Potential Impacts of Environmental Policy on Airline Markets

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On The Future of Human Mobility

- Our focus is on the emergence and effective power of the following groups of pressure:

  - **environmentally-conscious consumers**
    (who care about "greeness" quality, who are willing to pay the cost of the pollution, to partially internalize the externality)
  - **environmentally-conscious citizens**
    (who put pressure on politicians for intervention)

- on market results
  (driven by consumers, firms, regulators, policy makers, aircraft manufacturers, etc)

Environmentally-Conscious Consumers

Background

- Concerns over global warming: policy makers targeting aircraft emissions to reduce greenhouse gases.
- EU from 2012: airlines will hold emission permits. Reports on emissions mandatory from 2010.
- Emissions permits will vary in accordance with fuel consumption: the permit price is then effectively added to fuel price, even though most of the permits will be freely distributed.
- Thus, the planned trading system can be viewed as equivalent to a carbon-tax scheme applied to aviation, which would explicitly raise the price of fuel.
- Emission trading system will alter airline choices in the same way of an increase in the effective price of fuel: becomes part of airlines' cost structure.

Recent Literature

- ***Brueckner & Zhang (2009) Airline Emission Charges: Effects on Airfares, Service Quality, and Aircraft Design***
- The effect of airline emissions charges on airfares, airline service quality, aircraft design features, and network structure
- Results: emission charges will raise fares, reduce flight frequency, increase load factors, and raise aircraft fuel efficiency, while having no effect on aircraft size.
- the effect of emission charges on the optimal structure of airline networks is ambiguous.
  - Under some parameter values, emission charges may generate a shift away from current hub-and-spoke (HS) networks toward point-to-point (PTP).
  - But the profitability of HS networks could be reinforced by emission charges under other parameter values.

Recent Literature

- The model of Brueckner & Zhang (2009) assumes that the total volume of airline passengers is fixed and thus unaffected by fuel prices and hence emission charges.

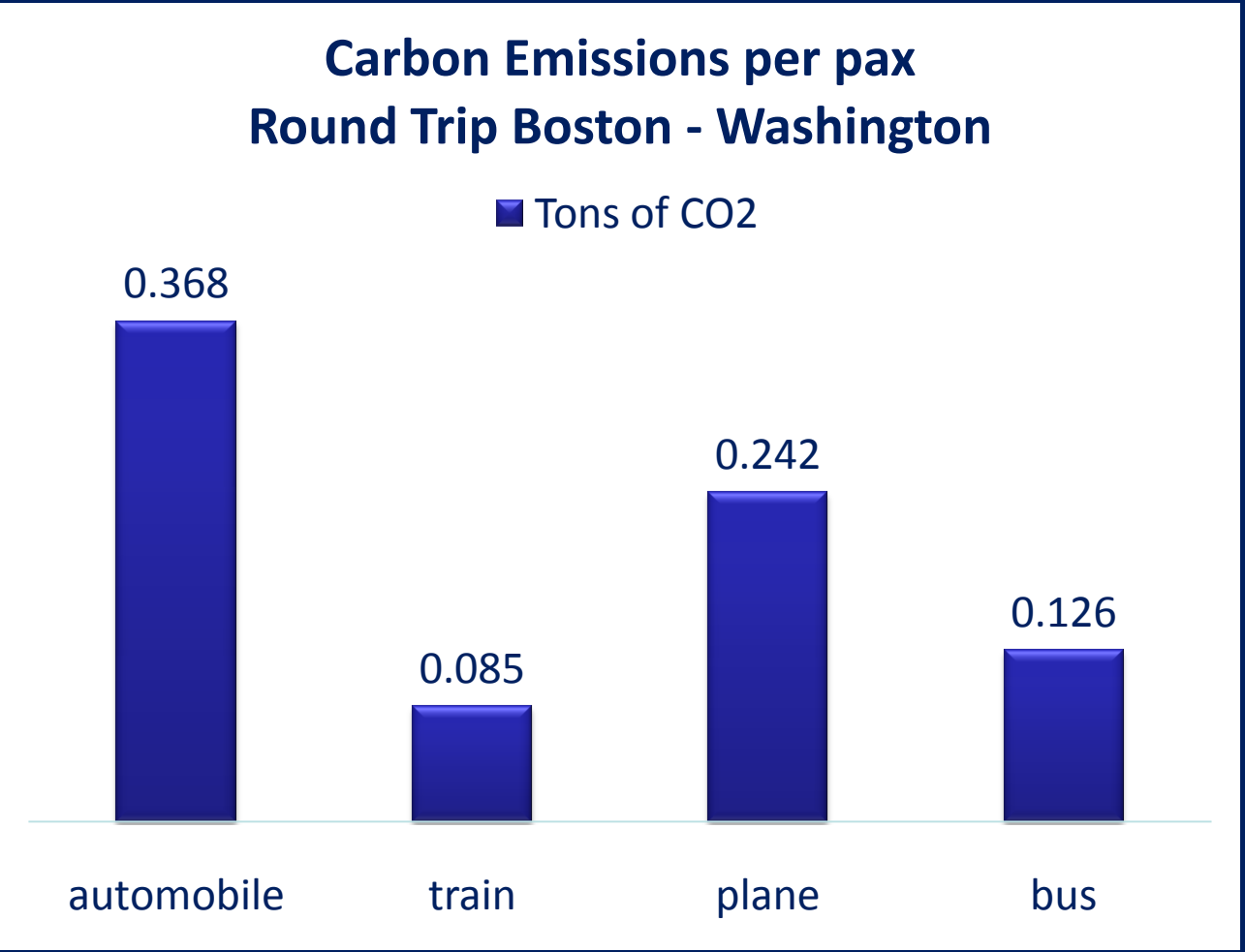
- There is no loss of competitive advantage to other means of transportation (trains for example)

- This may be unrealistic given the current status intermodal competition

Competition between trains and planes

- Travelling by train: Is it a greener way to go?
- In UK:
  - “Travel greener with Arriva to Wales”
  - “Hop aboard Eurostar and generate 10 times less CO2 than flying to Paris”
  - “Emit 78% less than flying with Virgin's Pendolino trains to Glasgow”.

Competition between trains and planes



source: Carbon Footprint Calculator

Competition between trains and planes

Environmentally-conscious consumers are now everywere and are increasingly influential citizens

Major Challenges

Issues:

- How environmental taxation will affect airlines?
- Will travelers' preferences be changed when choosing between travel by trains and planes?
- Which air markets will be more affected?
- Will the network structure choice by airlines be impacted?

How airline markets may be affected

Assumptions for the next decades

- Environmentally-conscious citizens force politicians, emission charges/permits. The result is a fuel cost increase
- Emergence of “greeness” as major attribute by environmentally-conscious consumers, which may be incorporated or not by carriers in their product quality (ex. by enhancements in the carbon offsetting programs).
- Both business and leisure travelers value product greeness; businessmen may value it more but value other attributes too.
- Intermodal competition with trains, which have a higher greeness quality perception (supported or not by engineering arguments)

How airline markets may be affected

Assumptions for the next decades

- Intrinsic quality (time): FSC > LCC > Train, but not on short haul routes
- Price elasticity: Train, LCC > FSC
- Environmental perceived quality: Train > FSC > LCC
- Costs: FSC > LCC, Train
- Cost Pass-Through to prices: FSC > LCC, Train.
- Network Structure: LCCs still with PTP; FSCs still with HS

FSC = full service carriers; LCC = low cost carriers; HS = hub-and-spoke; PTP = point-to-point

How airline markets may be affected

- Air travel will be impacted by the price increase but demand may also be reduced by the greeness awareness. In both cases, trains will be benefited.

- Dilemma for FSCs: the higher the greeness awareness the higher their perceived quality by businessmen in comparison to LCCs. But they will have to face trains more intensively.

How airline markets may be affected

- Price increases due to emission charges will impact LCCs and FSCs differently.
- LCCs might have some fat to burn and might pass something to prices, but at a risk of incurring in more price competition with trains
- FSCs will be in a situation where they become even closer to LCCs or will be forced to withdraw some markets.
- A survival approach for FSCs might be to enhance their dominance at more convenient/congested airports and invest in both intrinsic and environmental quality. All this may compensate the impact of demand diversion.

How airline markets may be affected

- In short haul-markets, emission charges then may result in
  - higher prices of both FSCs/LCCs and more diversion to trains
  - lower differentiation among carriers
  - increasing consolidation, possibly mergers of FSCs and LCCs and of air and rail carriers: more intermodal integration
  - higher concentration: less air carriers serving short haul routes

How airline markets may be affected

PTP Networks

- short-haul or regional routes will become increasingly expensive. Even denser routes such as London-Paris may be visibly affected.
- Longer routes eg. London-Alicante, London-Barcelona, will face price increases but still exist with fewer purchase alternatives.
- This may confer LCCs with higher stage length with more market power but will strongly impact the classic Southwest Airlines paradigm for LCCs (multifrequency with operations in short-haul routes)

How airline markets may be affected

HS Networks

- Become intermodal eg. London-SP with alternatively, direct services from St Pancras to CDG by train and then CDG-GRU.
- Regional airlines may take a hit. Some spokes might eventually vanish.
- Note that this is already happening in places such as Frankfurt and AMS-Schiphol, but the connection rail-air might become **seamless**, with dedicated carriages for air travelers, baggage dispatch when entering the train and so on. In other words, more integration rail-air in several dimensions.
- In the end: all the HS network structure may be at risk, as traffic density (and economies of density and scope) may vanish.

How airline markets may be affected

Technology

- Both FSCs and LCCs have strong incentives to be proactive with manufacturers with regards to new technologies
  - FSCs aiming at not losing many environmental quality-sensitive pax to trains
  - LCCs aiming at not losing many price-sensitive pax and some environmental quality-sensitive to trains
- The amount of taxation will determine who will be more impacted = size of externalities (hard to assess)

How airline markets may be affected

Technology

- focus on fuel-efficiency, energy recovery, possibly solar panels in body/wings (?), not only for production purposes but for marketing purposes (enhance “greeness”)
- new “intermodal hub & spoke” increasing the need of greater/faster access to aircraft eg. Simultaneous use of several doors

How airline markets may be affected

Technology + Marketing more environment-oriented

The "easyJet ecoJet": to cut CO2 emissions by 50% by 2015

How airline markets may be affected

Marketing more environment-oriented

Flybe Bombardier Q400		flybe.
Local Environment		
Noise Rating (Less … More)		A
Take Off & Landing CO_2 Emissions		A (817kg)
Take Off & Landing CO_2 Emissions (per seat)		10.5kg
Take Off & Landing Local Air Quality [1]		2kg
Journey Environment		
Total Aircraft Fuel Consumption By Journey Length	Domestic (500km)	A (1044kg)
	Near EU (1000km)	A (1896kg)
	Short Haul (1500km)	A (2760kg)
CO_2 Emissions Per Seat By Journey Length	Domestic (500km)	B (42kg)
	Near EU (1000km)	B (77kg)
	Short Haul (1500km)	B (111kg)
Passenger Environment		
	Minimum Leg Room	30"
	Number Of Seats	78

[1] Emissions of Nitrogen Oxides as an indicator of the effects on local air quality

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Thank you!