

How to Mix Per-flight or Per-passenger Based Airport Charges

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Many airport facilities are built and maintained for the benefit of airline passengers. It is **in the interest of** both the **airport and** the **airlines** to recover these costs through passenger based charges instead of other aeronautical based charges. (International Air Transport Association, IATA, July 2010)

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Is there something missing? Passengers?!

We wonder:

- Why are carriers interested in raising per-passenger airport charges relative to per-movement charges?
- Is the carriers' proposal socially optimal?

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Is the carriers' proposal practically relevant?

- The International Civil Aviation Organisation (ICAO) proposes that landing charges as well as parking and hangar charges should be based on aircraft weight formula (ICAO, 2012).
- Traditionally, aeronautical charges are indeed based on aircraft weight formula.
- There is a growing tendency to cover airport costs by passenger service charges (Zhang, 2012).
- Airports worldwide derive today as much aeronautical revenues from per-passenger charges as from aircraft related charges (ACI, 2008).
- Yet, the trade association for the world's airlines (International Air Transport Association, IATA) seems to propose to further move away from aircraft weight related airport charges towards per-passenger based charges.

- It is common to assume that load factors are 100% (e.g., the studies mentioned below). If seat capacity is further normalized to 1, per-flight and per-passenger charges are the same.
- Flores-Fillol (2010) considers a congested airport, schedule delays and a per-flight charge to internalize congestion.
- Silva and Verhoef (2013) consider a congested airport and per-flight and per-passenger charges: market power corrected by the per-passenger subsidy and the per-flight charge controls congestion.
- Gillen and Mantin (2013): Profit maximizing per-passenger and per-route airport charges.
- Silva et al. (2014): Airline route structure competition and network policy.

- The contribution is to incorporate **schedule delays** and **airport cost recovery**.
- In our framework it holds:

$$\text{full fare} = \text{ticket price} + \text{schedule delay cost.} \quad (1)$$

- (Note that an increase in the per-passenger charge may have no effect at all on the full fare.)
- And, to compare the **carrier's with the social viewpoints**.
- (And, to capture passenger types with distinct time valuations and uniform or discriminating fares.)
- To abstract from competition effects, we deliberately concentrate on a monopoly carrier.

- A positive per-passenger charge is indeed optimal from the carrier's viewpoint.
- The carrier's and the social viewpoints on the airport-charges structures can be in line (i.e., there is no disagreement).
- A zero per-flight charge may indicate that the private and the social viewpoints are in line.

Remarks on the methodology:

- Schedule delays and airport cost recovery make it difficult to derive analytical solutions.
- Our analysis relies heavily on the discussion of first-order conditions.
- And, numerical simulations.
- We consider general functional forms.
- The presentation abstracts from comparative-static analysis.

- Airport profit:

$$\Pi \equiv \tau_q q + \tau_f f - F \quad (2)$$

- Carrier profit:

$$\pi \equiv (p - \tau_q)q - (\tau_f + c)f \quad (3)$$

- Full fare:

$$\eta \equiv p + v\Gamma \quad \text{with} \quad \Gamma'(f) < 0, \Gamma'' > 0 \quad (4)$$

- Consumer surplus:

$$CS \equiv B - \eta q \quad \text{with} \quad B''(q) < 0 \quad (5)$$

- Welfare:

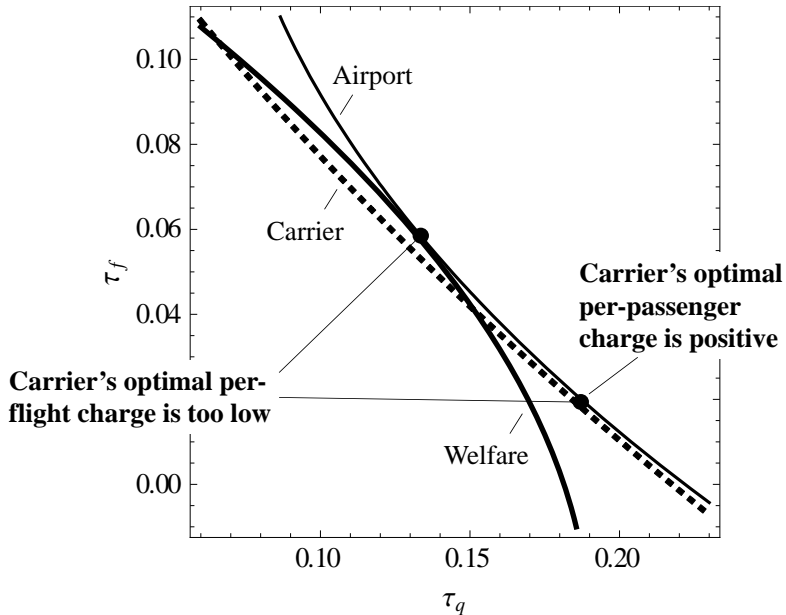
$$W \equiv B - qv\Gamma - cf - F \quad (6)$$

Time structure with two stages:

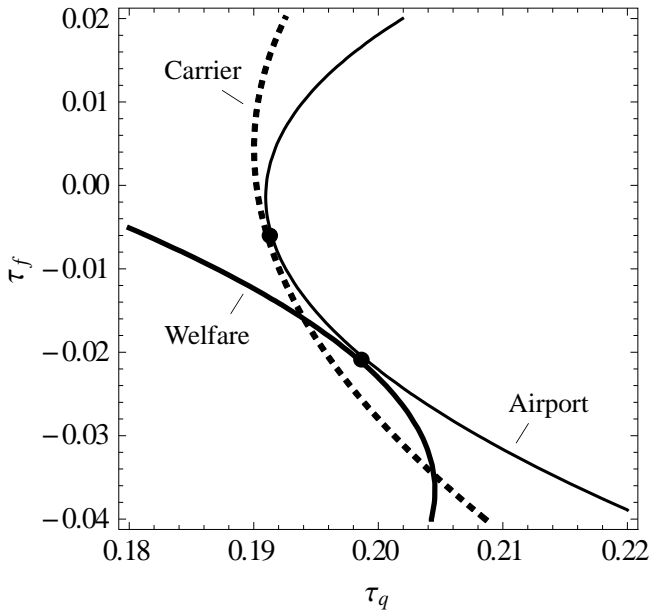
- First stage: The per-passenger and per-flight charges are determined in order to ensure airport cost recovery.
- Second stage: The carrier chooses price and frequency.

- $\Gamma = 1 - f + (f^2/2)$ for $f < 1$
- $B(q) = 3q - (5q^2/4)$
- $c = F = 1/10$
- $v \in \{1/5, 2/5, 5/2\}$

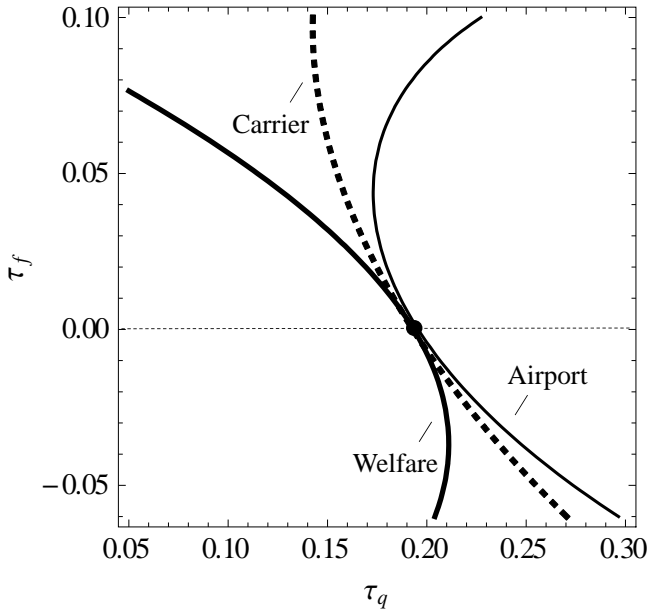
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Thank you.