>
<td>Other</td>
<td>134.0</td>
<td>135.5</td>
<td>-1.1%</td>
</tr>
</tbody>
</table>

- Slight growth of commercial activities (+0.9%) despite the difficult environment:
  - Efforts to raise sales/pax (12.0€; +8.4%) more than offset traffic impact
  - Car parks hit by traffic decline and drop in average spend/user
  - Decrease of industrial services resulting from transfer of electricity and cooling/heating revenue to "rental revenue" (-€7.9m)
  - Increase in rental revenue driven by transfer of revenue from industrial services, indexation of lease and new facilities
Activities of airports

Diversification

- Activities at (big) airports depart from core business
  - Fraport: aeronautical services stand for 60% of the revenues but 40% of the profits, while commercial activities yield 60% of the profits
  - ADP: increase of the operational profit explained by the commercial activity
  - Schipol: 34% of the operating result is coming from the commercial activity

⇒ Question: how to organize these two activities? separately or not?
The current regulation

Who? ICAO with 3 main documents:

→ Article 15 of the Chicago convention (on international civil aviation)
→ Document 9082: policies on airport charges and air navigation services
→ Document 9562: the airport economics manual

⇒ Commercial revenues are included in the regulation area
Main contribution of the paper

Original application of Two-sided Market model

Airports play the role of a platform between shops and passengers

→ Two-sided market analysis + regulation
→ Commercial and aeronautical activities related through externalities

Results

• Single till regulation is always better
• Evaluate the impact of the externalities on the price structure (helpful for regulation)
Related to airports

- Starkie and Yarrow (2001), Starkie (2002): single till is not so good because gives wrong incentives in terms of investment (cost of capital model)
  → no externalities
- Torres, Dominguez, Valdès and Aza (2005): show a positive (and significative) correlation between waiting time and commercial expenditure at airports
  → shops demand depends as well on the connecting time
Literature

- Related to two-sided market analysis
    → usage externalities
  - Armstrong (2002): platform competition
    → The airport is a (regulated) monopolist
  - Anderson-Coate (2005): welfare analysis
How does it work?
Market for aeronautical and for commercial services

How does it work?

Airport =Platform

=Platform

Passengers

Shops

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Market for aeronautical services

How does it work? Aeronautical activity

Regulator

sets price cap $a_{\text{max}}$

Rent commercial spaces

Airport

buy/sell aeronautical services, price $a$

Airlines

buy/sell tickets $(p, n)$
offer connecting time $t$

- atomistic
- value price + connecting time

Passengers

Shops

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Market for aeronautical services

- Passengers express their demand for travel:

\[ N(p, t) \]

where \( p \) is the price of the ticket
and \( t \) is the connecting time

→ the higher the price \( p \), the less the demand for travel (direct effect)
→ the higher the connecting time \( t \), the less the demand for travel
→ price and time are imperfectly substitutable i.e. \[ \frac{\delta^2 N(p, t)}{\delta p \delta t} < 0 \]
Market for aeronautical services

- Airlines choose $t$ and $p$ in order to maximize their profits, given the demand for travel

**Costs:**
- aeronautical costs/taxes + production costs
  - $\Rightarrow$ choosing a high $t$ allows to produce at a lower cost

**Revenues:**
- all coming from selling the tickets at price $p$
  - $\Rightarrow$ choosing a high $p$ decreases the demand (local monopolies)
Market for commercial services

How does it work? Commercial services

- Numerous
- Interested in the number of passengers in transit
- Interested in the connecting time
Market for commercial services

- Shops express their demand for space inside the airport

\[ s(r, N, t) \]

where \( r \) is the rent for the space,
\( N \) is the number of passengers,
\( t \) is the waiting time

→ the higher the rent, the lower the demand for space (**direct effect**)
→ the higher the number of passengers, the higher the demand for space (**positive externality**)
→ the longer the connecting time, the higher the demand for space (**positive externality**)

⇒ there exist external effects between the aeronautical and the commercial activities.
The airport chooses...

**if single till:**
...tax $a$ to be paid on each ticket sold, corresponding to the aeronautical activity, given the demand for ticket $N(p, t)$, given the demand for space $s(r, N, t)$

**if dual till:**
...a tax $a$, given demand of passengers $N(p, t)$, given demand for space $s(r, \bar{N}, t)$, with $\bar{N}$ taken as given, i.e. ignoring $N$ is influenced by the aeronautical tax
The airport chooses...

if single till:
...tax $a$ to be paid on each ticket sold, corresponding to the aeronautical activity, given the demand for ticket $N(p, t)$, given the demand for space $s(r, N, t)$

if dual till:
...a tax $a$, given demand of passengers $N(p, t)$, given demand for space $s(r, \bar{N}, t)$, with $\bar{N}$ taken as given, i.e. ignoring $N$ is influenced by the aeronautical tax
Regulator choice

- The regulator sets $a_{\text{max}}$...

**if single till:**

...taking the total profits of the airport into account

**if dual till:**

... taking profits generated by the aeronautical services only
Regulator choice

- The regulator sets $a_{max}$...

if single till:
...taking the total profits of the airport into account

if dual till:
... taking profits generated by the aeronautical services only
Regulator sets price cap $a_{\text{max}}$

Airport chooses $r$ and $a$

Airlines choose $p$ and $t$

Passengers buy their ticket

Shops rent their location
Main Results

- Role of the connecting time

\[
\frac{\delta \Pi}{\delta t} = 0 \iff p - a - \frac{\delta C}{\delta N} = \frac{\delta C}{\delta t} / \frac{\delta N}{\delta t}
\]

The airline sets \( t \) comparing

- gains in terms of cost from increasing the connecting time
- costs in terms of number of passengers of increasing their waiting time

The airline does not internalize the fact that \( a \) is influenced by \( t \)
Main Results

**Profits**
The airport makes at least as much profit as in the dual till situation

**Not clear-cut effect on a**
The single till aeronautical tax can be lower or higher depending on which effect (waiting time or passengers) has a superior effect

- Two positive externalities are coming from the aeronautical side: waiting time + number of passengers
- However, the waiting time has a negative impact on passengers demand
## Main Results

| **Rent** | The rent of the shops is higher (always) because shops are benefiting of the externalities |
|**Ticket price** | The price of the ticket is lower if the aeronautical tax is lower (inducing a lower number of passengers) |
|**Connecting time** | The waiting time is higher if the aeronautical tax is lower (inducing a lower number of passengers) |
Extensions

- Testing empirically
  - trying to measure and compare the externalities
- Adding asymmetric information on the airport side (on costs for instance) and focusing more on the regulation impact in two-sided market model