



Publication Alert June 2008 – 'Evaluation of air transport emissions trading scheme allocation methods'

The growing interest in environmental issues has led to a possible incorporation of air transport in the existing emissions trading scheme (ETS) by the European Commission from 2012. Peter Morrell from Cranfield University discusses three different allocation methods and its impact on network carriers (British Airways), charters (Britannia / Thomsonfly) and low-cost airlines (easyJet). The allocation methods discussed are grandfathering, auctioning and benchmarking. The social costs (e.g. damage to human health) are accounted and are assumed to be passed on to the passengers. LCCs are expected to be harmed the most (regardless of the allocation method), due to their intra-European travel and their fast growth in the past. The charters and network carriers are generally burdened at the same level. Auctioning seems to be the best allocation method, but is also the most costly for the airlines. Benchmarking is second-best, due to the fact that fuel-efficient airlines are favoured within this method. Grandfathering tends to favour polluting airlines and is therefore least favoured.

Regulatory standards and trends

The Kyoto protocol requires parties to limit their emissions. Within the air transport industry, this should be initiated by ICAO. There is no timescale laid down, however. ICAO focuses mainly on the improved emissions of new aircraft engines. IATA has adopted a goal to achieve a 26 percent improvement between 1990 and 2012 in litres per 100 revenue tonne-kilometers (RTK). Some individual airlines have even set the target higher (BA at 30 percent between 1990 and 2010). ATAG reports that the reduction has been around 70 percent in the last forty years. Today's aircraft has a fuel consumption of around 3.51 per 100 passenger-kilometer (similar to a modern compact car).

The problem is that air transport traffic is assumed to grow by 4 to 5 percent per year. And the long-term fuel efficiency improvements are assumed to be around 1 percent per year. Emissions are therefore set to increase in the coming years. Luckily, most airlines have had a strong incentive to technical improvements, due to the longer period of high fuel prices.

Emission trading

There is not much confidence about a trading system at world level, due to reluctance of the US to be involved. An EU scheme is very likely to become reality. CE Delft (2002) have analyzed the most effective way to meet the policy objectives: a combination of emissions trading and emissions charges.

In a later study, they concluded that the best entity to base the system upon would be the airlines, with allocation at the EU (instead of individual state level). The inclusion of solely CO₂ should be sufficient initially too. They found that auctioning would be the most attractive method, followed by benchmarking and grandfathering. Morrell examines whether the impacts of the three methods differs along three business models.

Methodology

As stated, three business models are considered. They all have their own characteristics. The low-cost carrier (LCC; e.g. easyJet) and the charter (e.g. Britannia / Thomsonfly) have significant higher load factors. The charter airline however uses larger aircrafts and is often scheduled on intercontinental flights. Therefore, an intra-European trading system would impose more burden to the low-cost carrier. The network carrier (e.g. British Airways) is relatively the most efficient fuel-burner, due to its long-haul operations and more efficient aircrafts.

Three allocation methods are researched:

- Grandfathering: this involves allocation of free allowances based on past emissions. Once these are used up, airlines are required to purchase allowances from other airlines or trading entities. Problem is that grandfathering tends to reward the more polluting airlines with pollution allowance that they do not have to pay for. Environmental development can only be obtained by more efficient aircrafts or the purchase of necessary allocation from others at a market price. An average of 3 or 5 years would harm the LCC's the most, since they have been growing sharply for the last years. New entrants have to purchase all allowances.
- Auctioning: this should be done by an administering authority. Airlines need to bid on emission rights. This method is quite fair, due to the same rights of existing and new airlines, faster and slowly growing airlines. The problem here is how apply the proceeds from the auction.
- Benchmarking: the advantage here lies at the airlines that are already quite fuel efficient. This method involves setting a baseline efficiency measure (e.g. in RTKs per tonne CO₂), fixing an overall CO₂ cap, and allocating the allowances depending on the share of RTKs. The expectation is that this method burdens the airlines with high load factors and long-haul operations the least. The short-haul operators are expected to be penalized.

Results

The burden on the airlines is measured in an extra charge to the customers, since it is assumed that the customer has to pay the full extra cost of the emissions (arbitrarily set at a cost of US\$40 per tonne CO₂).

- Grandfathering: the LCC would need to purchase the most extra allowance in the market. The extra for the passenger would be \$2.17 (or a reduction in profitability \$62 million) against \$0.41 and \$0.63 for the network carrier and charter respectively. The premium for the LCC is around 3 percent above their current ticket price.
- Auctioning: all required emissions have to be bought in the open market. The LCC is again the airline with the highest burden (\$5.87, a

9 percent premium). The extra cost for charters is \$3.00. The premium for the network carrier is still quite low (1.6 percent, \$4.18) due to the high average ticket price.

- Benchmarking: two benchmark models are studied.
 - o The first considers a benchmark based on RTKs. The charter is not penalized here, they receive more allowances than needed (a premium of \$-0.53). The premium of the network and low-cost carrier are \$1.76 and \$3.49 respectively.
 - o The second method takes aircraft kilometers and flights as a benchmark. The LCCs are still have the highest premium here (\$2.39), whereas charters are burdened with an amount of \$1.16 per passenger. Now, the network carrier is not penalized, they have an allowance excess, leading to a premium of \$-0.24,

Conclusion

This study should give a good indication of the impact of the three allocation methods on the three business models. A broader sample is needed, however, to come to more reliable and robust results. The impact is as expected greater on the LCCs with all methods, mainly due to their focus on short intra-European flights. Faster growing airlines are predicted to be penalized by the benchmark and grandfathering approach. The main problem seems to be the competitive position of the airlines relative to their American peers. Auctioning is most favoured by CE Delft (2005), but is also the most costly option.

Source:

Title: An evaluation of possible EU air transport emissions trading scheme allocation methods.

Author: Peter Morrell

Source: Energy Policy, 2007, 35, 5562-5570