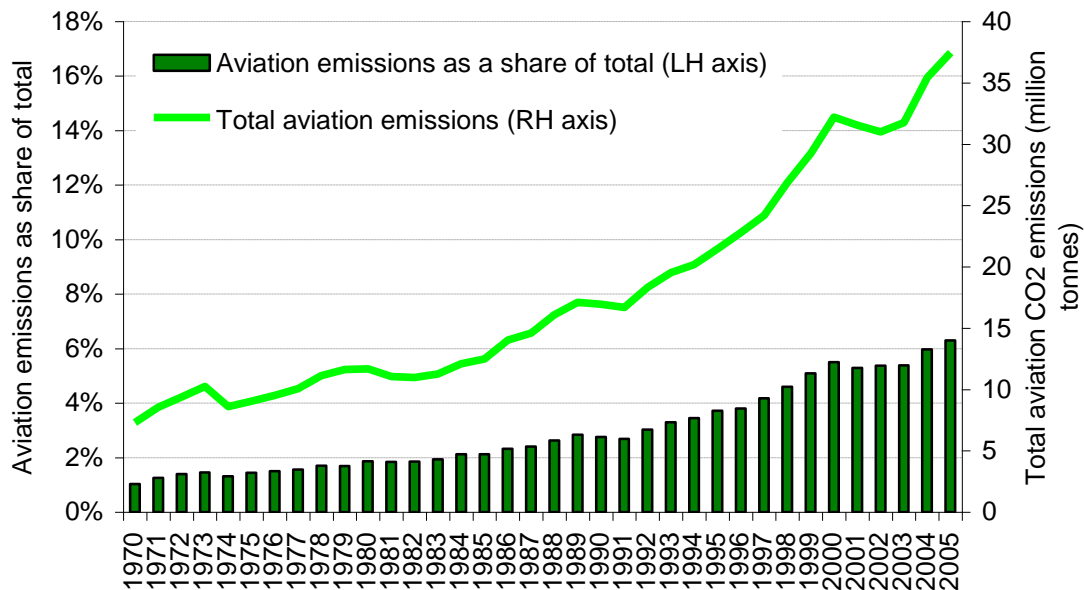


Taxing Flights, Cormac O’Dea

As climate change has risen up the political agenda in recent years, air travel has come in for some bad press. In recent months we have seen protesters clambering onto aircraft at Heathrow and onto the Houses of Parliament. It is, the protesters contend, a polluting way to travel. However, it is also popular and getting more so. The most recent protests have been sparked by proposals to build additional runways - which wouldn’t be needed if people weren’t flocking in increasingly large numbers to buy cheap air tickets.

The number of passengers coming through UK airports increased by an average of nearly 6% a year between 1970 and 2005 which, of course, has meant an increase in aviation emissions. As Figure 1 shows, UK aviation emissions in 2005 were over 5 times their level in 1970, and now account for over 6% of the UK’s Carbon Dioxide Emissions. What is more concerning for many is the rate of growth of these emissions, a growth rate that shows no sign of abating.



Note: Total emissions include domestic aviation and estimates of international aviation emissions generated by aircraft using fuel loaded at UK airports. Source: Department of Environment, Food, and Rural Affairs, e-Digest of Statistics, Table 5. <http://www.defra.gov.uk/environment/statistics/globalatmos/download/xls/gatb05.xls>

This article outlines how economic theory suggests that policymakers should respond to this pollution, and shows that the current policy response (a tax known as Air Passenger Duty) is far from optimal.

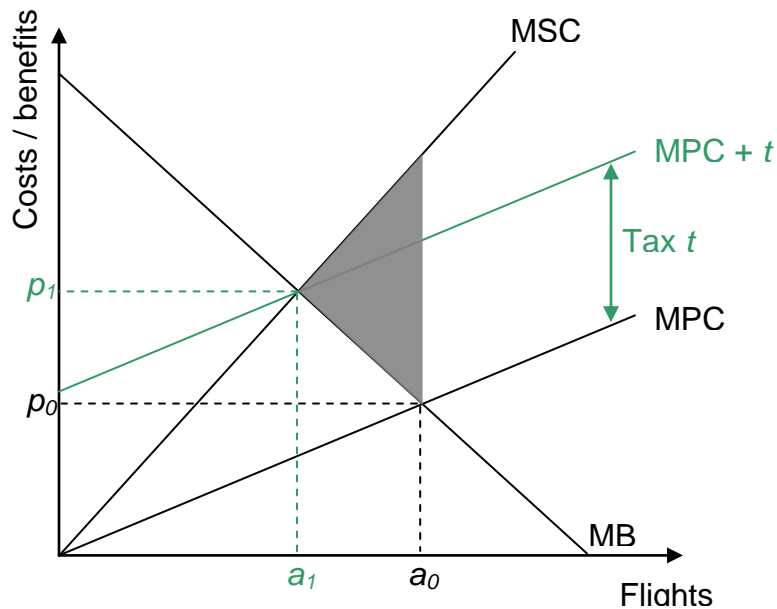
The reform of aviation taxation is a cause that has been taken up by the three main political parties. It is an attractive target for politicians for a number of reasons. Firstly, they can sell increased environmental taxes as a good thing, courting support by suggesting that they will use increased environmental tax revenue to reduce other

unpopular taxes. Secondly, unlike many other existing and proposed environmental taxes, aviation taxation is, broadly speaking, progressive. On average, those who fly have higher incomes than those who don't. Compare this with a tax on home heating, another polluting activity. Increasing the taxation of home energy use would hit the poor (and in particular the elderly poor) hardest, and thus is unlikely to be considered either desirable or acceptable. Thirdly, as I will explain below, Air Passenger Duty is, from an environmental point of view, extremely poorly structured. Together, these three factors have made reform of aviation taxes impossible to ignore.

The Externalities Argument for Taxation

Even if there was no need to raise revenue from a tax on air travel, the externalities argument would provide an economic justification for such taxation. When an individual purchases a plane ticket, some of the costs that their trip induces (for example, the noise for those living under a flight path) are borne by people who have nothing to do with the transaction. These costs are known as externalities or external costs. They will not be taken into account by the individual when deciding whether to travel or not, and it is likely that some trips are made which cause a greater social cost than the social benefit they provide. The externalities associated with air travel include the pollution emitted by the engine, the noise, and congestion (both in the airport as well as in the skies). In equilibrium, these negative externalities mean that there will be overproduction relative to the social optimum. If a policy maker wants to ensure that the optimal level will be produced, they can impose a tax that forces the consumer to take account of the costs that they are imposing on society (it is said that this forces them to 'internalise' the externality'). The tax would ideally be set at a level that induces consumers to choose the socially optimal level of aviation – although even a smaller tax will move the market *closer* to the socially optimal level. This sort of tax is known as a Pigovian tax after A.C. Pigou who first suggested it.

The figure below illustrates this point in a very simplified way. The horizontal axis shows the level of aviation in terms of numbers of flights and the vertical axis the 'price' of aviation. In a very simple world where all flights were identical, this would be a representation of the entire market for aviation. The downward-sloping marginal benefit (MB) curve shows the additional benefit to society of each additional flight, which is assumed to fall as the total number of flights increases. The marginal private cost (MPC) curve shows the cost of each additional flight to airlines. Finally, the marginal social cost (MSC) curve shows the cost to *society* of each additional flight, with the gap between private and social costs showing the external costs discussed above. In equilibrium, the total number of flights will be the level at which marginal benefits equal private marginal costs, generating a level of aviation a_0 at price p_0 . At this level, however, the social costs of flying exceed the benefits by a total amount given by the shaded triangle – this represents the welfare loss of excessive aviation. An aviation tax set at rate t , however, increases the private costs and results in the socially optimal level (the quantity at which the marginal social cost equals the marginal benefits) being produced in equilibrium. The number of flights is reduced to a_1 at price p_1 and the welfare loss is eliminated.



The ideal environmental tax will accurately track these factors; passengers on planes that cause a greater externality should face a higher tax than those on planes that cause a smaller one. An appropriately targeted tax will encourage passengers and airlines to reduce the most environmentally damaging flights and will also provide incentives for the development of greener aircraft. The optimal tax will then vary with:

- How polluting the plane is. This will, in turn, be determined by a number of factors, including the plane's size (larger planes clearly pollute more than smaller ones), and its age (older planes tend to be less fuel efficient and therefore pollute more).
- How noisy the plane is.
- Whether the flight takes off from/lands at an airport in a residential area. Planes departing from Stansted airport, generate noise that substantially fewer people hear than those taking off from Heathrow.
- The length of flight.

Having looked at what an optimal environmental tax on aviation might look like, we can now consider the current policy response: Air Passenger Duty. It is a per-passenger tax, with four rates differentiated by whether the flight is to a European or non-European destination, and whether the ticket is for an Economy Class seat or an Other (Business or First) Class seat. The table below shows the four rates.

	European		Non-European	
	Economy Class	Other Classes	Economy Class	Other Classes
Per Passenger Tax	£10	£20	£40	£80

APD is the only tax on air travel in the UK. There is no VAT on tickets (as is the case with all forms of public transport), and there is no tax on fuel used on any international and most domestic flights.

It is clear that Air Passenger Duty:

- Doesn't vary with the efficiency of the engine.
- Doesn't vary with the noise emitted by the engine
- Doesn't vary by airport of departure
- Doesn't vary by how full the plane is. The total amount of tax charged on empty flights is much less than that charged on full flights (as the charge is levied per passenger, not per flight)
- Only varies loosely with distance. A passenger on a domestic flight pays the same as a passenger on a flight to, for example Turkey

If APD is meant to be an environmental tax, then, it is not a well targeted one. It must be emphasised though, that the optimal environmental tax may be extremely complex, and therefore too costly to operate. As with many taxes, there is a trade-off between administrative simplicity and optimal targeting. At the very least, though, it is sensible that the basis of taxation is changed from the passenger to the flight. A change of this kind was announced by the Chancellor in the 2007 Pre-Budget Report, though the precise details of how the new tax will operate when it is introduced in November 2009 have, at time of writing, not been announced. Taxing the plane instead of the passenger will mean that a greater tax per passenger will be charged on emptier planes. This will provide additional incentives for airlines to cut back on routes that typically have low capacity. It remains to be seen whether the new aviation tax will vary in a more systematic way with the length of the flight than does Air Passenger Duty or will vary by the efficiency of the engine or the noise that it makes.

Air travel is, like many other activities, polluting. While it is up to each individual to decide whether they want to cut back on (or attempt to cut out) such activities, economic theory suggests that where there is an externality associated with a good, policymakers can improve market outcomes. Rather than opting for extreme solutions like, on the one hand, drastically constraining airport and runway capacity, or, on the other, by giving the aviation sector unfettered opportunities to expand, economic theory suggests taxing air travel in way that reflects the marginal externality. The current tax, Air Passenger Duty, does not do this well. The new tax is an important opportunity to improve on this.