Aviation

White Paper

Aviation Taxes and their role in managing aviation's carbon footprint

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In response to both high profile citizen campaigning and the growing disconnect between the carbon emissions required globally to avert catastrophic climate change and commercial aviation's growth trajectory, a number of European governments have turned to taxes as a tool to influence the market. In this paper, we consider if these taxes are likely to achieve their intended purpose, and ask whether other tools and incentives may be more effective in achieving the dual goals of continued connectivity and economic prosperity, without continued carbon emissions growth.

Introduction

Earlier this year, the expression "flygskam" ("flight shame" in Swedish) emerged in Sweden and rolled across Europe, describing the feeling of embarrassment using airplanes, while a KLM sustainability campaign featured suggestions about using trains instead of planes to avoid flying altogether. While these examples themselves might not transform the industry's overall growth projection, they are anecdotal evidence that concerns about the sustainability of aviation have reached a much wider audience.

Governments and regulators have been responding to these concerns. The French government announced the introduction of an "eco-tax" that will apply to all flights from French airports. The tax is levied on a per ticket basis ranging from €1.5 for economy class tickets within the EU to €18 for business class tickets for flights out of the EU. The French government is not the only European government that has recently announced new aviation taxes stating environmental reasons for their introduction. The Dutch government, committed to "greening" its tax regime, published a bill in May that would tax every departing passengers €7. Many other governments already have taxes on aviation.

The global aviation sector is responsible for more than 2% of anthropogenic CO2 emissions, and more than 3% of the EU's GHG emissions. Whilst not a large share today, aviation is expected to grow considerably in the future, presenting a challenge to the EU's net-zero emissions target for 2050. At the same time, the industry provides a significant benefit to countries and residents alike: an increasingly vital part of the globalised world, aviation facilitates tourism and trade, employs over 60 million people globally, and contributes up to 3.5% of the world's gross domestic product[1].

In this paper we will consider the implications of these taxes and how well suited they are to the task of managing aviation's impact on climate change.

[1] Source: Air Transport Action Group, jobs and GDP contribution include direct and indirect contributions

We will also consider alternative approaches, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) developed by ICAO. Understanding how governments and the industry approach aviation and climate change will be key to understanding how the industry will evolve over the next 50 years with implications for stakeholders inside and outside the industry.

Taxes on aviation

Aviation taxes exist in a number of European countries, and are applied in various ways and to various extents. There is currently no European consensus on how countries tax aviation and in fact many countries do not tax aviation at all.

Country	Domestic Rate	International Short-Haul Rate	International Long-Haul Rate	Transfers excluded?
Austria	€ 14 / 7%	€ 7 / 4%	€ 35 / 6%	Yes
France*	€ 14 / 7%	€ 7 / 4%	€ 16 / 3%	Yes
Germany	€ 15 / 7%	€ 7 / 4%	€ 42 / 7%	Yes
Italy	€ 14 / 7%	€ 18 / 9%	€ 28 / 5%	Yes
Norway	€ 17 / 8%	€ 8 / 4%	€ 8 / 1%	Yes
Sweden	€ 11 / 6%	€ 6 / 3%	€ 37 / 6%	No
United Kingdom	€ 28 / 14%	€ 14 / 7%	€ 87 / 14%	Yes
Netherlands (proposed)	€ 14 / 7%	€ 7 / 4%	€ 7 / 1%	Yes

*includes the French 'eco-tax', the French Civil Aviation Tax and the Air Passenger Solidarity Tax

**figures quoted are for Rome Fiumicino, other airports are less heavily taxed

Among the major nations that apply specific taxes to aviation, the levels vary considerably, but they share several common traits:

- They represent a relatively small share of the overall ticket price (a maximum of 18%, and most are between 3% and 14%)
- They are typically broadly priced in proportion to the ticket price such that the % increase is similar whether you are travelling domestically or long haul. Norway is an exception, charging a flat rate regardless of haul (this is also true of the Netherlands proposal)
- Most exclude transfer passengers – note the transfer passenger will be liable for tax in the country of their origin or destination (if such a tax is present there), but not the country where they connect
- In virtually all cases, the revenue generated by these taxes goes to central government and is not ring-fenced for aviation or environmental activities. The eco-tax in France is an exception here – they have stated that monies raised will go to funding alternative modes of transport

As we shall see, these traits have significant implications on the ability of these taxes to influence customer behavior, if indeed this was their intention.

Taxes on aviation – to what end?

The context of this paper is taxation as a tool to manage aviation's environmental impact. Whilst not all of these taxes are explicitly designed to this end, most are at least part-justified on environmental grounds. In Germany the Act explicitly mentions the environmental impact of aviation, the Austrian tax was defended in parliament using environmental arguments, the Swedish tax's purpose is to reduce air travel. In the UK's case, the UK Treasury describes the 'secondary environmental benefits'[2].

Regardless of their original intent, taxation is seen by some as the answer to managing aviation's impact on the environment.

Here, we assess how well suited the current tax regime (or set of tax reqimes) is to that role.

Typically, when taxation is used to address activities that are deemed to have wider societal costs, they do so in one or more of the following ways:

1. Reducing activity – this is the concept behind so-called sin-taxes which aim to lower the activity by increasing the cost
2. Incentivising the use of alternatives – a variation of the above, but where consumers are incentivized to choose less damaging alternatives
3. Raising funds to tackle the costs incurred by the activity

The aviation taxes currently in use most closely resemble a sin tax. The funds raised are not ring-fenced to fund initiatives to reduce the environmental impact of flying (either by funding research and development or offsetting emissions), nor do they incentivize customers (or airlines) towards more environmentally friendly forms of flying (other than simply flying less).

But how well do they operate as sin-taxes? The key challenge currently is that most governments have been silent on what they want to achieve – do they want customers to fly less? How much less? The practice of excluding transfer passengers – arguably the least environmentally efficient form of flying (incurring circuity, and an additional landing/take-off cycle) - from the taxes undermines an intention to reduce flying.

Experience in other domains shows that sin taxes are most effective in changing behaviour when they fundamentally change the cost of the purchase and when they are coupled with robust public education campaigns. In the case of cigarettes, for example, sin taxes were used to more than double the product's cost to consumers while governments simultaneously restricted promotional advertising and required prominent anti-smoking warnings on the package. In the case of aviation, by contrast, most European governments have been quiet on how they want customers to respond. Only Sweden has explicitly set a target of reducing flying.

[2] "Reform of Air Passenger Duty: response to consultation" by HM Treasury, 2011

There are also not clear pricing signals from the taxes themselves. In most cases the relative impact on the cost of domestic flying (where typically there are alternative modes of transport) is not materially higher than on international long-haul flying (where there are no alternatives to flying). Some countries apply a higher rate of tax to business travelers (who, due to the less densely packed cabins have a far higher carbon footprint), however the amounts again do not amount to a more punitive tax relative to the fares. And, again, the exemption for transfer passengers.

Examples of 'Sin Taxes' in the United Kingdom

Commodity	Rate	Example Product	Tax	Typical Price	Tax % of Cost
Spirit	£28.74/litre of alcohol	70cl 40% gin	£8.12	£13.00	62%
Beer	£19.08/litre of alcohol	330ml can of 5% beer	£0.31	£2.5	13%
Cigarettes	£228.29/1000 + 16.5% retail price	20 pack	£6.62	£12.45	53%
Fuel	£0.5795/litre	litre of petrol	£0.85	£1.29	45%
Aviation - Domestic	€26 per return flight	typical return flight	£26.00	£185.00	14%
Aviation - Intl'l Long haul	€26 per return fligh	typical return flight	£80.00	£650.00	12%

The result is that the taxes have not resulted in a consistent impact on the prices that passengers pay. Flights to New York, for example are not materially more expensive from London compared to other cities in Europe that do not charge an aviation tax (e.g. Madrid and Amsterdam).

Flights to New York (JFK) from Select European Airports

(Cheapest return flight including all taxes and surcharges, but excluding bag fees; 6 day return flight in November 2019, searched on 5th August 2019)

Commodity	Tax	Return Fare
London	£80	£245
Frankfurt	£39	£305
Madrid	£0	£240
Amsterdam	£0	£277
Paris	£14	£240

We cannot know what would have happened if these specific taxes had not existed, and there are myriad factors that determine prices including airline business models, macroeconomics, fuel price etc. It is likely too, that countries where the aviation industry is less resilient are less likely to apply the most punitive tax regimes – these airlines are less likely to have competitive cost bases and therefore charge higher prices.

That is not to say that the outcome of taxation has not altered the situation – there is a well-founded relationship between the price of a commodity and demand and certainly a globally applied increase in the price of air travel would serve to reduce passenger demand. However, whilst increasing the price to passengers may well reduce growth, it does little to incentivize passengers or airlines to choose more sustainable options – a downturn in passenger demand could even conceivably result in deferred investment in new sustainable technology solutions.

EU-wide Taxation?

Thus far, aviation taxation has developed sporadically and inconsistently among EU member states. Some countries – notably the Netherlands – have been calling for an EU-wide approach. This would avoid fears that the introduction of new tax will disadvantage the taxing country against other EU members (particularly given the flexibility with which European airlines can redeploy capacity within the EU). The idea of starting to tax aircraft fuel in Europe, which would constitute such an EU wide tax, has recently been discussed on several occasions, and Dutch Finance Minister Menno Snel brought up the idea of an EU wide aviation tax in February 2019, stating that taxation of aviation should be tackled on the European level.

Alternative approaches

EU ETS & CORSIA

The 1997 Kyoto Protocol called for ICAO to address carbon emissions from international aviation. After progress in this field stalled at a global level, the EU extended the EU Emissions Trading System (ETS) to flights within the EEA in 2012.

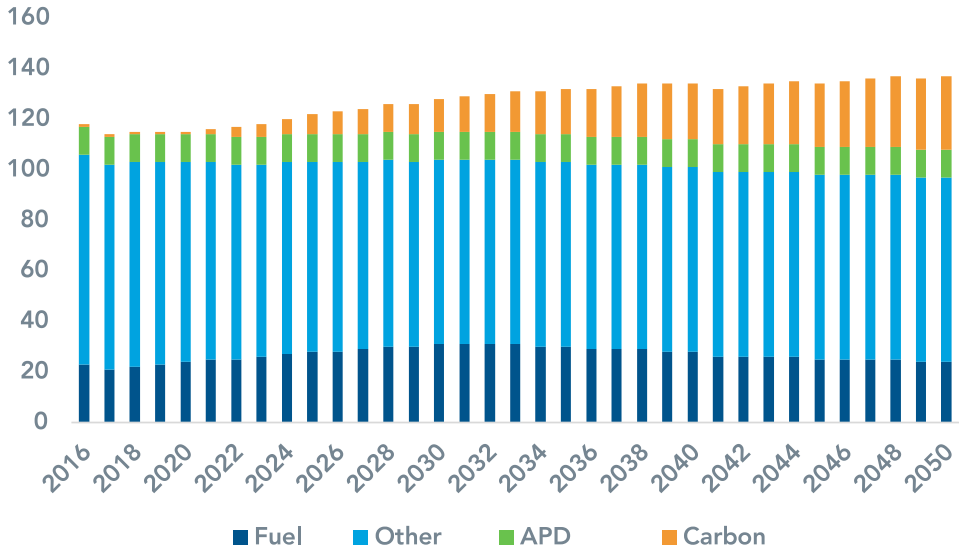
The ETS is a mandatory cap and trade mechanism in which airlines (and other applicable industries) are legally required to acquire and surrender allowances equivalent to their total carbon emissions at the end of the year. Over 80% of aviation allowances are currently being allocated for free. The remainder are 'auctioned' – airlines must purchase allowances from other participants in the scheme (not necessarily in the same industry). From 2021, the volume of freely allocated allowances will decrease by 2.2% p.a. requiring operators to purchase a greater proportion of their allowances. Importantly, there is a direct correlation between an airline's emissions and the costs and as such companies are incentivized to reduce carbon emissions in order to reduce their carbon costs. To date, due to the current low cost of allowances, costs incurred by airlines have been relatively low. With carbon costs currently just under €30 per allowance, the cost to the industry is estimated to be around €700m in 2018. With around 500m intra-EU passengers the average cost per passenger is currently around €1.50 per passenger.

Meanwhile ICAO have progressed their global equivalent approach – the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) – which will enter into service in 2021. In its first phase, the scheme will only apply to states that have volunteered to participate. From 2027, the scheme will apply globally (with exceptions[3]). It does not apply to domestic aviation (not so significant for Europe, but very significant for the likes of India, China and the USA), and applies to only emissions over and above the 2021 levels (initially at least), targeting carbon neutral growth rather than an absolute reduction in emissions. It is unclear yet whether the two schemes (EU ETS and CORSIA) will coexist, but it seems likely that the influence of these schemes will grow over time (with the declining share of free allocations in ETS, and the introduction of CORSIA) with impacts on the costs and by extension prices of air travel. By way of an example, the UK Department for Transport in their UK aviation forecasts assume the cost of carbon offsetting equating to 21% of the total airfare by 2050.

UK DFT Forecast Components of Weighted Average Fare[4]

All figures are in 2016 prices, and in £ per passenger. Fares are for a single one-way journey; they are national averages weighted by the number of passengers in each market

[4]"UK Aviation Forecasts 2017" by UK Department of Transport



Individual Carbon Offsetting

Some airlines allow customers to offset the carbon emissions of their air travel. This facility is currently sporadically available and feedback from airlines suggests that when offered the option, only very small proportions of customers choose to pay for an offset.

The UK Government is currently consulting on a set of possible proposals, including making individual carbon offsetting on flights and other forms of transport an opt-out, rather than an opt-in, as a way to raise traveler awareness and to increase rates of individual voluntary offsetting.

[3]Least developed countries (LDCs), Small Island Developing States (SIDS) and Landlocked Developing Countries (LLDCs)

Aviation Fuel Taxation

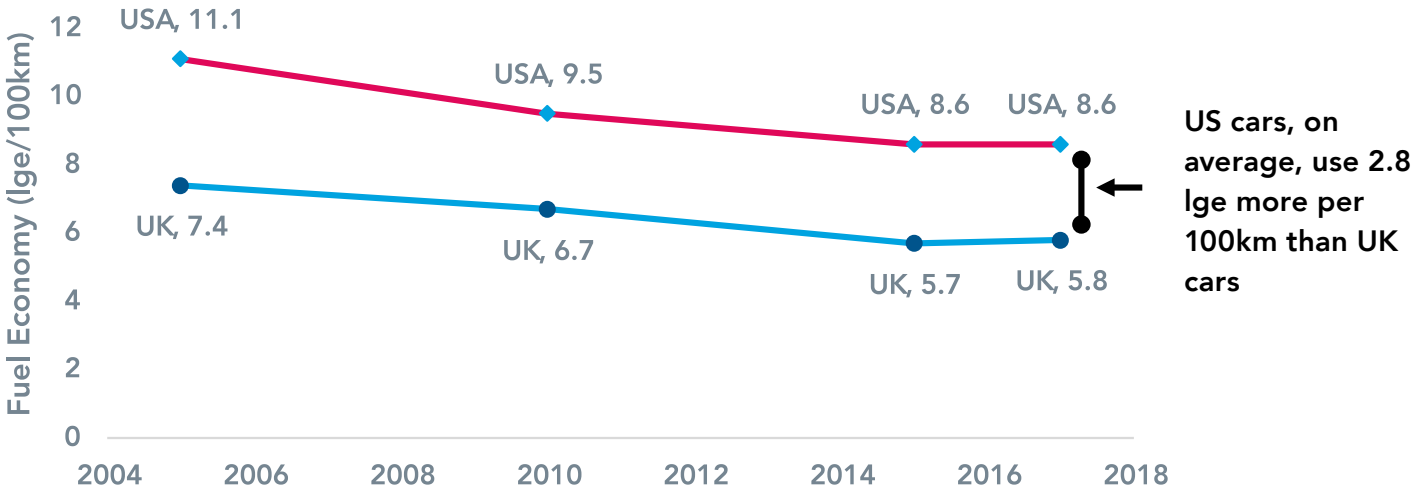
The EU currently exempts aviation fuel from being taxed directly, but several major non-European countries have a fuel tax in place, including the United States and Japan. The tax exemption harks back to the international provisions of the 1944 ICAO Chicago Convention, but there is scope within the EU rules to apply tax to domestic flying (though none do).

The 1944 convention also only applies exempts the fuel already onboard aircraft when they arrive in a member state.

Comparison of Taxation on Petrol in UK & USA (State and Federal)[5]

Commodity	Rate	Example Product	Tax	Typical Price (per litre)	Tax % of Coast
UK	£0.5795/litre	litre of petrol	£0.58	£1.29	45%
USA	£0.5264/gallon	litre of petrol	£0.14	£0.72	19%

Comparison of Fuel Economy UK & USA (litres of gasoline equivalent (lge) per 100km)[6]



[5]Volume-weighted average across US states

[6]Source: iea.org

Whilst in practice most member states provide exemptions within Bilateral or Open Skies agreements, this does potentially provide scope for the imposition of taxes on the fuel uplifted in member states. This was the subject of a leaked EC report, and has been gaining momentum as a method of combating climate change. In theory, taxation on fuel would incentivize more efficient practices, though airlines would argue that the fact that fuel cost is a major part of their cost-base – in the range of 20 to 30% – is sufficient incentivization already.

There is some evidence from the automotive industry where fuel is heavily taxed in most of Europe but more lightly taxed and far cheaper in the USA. This has impacted customer choice, and in turn the products offered by the car manufacturers, leading to materially higher fuel efficiency in (for example) UK cars vs American cars.

One example in this field where a strong message from government allied to pricing signals influenced behavior, is in the promotion of diesel engines. Notwithstanding the recent scandals over falsifying diesel emissions tests, it is still the case that diesel engines produce less CO2 emissions than equivalent petrol engines. In the early 2000s, the UK government promoted diesel engines as a cleaner alternative to petrol and reduced Vehicle Excise Duty (VED) on diesel cars (since the VED was explicitly linked to carbon emissions). By contrast, in the USA diesel has typically been taxed marginally higher than petrol nationally. The result: diesel engine sales accounted for 1% in the USA in 2017 compared to almost 50% in the UK.

Clearly, fuel taxes in the automotive industry (where the customer pays for the fuel) are not exactly analogous to aviation (where the airline pays the fuel bill). It is also true also that there can be unintended and counter-productive side effects, for example fuel taxes can lead to inefficient activities such as tankering (carrying more fuel onboard so that you don't need to fill up at the destination). Nevertheless, this is a potentially powerful option in the policy toolbox, particularly if allied with incentives to use cleaner fuel such as bio-fuels or sustainable aviation fuels.

Conclusion

The aviation industry faces a significant challenge if it is to maintain growth (and all the commensurate benefits that brings – increased connectivity, lower prices, more jobs) while at the same time ameliorating its impact on climate change. Public sentiment is becoming a powerful voice in the debate and demands action. In this context it is maybe not surprising that many countries have introduced, or are considering introducing, taxes on aviation. While this patchwork system of taxes may well have the power to slow the growth trajectory of aviation, their impact is likely to be uneven, distortionary and difficult to assess. If, on the other hand, governments want to continue to support the development of aviation on a more sustainable trajectory, while accelerating the development and take-up of technologies and fuel sources that will reduce its carbon and other impacts, a more nuanced set of incentives are likely to be needed.

About the Authors

Daniel Galpin has extensive experience in traffic forecasting, combining a strong background in complex data analysis and modeling with an in-depth understanding of supply-side factors. In addition to high-level forecasting, he is familiar with more detailed design day modeling and its relationship to infrastructure requirements as well as the more commercial aspects of airports including air service marketing. Mr. Galpin works for airlines on a number of assignments, from high-level strategy and planning, to developing detailed network planning models.

Prior to joining ICF, Mr. Galpin worked for Virgin Atlantic Airways where he was the route revenue manager responsible for delivering budgets on a portfolio of transatlantic routes. He has also worked at NATS, the British Air Navigation Service provider, where he analyzed safety incidents, modeled airspace improvements, and forecast passenger demand and air traffic movements in the United Kingdom airspace and at United Kingdom airports.

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Prior to joining ICF, Flurin completed his Master's degree in Economic Policy at Boston University, where he also worked as a research assistant in the Department of Economics. While there, his focus was on labor and development economics, as well as quantitative methods.

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