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Possibilities of a Carbon Tax for the Commercial Aviation Sector

LLM Paper
by Tim Vanquaethem
Student number: 01406908

Promoter: An Cliquet

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List of Abbreviations

APD	Air Passenger Duty
ATAD	Anti-Tax Avoidance Directive
CCC	Committee on Climate Change
CCCTB	Common Consolidated Corporate Tax Base
CJEU	Court of Justice of the European Union
COP	Conference of Parties
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CRBTA	Carbon-Related Border Tax Adjustment
EASA	European Aviation Safety Agency
EEA	European Economic Area
ETR	Effective Tax Rate
EUC	Emissions Units Criteria
EU ETS	European Union Emissions Trading Scheme
FAA	Federal Aviation Administration
GDP	Gross Domestic Product
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICE	Internal Combustion Engine
IPCC	Intergovernmental Panel on Climate Change
LRTAP	Long-range Transboundary Air Pollution
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
PED	Price Elasticity of Demand
PPP	Polluter Pays Principle
PwC	PricewaterhouseCoopers
TAB	Technical Advisory Body
TFEU	Treaty on the Functioning of the European Union
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WTO	World Trade Organization

“The market won’t put a price on the atmosphere because no one owns the atmosphere. Having a combination of a free market with environmental regulation therefore gives you the best of both worlds.”

Steven Pinker (4 February 2018)

Introduction

Everywhere around the world we see a renewed motivation to tackle some of the largest contributing factors to climate change and environmental deterioration since the COP 21 meeting resulting in the binding Paris Agreement. In Europe we see different Member States taking individual initiatives to lead the charge, as is the case with the UK Air Passenger Duty (APD) and the Dutch Air Passenger Tax. However, national ambition does not suffice to treat transboundary issues such as CO_2 emissions originating in the aviation sector.

Whilst there are international measures in place and in further development, this research aims to evaluate a potential carbon tax mechanism in the light of the existing measures such as EU ETS, CORSIA and other (national) alternatives. It is not only important to cover the way such a mechanism would work in practice but also how to have it ratified in different jurisdictions so as to address feasibility. As the aforementioned measures indicate, this study is conducted from a European as well as an international perspective.

Since some argue that taxation is not necessarily an effective way to combat (aviation-induced) climate change, or more generally to incentivize individuals or companies to change their behaviour, there is a section that will cover why and how this scepticism might not be justified in certain situations. The ambition is not to create an or-or atmosphere in which taxation is the only viable measure left but rather to show where taxation has a higher chance of achieving the same and possibly other objectives compared to existing systems, again both legally and in practice. Consequently, it will show where taxation is rather weak and thus should not be considered a feasible measure as well.

Taxation in itself is not a positive motivational factor. However, the idea that one has to pay when creating revenue or in this case when one is accelerating climate change, does not necessarily have to be a strict negative. Analogous to national tax systems, a potential tax credit could also be built in. If companies show willingness to invest in more sustainable technologies or compensatory systems, then they should be rewarded for their efforts. These concepts are especially important because policy makers often forget to consider the fundamental psychological drivers behind legislation. Positive and negative reinforcement measures have diverging effects on different personality types and thus both should be implemented if a carbon tax system is to function with optimal effectiveness.

Effectiveness, towards what objective? Clearly a tax does not provide a be-all and end-all solution to the issue of climate change or environmental damage caused by aviation. Most evidently, the tax is a driver, a motivation to think twice about the necessity of the transport by airplane for consumers and for aircraft developers to develop cleaner technologies and alternatives or to at least compensate for the damage they cause. On top of that, it is a way to recuperate the externalized costs of climate change and potentially of environmental degradation as well. As might be becoming clear by this point, the two aspects, both taxation on the one hand and climate and environmental considerations on the other will sometimes need their separate sections to clarify particular issues before they can be integrated into the bigger picture. Moreover, that bigger picture could turn out to be broader than just an aviation carbon tax as calls for a general carbon price have been the subject of debate.[1] For all that to be made possible, it will be necessary to review how policy makers have treated aviation up to this point in time, and how they could change their ways in function of climate change.

[1] Belgian National Debate on Carbon Pricing, Executive Summary, June 2018

I. A Carbon Tax: Why? When? How?

1.1 Polluter Pays Principle

Taxing the airline company always results in fulfilling one of the pivotal principles within international and European environmental law development; the Polluter Pays Principle or PPP.[2] Whether the companies or their clients pay the price in the end, the truth is that whoever chose to create the situation in which CO_2 emissions became possible, that person or entity is held responsible.

As mentioned in the introduction, there is already national legislation in place in various jurisdictions that aims to tackle carbon emissions based on this principle. (e.g. Norway's electric vehicle policy which simultaneously discourages the purchase of internal combustion engine – ICE - vehicles) However, one of the major limitations of the PPP is the principle of proportionality.[3] The following example clarifies where proportionality becomes an issue: According to the CJEU, "farmers do not have to pay for eliminating and preventing pollution to which they do not contribute".[4] That seems logical, but if we were to break down the reasoning, two elements arise that motivate why a tax for specific sectors or activities does not infringe on the proportionality requirement:

First off, a legislator should consider the fact that it is not solely the farmers who are responsible for the pollution (e.g. causing nitrates to be released) that they are accused of. Secondly, if a farmer succeeds at performing his activities in a less pollutive manner, he should be rewarded for that accordingly. In the context of a tax, it means their sanction would decrease or they would be granted a tax credit for making certain investments or would simply pay less. Taking those two elements into account, it shows why a separate, international or European tax for the aviation sector is not only justified but essential for it to be both fair and effective in its own manner. In attaining the objective of reducing the emissions caused by the aviation sector, the archetype of a tax on the source of those emissions is arguably the least restrictive measure. It guarantees that the polluter pays without causing third parties to be affected.

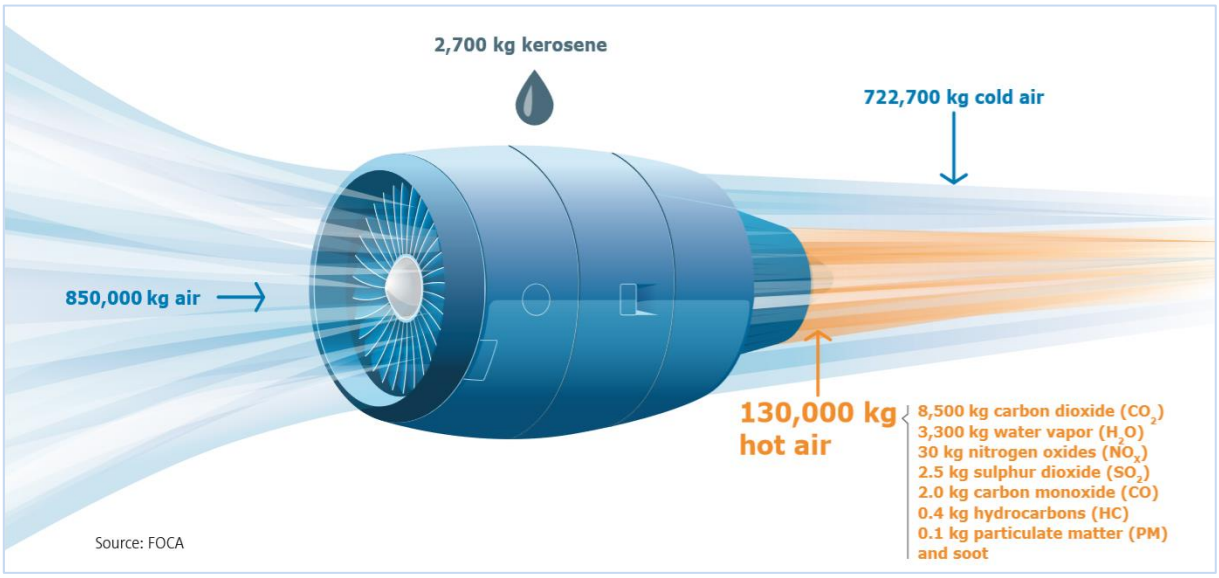
1.2 Significance of the Aviation Sector in Carbon Emissions: Scale & Perspective

The Long-range Transboundary Air Pollution or LRTAP Convention collects data on pollution coming from *inter alia* aviation throughout Europe. The international sources most prominently used in this research will be the EASA's reports and the International Civil Aviation Organization or ICAO's data collection and projections.

At first, Aviation may seem like a smaller source of emissions, accounting for approximately 2.1% of the global CO_2 emissions. International flights have a share of 62% in that total.[5]

[2] Art. 191(2) TFEU; OECD Guiding Principles [1975]; WTO Law
[3] Case C-293/97 Standley [1999] ECR I-2603 Paras. 51-53
[4] P.E Lindhout, B. van den Broek, The Polluter Pays Principle: Guidelines for Cost Recovery and Burden Sharing in the Case Law of the European Court of Justice, Utrecht Law Review, volume 10, issue 2 (May 2014), 49
[5] Proposal for a regulation of the European Parliament and of the Council amending Directive 2003/87/EC, Briefing, 2

On a European level, aviation caused 3.6% of greenhouse gas emissions in the EU.[6] However, growth in the commercial aviation sector is the most important element to consider. The United States official body FAA forecasts a growth in the number of passengers of more than 50% between 2017 and 2038 in the U.S.[7] and that rapid growth is expected to be similar on a global level. Moreover, the ICAO states that the anticipated growth will result in the emissions being "seven to ten times higher than 1990 levels" in 2050.[8] In Europe, EASA reports an increase of 20% in "passenger kilometres flown by commercial flights" between 2014 and 2017.[9] In that same time frame, emissions rose by 10%. Moreover, the number of flights is projected to increase by 42% between 2017 and 2040.[10] While efficiency per passenger kilometre flown has increased by 2.8% each year between 2014 and 2017, that has not been able to compensate for the sharp increase in actual kilometres flown. The image below shows the conversion process of an average aircraft engine "during a 1-hour flight with 150 passengers."[11]



Source: EASA European Aviation Environmental Report 2019

The explosivity of the sector's growth would not necessarily be a problem if the increased revenue were to originate exclusively in different pricing formulas. That would mean that there is no (substantial) increase in the amount of airmiles flown and thus CO_2 emitted, but rather that passengers are willing to pay more for an improved experience and differentiated service. Regrettably, pursuant to the objective of reducing the impact of human activity on climate change, that is not the case.

With the Paris Agreement participants' goal to limit a global temperature increase to 1,5 °C, total CO_2 emissions would need to decrease around 45 percent from 2010 levels.[12] If aviation is allowed to make up an increasingly large share of a shrinking total, then that is not only extremely damaging but also a counterproductive and unfair signal towards other sectors that do make an effort to conduct their activities in a more sustainable manner.

[6] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 13
[7] Federal Aviation Administration Aerospace Forecast, Fiscal Years 2018-2038, 19-20
[8] ICAO Agreement on CO2 emissions from aviation, EPRS, October 2016
[9] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 7
[10] *Ibid.* 13
[11] *Ibid.* 22
[12] IPCC (2014) Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change

1.3 Why and When Taxation is Effective

We have EU ETS in place, CORSIA will cause airline companies to offset flights from 2020 onwards. The exact inner workings of these mechanisms and the effectiveness will be discussed in sections further down, however as the goal here is to assess the possibilities and the feasibility of a tax, it could prove useful to see where taxation has worked to achieve a similar goal in the past. The goal, to reduce carbon dioxide emissions or, if the scope is broadened, to discourage people from inflicting climate damage and/or to reduce health hazards has been the driver behind other tax structures across the globe. Here are a few examples to show in what forms taxation has been effective and what the envisioned carbon tax should look like if similar results are to be achieved.

Taxation of tobacco products has been around for a long time in many countries. Already in 1986, Baltagi and Levin identified that in the U.S., "Cigarette taxation is found to be an effective tool for generating revenues even though there may be spill-over effects to neighbouring states where bootlegging is significant."[13]

In the same research paper, the most important concept in measuring effectiveness of a tax is brought up as well; price elasticity of demand or PED. PED is a tool to determine how consumers will react to a change in price of a certain good or service.

Ideally, for the effectiveness of a tax, the PED of a good or service should be a negative number lower than -1. It means an increase in price of an airline ticket would result in a decrease in demand. For example, at -1, a 10 percent increase in price would result in a 10 percent decrease in demand (a one-on-one-ratio). Thus, the larger the negative value of the PED in the aviation sector, the more impact a price adjustment through a tax could have.

There are many determinants for the PED in aviation such as: The number of available substitutes, quality of those substitutes, pricing of those substitutes, spending capacity of consumers, etc.[14] All of those are determinants that cannot be changed through policy measures and the reality is that elasticity will likely be different from region to region because of divergence in the determinants.

This is where the second element of Baltagi & Levin's findings must be considered: "[…] even though there may be **spill-over effects** to neighbouring states where bootlegging is significant"[15]. If anything, this is the evidence that for many issues, even ones that might not be treated as transboundary ones, people move across borders to avoid being confronted with restrictive measures. It supports a proposal for supra- or international action because the other option is simply ineffective in attaining the objective. When bringing this together with PED, there is an important question that remains unanswered. Since PED may vary from one country or region to the next, the tax would have to either be levelled up (more restrictive) or levelled down (less restrictive).

[13] Baltagi, B.H., Levin, D. (1986). Estimating dynamic demand for cigarettes using panel data: the effects of bootlegging, taxation and advertising reconsidered. *The Review of Economics and Statistics*, 148

[14] Brons, M., Pels, E., Nijkamp, P., & Rietveld, P. (2002). Price elasticities of demand for passenger air travel: a meta-analysis. *Journal of Air Transport Management*, *8*(3), 165-168

[15] Cfr. footnote 7

In other words; should the tax be set at a low percentage, because the impact would be too big for regions with a relatively high elasticity? Or, alternatively, should the tax be levied at a high percentage so that it is also effective in regions with a relatively low elasticity?

In a study conducted by Bartelings et al. (2005), the effectiveness of landfill taxation was tested across different countries. The important difference is that the tax levels and structures were put in place on a national level, thus it serves as a good example of what could happen if carbon emissions in aviation were to be taxed per country. Even though there are many more factors that influence the changes in behaviour regarding waste treatment, a low-level tax was found not to be effective.[16] In the same research article, several different PED findings were brought together. For landfill taxation, the PED values were between -0.12 and -0.45.[17] Even though the range could be considered wide, both ends of the spectrum are still 'relatively inelastic'; meaning the sensitivity to changes in pricing is low.

For the sake of effectiveness on an international level, the above suggests that level-up taxation is the only direction that is worth considering. The argument brought up could in that case be: "The overall effectiveness of a carbon tax on aviation would be determined by the most price-insensitive region that is taken up in it." However, the next section will provide insight into what could be considered the primary argument against a level-up formation of the tax.

1.4 Why to Treat Taxation with Caution

1.4.1 Social Injustice

Towards the end of 2018, a movement in France started protesting against president Macron's proposal to increase taxes on fuel (diesel and petrol), the so-called yellow vests movement. It is one of the examples that is still fresh in the minds of people at the time of writing. Whilst it is unfortunate that the situation caused the amount of outrage that it did, it does clearly indicate that taxation has the potential to be extremely detrimental to a country's economy and social cohesion.

Even though the primary consequence of this policy decision would have been that daily transportation became more expensive, there are a few parallels with the tax structure that this research revolves around. Transportation through commercial aviation, at its current price point and its most basic service provision, is available to almost anyone in developed regions. The cost of buying an ICE vehicle and using it, makes it so that it is also widely available. Between these two, the biggest difference is of course that most people do not make use of commercial aviation on a daily basis, whereas transportation by car is more common due to the range and purpose it is generally used for. If that reasoning is projected onto policy decision-making, the question arises whether the outrage would be comparable if the government chose to install a carbon-aviation tax that incurs a cost equivalent to the fuel tax increase for the public, albeit on a more irregular basis for most consumers.

[16] Bartelings, H., van Beukering, P. J. H., Kuik, O. J., Linderhof, V. G. M., Oosterhuis, F. H., Brander, L. M., & Wagtendonk, A. J. (2005). Effectiveness of landfill taxation, 15
[17] *Ibid.* 6

In Gough's (2011) paper on climate change policy and its social implications, this would be considered an issue in the second domain; within a (developed) nation. The two others being: Between nations on a global scale, and within developing nations.[18] When negotiating inter- or supranational measures to mitigate climate change – such as a carbon tax for the aviation sector -, finding a balance between all three of these domains has been and will inevitably continue to be one of the biggest hurdles to overcome. Subsequently, Gough defines the concept of double injustice in his paper, describing it as the phenomenon where "groups and populations likely to be most harmed by climate change are the least responsible for causing it and have the least resources to cope with the consequences."[19]

The historical evolution of the aviation sector is important to consider because it teaches us that it is not only the wealthy who are responsible for the sector's current explosive contribution to climate change. Where travelling by airplane used to be a privilege set aside for the wealthiest in society, we see that the liberalisation, competition and inherent subsidizing[20] of the sector has driven prices down to be affordable to the majority of the population in developed countries as mentioned above. Gillen & Morrison (2005) describe this evolution to also result in a change of the "perceived nature" of commercial aviation as a product.[21] According to them, price evolution made aviation into a substitute means to get from point A to B – where it used to be associated with wealth and luxury -. It has become more commodity-like. Thus, "consumers become more price sensitive and are willing to trade off elements of service for lower prices."[22] This naturally ties into the section on PED. Consumers have become more price sensitive, which indicates that a tax would have more effect now than it would have in the past.

What does that all mean for double injustice? First and foremost, it means that a flat tax – meaning an equal rate for any type of passenger over any distance – sets every flight passenger back the same absolute amount of money in theory but the weight of that absolute amount is naturally a lot heavier for persons with a lower income, who now have access to commercial aviation. The tax rate in that situation should be high enough so every potential passenger at least takes the added cost into consideration for it to have effect. It is not necessarily a severe case of double injustice, because the wide availability (also to persons with a lower income) is unfortunately what is at the core of aviation's growth.

Then comes the moral and ethical discussion; should the tax rate be at such a position that some consumers are left out? Is everyone entitled to fly wherever they desire? At what cost – economically and socially – do governments wish to battle climate change or improve air quality? Uninformed voices may call for an extremely high tax rate, but the social unrest and the consequences it entails cannot be neglected.

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[18] Gough, Ian (2011). Climate change, double injustice and social policy: A case study of the United Kingdom, UNRISD Occasional Paper: Social Dimensions of Green Economy and Sustainable Development, No. 1, ISBN 978-92-9085-083-0, United Nations Research Institute for Social Development (UNRISD), Geneva, 16

[19] *Ibid.* 1

[20] X (2011), Towards VAT on air, ferry and cruise tickets, T&E reply to the Consultation of the European Commission on the 'Green Paper on the future of VAT– Towards a simpler, more robust and efficient VAT system', 2

[21] Gillen, D., & Morrison, W. G. (2005). Regulation, competition and network evolution in aviation. Journal of Air Transport Management, 11(3), 170

[22] *Ibid.*

A way to mitigate social injustice would be to grant everyone a limited amount of flight credits. That way, those who fly more frequently – and can thus afford to do so - will be paying a higher price. If calculations are made across the entire line, the recurrent passengers could compensate for the damage that one-off passengers inflict but do not pay the full price for. Especially within the structure of a carbon tax, this could be an easy-to-implement yet effective way to at least take social injustice into consideration and on top of that shift part of the impact the tax could have on tourism to a group that is more capable of bearing the burden.

1.4.2 Economic Spill-over Costs versus Environmental Benefits: Case UK

When developing policy measures, a notion that economic scholars consider is spill-over costs. Social injustice also falls under that scope; however the goal in this section is to uncover other potential – economic - consequences of a carbon tax. Luckily, there is a case available in the UK that allows for a practical study, called the Air Passenger Duty or APD[23]. The structure shows similarities to the tax system envisioned in this study, except it is a **boarding tax** instead of an **emissions tax**. This means carbon is not in any way a factor in the calculation. Other aspects of APD will be discussed in sections further down.

Airline operators asked PwC to research the economic impact of this mechanism, the risk of a bias towards the interests of airline operators can therefore not be ruled out. For the 2013 budget, their study suggests that outright abolition of the tax system potentially gives a boost to the UK GDP of approximately "0.45 percent in the first 12 months"[24]. The projected growth is the result of: An expansion in investment (6 percent) and exports (5 percent); British businesses being able to spend more time with key overseas customers; the creation of almost 60,000 jobs; direct costs to the Exchequer lowering by about 3 to 4 billion GBP.[25]

The research goes on to describe the positive relation between GDP growth and growth of the aviation sector and that APD "could be regarded as a tax on exports"[26]. While all those points may be valid, the conclusion states that the role of APD in emission reduction is considered "secondary" and that better means are available to attain that objective. They fail, however, to point out what those other means or "more targeted taxes"[27] are except for a reference to EU ETS.

Economically, PwC thus believes that the abolition of APD in its current form could only be advantageous to the British economy. This clarifies what constitutes potential spill-over costs but there are nevertheless a few remarks to be made. As a national carbon tax on aviation, certain arguments linked to a competitive disadvantage towards airline operators based in other countries can be accepted from an economic perspective. However, in a situation where the transboundary issue is treated with a transboundary measure, that argument is suddenly rendered meaningless.

[23] Seely, A. (2019). Air Passenger Duty: Introduction. House of Commons Library, Briefing Paper Number 413, 3
[24] X, (2013), The economic impact of Air Passenger Duty, PricewaterhouseCoopers LLP, 1
[25] *Ibid.* 2
[26] *Ibid.*
[27] *Ibid.* 22

If the “playing field” - being the market in which the airline operators act - is levelled, the competitive balance is restored and there is an increased abatement of emissions at the same time.

While an increase in the country’s GDP of 0.45 percent in the first 12 months cannot be neglected, it is projected to decrease to approximately 0.11 percent per year in the long run. PwC call it a “small but permanent GDP gain”[28]. A negative impact on economic growth was to be expected within reason, and if the trade-off is that commercial aviation is pushed to be a more sustainable sector in the long run, then policy makers have to at least make a cost-benefit-analysis for themselves.

Spill-over costs, in other words, are inevitable. However, if they are not capable of damaging the functioning of markets on a systemic or fundamental level, then how can the decision to not mitigate the climate and environmental impact be defended? Research has after all pointed out that that very environmental impact does pose an irreversible systemic risk in the long run if it is not tackled within due time and becomes more expensive to mitigate the longer we wait.[29]

So then, does APD succeed at reducing emissions? In its current form as a boarding tax, not directly.[30] Mayor & Tol (2007) made an analysis of the impact of APD on an environmental level which suggests that a more radical approach should be taken “if significant falls in emissions are being sought”.[31] APD in its current form has two brackets in which fares must be paid; below and above 2,000 miles. One of the main issues is that the price difference, as people travel further, relatively falls because of this. The result is an adverse effect which causes people to choose a destination further away once they have surpassed the 2,000-mile threshold. An amendment the international tax would therefore have to make is that the price is calculated on **true distance flown** or the closest workable approximation thereof. From a PPP perspective, it is the only way to get the polluter to pay the actual price of the damage he has caused. From their research it also follows that, based on UK price elasticity of demand for aviation, the rate should be higher than the average rate that applies to APD if a substantial reduction of CO_2 emissions is to be achieved.

1.5 A Different Objective but the Same Result? Other European initiatives

Because APD has been around since 1994[32], researchers have already been able to evaluate the economic effects and effects on climate. Other systems that have been put in place more recently have not had that chance. Regrettably, there are few distinctions to be made since the design of the tax structures often resembles that of the APD. Nevertheless, these individual national actions show that there is in fact support to at least facilitate fair competition in the transport sector as a whole.

[28] *Ibid.* 13
[29] IPCC, AR 5 Synthesis Report: Climate Change, 2014; Solomon, S., Plattner, G. K., Knutti, R., & Friedlingstein, P. (2009). Irreversible climate change due to carbon dioxide emissions. Proceedings of the national academy of sciences, 106(6), 1704
[30] Mayor, K., & Tol, R. S. (2007). The impact of the UK aviation tax on carbon dioxide emissions and visitor numbers. *Transport Policy*, *14*(6), 507; Truby, J. M. (2010). Reforming the air passenger duty as an environmental tax. *Environmental Law Review*, *12*(3), 200-201
[31] *Ibid.* 509
[32] The Air Passenger Duty Regulations [1994]

In Germany, the *Luchtverkehrabgabe* has been in place since January 2011[33]. It works similarly to Air Passenger Duty, in that sense that they make use of a *Distanzklasse* to determine the tax. Instead of two categories like APD, however, the German system uses three; short distance, medium distance and long distance. It did so because the ministry thought "an alignment of the actual CO_2 emissions from aircraft to be unworkable".[34] This has resulted in the tax being treated as an extra source of income for the treasury rather than a measure to mitigate damage to the climate. Understandably, the calculation based on true distance flown is complex for one country to handle. In that sense, the route-based approach of CORSIA – which will be thoroughly explained further down – is more feasible. Despite not taking ecologic efficiency of aeroplanes into account, the German Ministry of Finance did report that for the year 2011, their tax resulted in a reduction of 1,1 per cent in the number of passengers and a 0,6 per cent decrease in CO_2 emitted.[35]

Austria has had a similar system in place since April 2011[36], with the objective again quite clearly being to serve as an extra source of income for the treasury. Since January 2018, almost 7 years after its entry into force, the tax was halved in price because the damage it caused to other sectors (e.g. tourism) was reportedly greater than the revenue the tax could deliver.[37] In this case it is important to identify that governments make these types of decisions because the objective they pursue does not necessarily align with that of groups that have different interests. If Germany and Austria really wanted to tackle the issue of the aviation sector's contribution to climate change as their main objective, then they would use different techniques and they would maybe be willing to sacrifice part of their GDP to do so.

Of course, not all initiatives are drafted with the intention to serve as a fundraiser. When the Netherlands decided in 2008 that it wanted a *vliegbelasting* or air passenger tax, it was proposed as part of their amended environmental taxes act.[38] A number of factors did lead the government to abolish the tax only a year after its introduction. Most prominently - and this is a strong motivator for an international approach - Dutch airports saw many of their passengers cross the border to Germany or Belgium to start their flight journey there. Recently, the prime minister's cabinet proposed to reintroduce the tax in 2021. That plan is in line with their far-reaching climate proposal.[39] Evasion of the tax by going to Germany is out of the question now and on top of that it has been stated that its previous form failed because it was introduced at an unfortunate time:

[33] Luftverkehrsteuergesetz (LuftVStG), 9 December 2010
[34] Der Vertreter der Ministerien, 24 June 2010
[35] Unterrichtung durch die Bundesregierung, Bericht an den Deutschen Bundestag über die Auswirkungen der Einführung des Luftverkehrsteuergesetzes auf den Luftverkehrssektor und die Entwicklung der Steuereinnahmen aus der Luftverkehrsteuer, 17/10225, 16 *et seq.*
[36] Bundesgesetz, mit dem eine Flugabgabe eingeführt wird (Flugabgabegesetz – FlugAbgG)
StF: BGBl. I Nr. 111/2010 (NR: GP XXIV RV 981 AB 1026 S. 90. BR: 8437 AB 8439 S. 792.)
[CELEX-Nr.: 32010L0012]
[37] That analysis was, however, countered by the independent IHS in Vienna in the following study: Schönpflug, K., Paterson, I., & Sellner, R. (2014). Evaluierung der Flugabgabe. Update zur IHS Studie 2012, 1-2
[38] Wet van 23 december 1994, houdende vaststelling van de Wet belastingen op milieugrondslag
[39] Voorstel van wet van de leden Klaver, Asscher, Beckerman, Jetten, Dik-Faber, Yesilgöz-Zegerius en Agnes Mulder houdende een kader voor het ontwikkelen van beleid gericht op onomkeerbaar en stapsgewijs terugdringen van de Nederlandse emissies van broeikasgassen teneinde wereldwijde opwarming van de aarde en de verandering van het klimaat te beperken (Klimaatwet), 34 534

"The introduction came a few months before the crisis. Elsewhere the aviation industry declined just as fast, that was not a consequence of the tax."[40] In any case, going to Belgium to evade the tax would still be possible.

History shows that all participants have to agree on the objective they want to pursue, and that international cooperation is necessary to – apologies for the term - avoid tax avoidance.

1.6 Direct Format and Proportionate Compensation

In terms of basic formulation, the tax is rather straight-forward after all considerations in earlier sections. The formula for calculation in APD – as mentioned ut supra – does not consider carbon emissions either directly nor indirectly and will therefore not be used.

INPUT

$$T = [(E * D) * P]$$

- T = Tax payable
- E = Carbon emissions per metric unit used, fixed for the type of airplane used
- D = Distance flown
- P = Price fixed per metric unit of carbon emitted (based on PED)

OUTPUT

- Funding of the administration supervising and collecting the tax revenue.
- Direct investment in
    - Mitigation of climate and environmental damage (e.g. re-forestation instead of de-forestation and subsidizing of climate-neutral substitutes and technologies such as carbon filters if proven eco-efficient.)
    - Research and development of new, more efficient aircraft and aircraft engines.[41]

One thing that has not been considered so far is how the revenue should be used. The advantage of having this separate tax filling a 'separate treasury' – addressed in this thesis as the **direct format** - is that a new budget emerges. For passengers that pay the tax it is important to know that their contribution does not end up in the box of 'general government expenditure' of the country they pay it in as especially international passengers have no real interest in that. Additionally, the direct format outlaws any discussion about the size of the total budget. This can be used to mitigate and proportionately compensate for climate damage on the one hand and invest in technology on the other so that the effective tax rate (ETR) for the aviation companies may decrease over time. Naturally, this creates an incentive for the companies to invest in cleaner technology. Further down the line, this direct format and the flexibility it brings are bound to be crucial elements in distinguishing the impact of a carbon tax, compared to other emissions abatement systems.

[40] Statement by Secretary of State Menno Snel, 30 June 2018
[41] Metcalf, G. E., & Weisbach, D. (2009). The design of a carbon tax. *Harv. Envtl. L. Rev.*, *33*, 516

The exact division between both branches of the output is to be decided by policy makers themselves, however considering the urgency of the problem, there is an argument for the largest part of the budget to be allocated towards direct mitigation. While the consequences in the long run are not to be underestimated, those consequences can be postponed if all sectors collectively succeed at decreasing their yearly emissions substantially over the coming years. Direct compensation or offsetting arguably provide more certainty that sectors will achieve this objective. Metcalf and Weisbach (2009) find that – for a general carbon tax - "a small portion of the funds might be directed to providing transition relief for displaced workers"[42] as well. They primarily brought this up for miners, but it is possible that some workers within the aviation sector either leave or have to retrain in order to remain employed when new technologies start to circulate, in which case they need the extra funds.

1.7 Wider than Carbon: Nitrogen Oxide (NO_x)

At first sight, this segment might seem short and insignificant but assessing the possibilities of a carbon tax entails recognizing the diverging effects on other aspects of aviation. Alongside the effect of diminishing CO_2 emissions, it would be beneficial if a carbon tax could lead to equivalent drops in, for example, nitrogen oxide (NO_x) emissions. In section 1.2, the image shows that an average of 30 kilograms of NO_x is emitted during a one-hour flight with 150 passengers. Research has suggested time and again that these NO_x emissions are detrimental to our respiratory systems[43]. Alongside that, the UK Committee on Climate Change (CCC) states: "Non-CO2 effects from aviation, which include the emission of nitrogen oxides and contrails, is an additional example of a human effect on the climate system that is also largely short-lived. Finding a way to eliminate these effects (which have an overall warming effect on the climate) before global temperatures peak would contribute to a lower peak warming if done without a compensating increase in CO2 emissions."[44] Although this thesis does not aim to elaborate further on the various specific consequences, there is a strong incentive to tackle its source.

Caution is advised, however, since more efficient engines over time have led to "increasing pressures and temperatures within the combustor."[45] It suggests that the incentive to make engines more fuel-efficient (to decrease CO_2 emissions) may lead to an increase in NO_x emissions unless a new, ground-breaking technique succeeds at improving one without impeding the other. An option there is to invest part of the tax revenue in offsetting said emissions.

[42] *Ibid.*
[43] Kampa, M., & Castanas, E. (2008). Human health effects of air pollution. *Environmental pollution*, *151*(2), 364. This article is a literature review combining a vast number of studies that support all the - mostly negative - effects of NO_x emissions.
[44] Net Zero: The UK's contribution to stopping global warming, Committee on Climate Change, May 2019, 72
[45] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 34

Chapter II: (Im)possibilities within the European Union

2.1 Competence and Conflict

In this discussion, the EU is in a rather difficult position. Whilst the leaders of the Union have committed to reduce greenhouse gas emissions by at least 40% - compared to 1990 levels - by 2030[46] and 80-95% by 2050, they lack the competence in certain areas of policy making to attain those objectives.

Direct taxation policy is one such competence that Member States still have more or less full control over but already in the past and for other reasons than climate change mitigation, scholars and politicians alike have challenged that.[47] In a harmonized internal market, a harmonized, centralized tax system is likely to decrease the administrative burden of companies that conduct their activities throughout the entire Union; it is likely to abolish certain types of tax avoidance structures, etc.[48] In short, there are many advantages to harmonizing the tax system even if the only objective is to strengthen the cohesion of the internal market.

The Common Consolidated Corporate Tax Base or CCCTB is a rather ambitious proposal on that front, striving for a complete harmonization of the corporate tax system. Arguably, one of the reasons CCCTB is still a proposal at this point is because the idea covers too broad of a field to harmonize at once. Harmonization of, for example, the free movement of goods went through many waves of progress before being at the point it is today. With a carbon tax for commercial aviation being such a specific proposal, the odds of certain steps in the approval process causing insurmountable obstacles may be lower because there simply are not as many steps to go through.

Moreover, it does not conflict with national tax measures already in place in individual Member States, (except for APD in the UK) whereas CCCTB directly challenges the corporate taxation structure and ideology that is firmly embedded in different Member States. Instead, the carbon tax is a supplementary tax on top of existing structures.

2.1.1 The EU's Power and Duty to Preserve the Environment… and the Climate?

The following section will explain how and under what conditions the approval of a carbon tax in the EU is possible. Whilst taxation is a sensitive subject, the constitutional value of the Treaty Provisions does not prevent the Union to act when the (living) environment is at stake, in fact it always obliges the Union to take those concerns into consideration. Article 11 TFEU is a perfect example of that:

> *"Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development."*

[46] EU Climate Action Plan (https://europa.eu/european-union/topics/climate-action_en)
[47] Council Directive (EU) 2016/1164 of 12 July 2016 laying down rules against tax avoidance practices that directly affect the functioning of the internal market (also known as ATAD); Common consolidated corporate tax base (CCCTB) 2018 briefing
[48] Common consolidated corporate tax base (CCCTB) 2018 briefing, 4

Of course, the main criticism that may arise when using this article as the only motivation is that there is a lack of substance. Yes, the Union should take environmental protection into account when implementing policies and activities but exactly what policies can be considered relevant in this case? That is where Article 113 TFEU presents itself in the debate:

> *"The Council shall, acting unanimously in accordance with a special legislative procedure […] adopt provisions for the harmonisation of legislation concerning turnover taxes, excise duties and other forms of indirect taxation to the extent that such harmonisation is necessary to ensure the establishment and the functioning of the internal market and to avoid distortion of competition."*

Two major elements providing legal substance can be found here. The first is the functioning of the internal market. In the context of this thesis, perhaps the term 'prolonged' functioning of the internal market describes the intention of a carbon tax more accurately. Finally, creating conditions in which the functioning of the internal market is ensured in the long run is one of the powers conferred to the EU.[49]

The second element of legal substance is "[…] to avoid distortion of competition"[50]. While it was mentioned in a different section, this Treaty Provision simply reinforces the argument. Article 113 can be treated as a provision that justifies the tax to override the national boundaries because having it on an individual Member State level could lead to distortion of competition. If Member States show any interest – which they do - in creating an attractive climate for investment, for companies to settle in their country, the inevitable consequence of a national tax measure would be a race to the bottom (cfr. ANNEX II). Not only would this mean a distortion of competition, in extreme circumstances it could also be questioned as state aid as other tax rulings have been before the CJEU.[51] While for some time, the EU was exclusively built on establishment of the internal market and today it still can be considered its primary reason of existence[52], the Treaties contain a provision that allows the Union to act specifically on matters of environmental protection (which is closely connected to climate change in the long run):

> *"Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay."*[53]

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[49] Article 26, § 1 TFEU: The Union shall adopt measures with the aim of establishing or ensuring the functioning of the internal market, in accordance with the relevant provisions of the Treaties.
[50] Article 113 TFEU
[51] Case T-131/16 & T-263/16 on Belgian Excess Profit Rulings. Even though the Commission's decision was annulled by the General Court in these cases, the grounds on which the judgments were made are to be largely attributed to the Commission not providing an adequate amount of evidence samples. Therefore, the requisite 'standard of proof' was not met. Another reason the annulment passed is because tax authorities do have what the Court refers to as a 'genuine margin of discretion'. Naturally it is possible for authorities to surpass that margin which is why national carbon tax measures and potential grants or credits that come with it should be treated with extreme caution.
[52] Article 3 (3) TEU
[53] Article 191 (2) TFEU

Adding onto the PPP that was mentioned in the first chapter, this article obligates the Union to act based on *precaution* and to take *preventive action* as well.

2.1.2 Articles 113 and 192 TFEU: Arteries to EU Carbon Taxation

Other than justifications for internal market and environmental-related measures, article 113 also allows the EU to act within the taxation sphere of policy making. Importantly, the article only mentions *turnover taxes, excise duties and other forms of indirect taxation.*

When drafting a robust carbon tax within the European legal framework, its denomination along with its *de facto* execution should therefore be in line with those of indirect taxes in case it is subjected to evaluation from an interpretivist perspective. For this analysis, it is convenient that the most bespoke and easiest to compare form of indirect taxation is the Value Added Tax.[54] However, since VAT in Europe is still relatively young from a textual point of view[55], another way to reinforce legal validity is to adhere to the definitions strictly, as originalists would do. The Cambridge Dictionary describes an indirect tax as follows:

> *"A tax charged on goods and services rather than on the money that people earn."*

It implies, as does the form of carbon tax in section 1.5, that the tax does not take the income of a taxpayer into consideration. While that may seem unfair for citizens at the lower end of the income-spectrum as it takes a relative chunk from their income that is larger than that of their better-off counterparts, there is a certain degree of fairness in absolute equal treatment.[56] Legally, it allows policy makers to retain oversight in what could be considered a complex issue as well. Following the famous *keep it simple, stupid* motto, it supports an argument for a flat tax rate across all Member States or all countries that choose to participate in a carbon tax system (along with the effort to avoid distortion of competition[57]). There is also a restrictive notion; the definition implies that drafters must avoid any connection to taxpayers' income if they wish to waterproof their tax. Any connection to direct taxation is out of the area of competence of the EU and would thus present an opportunity to annul the tax legislation.[58] The conclusion of the *carbon tax as an indirect tax* analysis is quite simple.

Yes, rates may differ between participating countries, however, the aforementioned arguments strongly advise against it for reasons of legal validity, fair competition and legislative clarity.

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[54] A study on the economic effects of the current VAT rates structure (2013), Institute for Advanced Studies, 23

[55] i.e. the potential interpretations of the Treaty provisions now do not substantially deviate from the interpretations researchers would have had back in 1977 when the Sixth VAT Directive was adopted because the language has not significantly changed since then.

[56] Hall, R. E., Rabushka, A., Armey, D., Eisner, R., & Stein, H. (1996). *Fairness and efficiency in the flat tax*. American Enterprise Institute Press, 100. Hall et al. describe fairness as "one of the greatest virtues of the flat tax".

[57] Lejeune, I. (2011). The EU VAT experience: what are the lessons. *Tax Analysts*, (2), 280. Lejeune's arguments suggest that different VAT rates across Europe have resulted in "unnecessary complexity, uncertainty and inefficiencies."

[58] Article 263 TFEU obligates the CJEU to "review the legality of legislative acts".

On an important side note: Aviation has been the subject of many 'historical derogations', the consequence of which is that airline tickets have been exempted from the value added tax system ever since it was set up in the EU.[59] For domestic flights, some Member States still have the choice. On an international level, however, VAT is not imposed on air transport and the International Air Transport Association (IATA) argues it should stay that way.[60] The main reason the association brings forward involves the complexity of the end consumer going from one jurisdiction to the other. To strengthen its argument, the association relies on ICAO resolutions in which it is accepted that "international air transport involves the use of aircraft and goods and services outside the boundaries of any tax authority"[61].

On top of the fact that some goods and services produced by or provided through burning fossil fuels are not taxed accordingly – such as aviation to an extent - and thus have an inherent climate subsidy that is not taken into account, the exemption mentioned above means that airline operators are receiving double subsidies simply because legal systems were not constructed in a way that facilitates VAT to be levied on international airline services. It explains why a separate carbon tax for the aviation sector makes for fair(er) competition within the transport sector, especially for shorter distances since various substitute modes of transport **are** in fact subject to VAT. This particular weakness of VAT simultaneously supports the argument to fully organise carbon taxation at the international level.

A second important part of Article 113 mentions that tax legislation on the EU level has to be approved *unanimously* and it has to be developed through a *special legislative procedure*.[62] Unanimity within the Council makes organising an indirect tax a difficult endeavour to undertake. The Commission has expressed its concerns about efficiency in the EU tax policy in communication to the European Parliament and the Council; stating that: "New challenges that have emerged, in the EU and globally, have exposed the limits of unanimity in tax policy at both EU and national levels."[63] Political support and unity for decisions that imply an increase of powers for the EU, especially in times of Brexit discussions, is hard to find. Strangely enough, Article 192 TFEU seems to clash with the *special legislative procedure* requirement if environmental concerns are involved:

> *"The European Parliament and the Council, acting in accordance with the* ***ordinary legislative procedure*** *and after consulting the Economic and Social Committee and the Committee of the Regions, shall decide what action is to be taken by the Union in order to achieve the objectives referred to in Article 191."*[64]

The relevant objectives referred to in Article 191 in this case are "preserving, protecting and improving the quality of the environment, protecting human health, promoting measures at international level to deal with regional or worldwide environmental problems, and in

[59] X (2011), Towards VAT on air, ferry and cruise tickets, T&E reply to the Consultation of the European Commission on the 'Green Paper on the future of VAT– Towards a simpler, more robust and efficient VAT system', 2
[60] IATA, "International exemption must be maintained for international travel"
[61] *Ibid.*
[62] Article 113 TFEU
[63] Towards a more efficient and democratic decision making in EU tax policy, communication from the Commission to the European Parliament, the European Council and the Council, January 2019, 1
[64] Article 192 TFEU

particular combating climate change."[65] Application of the PPP, precautionary and preventive principle has been mentioned before as part of Article 191 (2) and those objectives are relevant here as well. Last but not least, the objective to prepare policy on the environment should take into account "available scientific and technical data, environmental conditions in the various regions of the Union, the potential benefits and costs of action or lack of action."[66] In the case of a carbon tax, the last point in that line of objectives has been thoroughly investigated and there is extensive documentation describing the costs of action or lack of action.[67]

Unanimity constitutes a political obstacle that the tax would have to overcome, even if only because of its nature. However, the Council and Parliament could take the Commission's remarks into account and revise the requirements for decision making on EU tax policy. Maybe that is also long overdue, especially for the purposes of modernisation within this field of policy making.[68] Last of all, it remains unclear which legislative procedure should be applied.

2.2 The Internal Market Scattered: A Race to The Most Attractive Tax Climate

This section seeks to address differences and potential concerns of the impact of this tax on, for example, regulatory competition between neighbouring countries. Where they are able to create an attractive climate for companies to settle, jurisdictions often look to each other and subsequently make their conditions just a bit more acceptable for investors.[69] That becomes particularly clear when we take a closer look at the statistics in ANNEX II. Ireland has lowered its corporate tax rate substantially over the past decade. Multinationals that can afford it, such as Apple, have made use of various tax structures on top of that to shield profits.[70] While Ireland and Apple have been investigated by the Commission for providing so-called state-aid, the long list of multinational corporations incorporated in Ireland (Yahoo, Twitter, Microsoft, Facebook, etc.) shows that the race to the bottom is real.

For experts in international taxation, the question to answer is: "How do you suppose airline companies shift around carbon emissions like they do with profits?". And those persons implicitly make a critical remark, revenue gets shifted around from one jurisdiction to the next by having a company established in a low-tax-rate or more forgiving region (A) charge royalties to the more heavily taxed affiliated company in region B. It creates revenue for the company in region A, and a deductible tax cost for the company in region B. It leaves the group as a whole with an ETR that is much lower than it would be if their respective revenues were to stay with the original companies that created it.

[65] Article 191 (1) TFEU
[66] Article 191 (3) TFEU
[67] Zenghelis, D. (2006). Stern Review: The economics of climate change. *London, England: HM Treasury*, 687
[68] Towards a more efficient and democratic decision making in EU tax policy, communication from the Commission to the European Parliament, the European Council and the Council, January 2019, 2
[69] The State of Delaware in the U.S., for example, has for many years been known as a company law paradise. On the other side of the pond, The Netherlands has been referred to as the "Delaware of Europe for that same reason."
[70] State aid: Ireland gave illegal tax benefits to Apple worth up to €13 billion, European Commission press release, Brussels 30 August 2016

Even though measures like the Base Erosion Profit Shifting (BEPS) plan and Anti-Tax Avoidance Directive (ATAD) try to counter the aforementioned practices, innovative constructions and strategies such as the famous “Double Irish” or “Dutch Sandwich” succeed at shifting around profits to this day[71], albeit in a less perverted manner.

The idea of carbon emission shifting for tax optimisation purposes is something entirely new but if the rate is set at a high enough level in certain jurisdictions, then airline companies will inevitably do some forum shopping to mitigate that cost of the possibility presents itself. In terms of determining a range within which the emissions can be shifted, that depends entirely on the formulation of the tax. Moreover, and it counts for this entire section, this issue will only come to exist if policy makers allow different rates to be set by the Member States or participating countries themselves. Seeing as none of that is certain yet, the only relevant analysis is based on diverging hypotheses.

Scenario A: Emissions are taxed where the company is incorporated and price is determined by that jurisdiction.

This scenario is dangerous because it has the potential to render the tax partially or completely ineffective. It encompasses that all carbon emitted through a company’s activities – in all participating countries - is accumulated and subsequently taxed by the rate of the country where said company is incorporated. Much like corporate tax rates have evolved over time, this scenario instigates regulatory competition. On the other hand, it is arguably easier to draft and implement since levying a tax on that one centralized entity makes it more efficient to follow up. Dealing with one legal personality makes for more convenient communication between the company and the executive branch as well.

Scenario B: Emissions are taxed where the company is incorporated and price is determined by the jurisdictions in which carbon was emitted.

This is what drafters could refer to as the in-between approach. There is fragmentation in carbon pricing, which can be a slippery slope for avoidance or optimisation but a single point of contact remains because only one entity (and one legal personality) is taxed. Furthermore, from this approach onward, a difference in carbon pricing potentially creates an administrative burden that is difficult for smaller airline companies to handle. For example, a flight going from Warsaw to Madrid would cross Poland, the Czech Republic, Germany, France and Spain. If those five Member States are each allowed to set their own carbon tax rate and airline operators have to calculate the tax pro rata of the distance flown in each jurisdiction, it becomes painfully clear that administrative costs will skyrocket. However, convenient in this scenario is that there is consolidation, making it easier for accountancy purposes than scenario C.

Scenario C: Emissions are taxed separately in every country (and rates are determined accordingly).

[71] Thorne, D. (2013). The Double Irish and Dutch Sandwich tax strategies: “Could a general anti-avoidance rule counteract the problems caused by the utilisation of these structures?”, 8-14

As there is full fragmentation in this scenario, there is no advantage other than political ataraxia. Any international tax measure that allows countries to preserve ample sovereignty is bound to go through a simpler approval process. Taking into account that this allows for an ultimate race to the bottom as well, one could ask whether this type of tax is redundant in its corpus.

Effectiveness and feasibility – in all the aforementioned scenarios - depend on the margin of discretion that is granted to the countries that are willing to sign up to the effort. If there is a floor rate (meaning a minimum rate) that is still high enough to effectively reduce or offset carbon emissions, then the issue of regulatory competition is marginal. The solution is either that, or a situation in which the draft and approval process pass a uniform tax rate applicable to all participating countries. Either way, one consistent rate is undeniably more consumer-friendly.

2.3 EU Emissions Trading System (EU ETS)

First off, the ETS calculation format is completely different from the carbon tax envisioned here. ETS is a *cap and trade* system, meaning it puts a cap on the amount of greenhouse gas emissions that are allowed. Within the cap, allowances are granted to companies. These allowances can be traded between them through which a market and price point is established. Companies must have sufficient allowances relative to their emissions to avoid fines.[72] A decrease of emissions is facilitated as the total amount of allowances issued per year falls, known as 'the shrinking pie'. ETS has a significant advantage for policy makers in that they can set the limit and ultimately force an abatement of emissions over the sectors taken up in the trading system. However, that aspect makes it into a double-edged sword because the market is interfered with in an invasive manner. If that intrusion is overly obstructive, then the damage done to a market or sector can generate "huge risks for related enterprises investment".[73] A reason for choosing the carbon tax over any cap and trade system is "the tendency to allocate free allowances under cap and trade bills to affected industries".[74] According to Meltzer (2014), this leads to windfall gains as some firms sell excess allowances "when abatement costs are lower than the allowance price"[75]. This can distort competition as a consequence.

Prior to aviation being added to the EU ETS in 2012, it took four years to get Member States to agree and then still the scope was limited, ultimately until the end of 2023.[76] This was originally decided to facilitate a better development of CORSIA, the International Civil Aviation Organization's (ICAO) plan to monitor and offset carbon emissions stemming from aviation. Because CORSIA does not come into effect until 2021, it means that for at least nine extra years, airline companies will have had to comply with less restrictive measures than other sectors. EU ETS and its problematic integration process can be seen as a lesson. One of those lessons lies in the issue with the limited scope. It adds to a list of legal pitfalls that legislative authorities should avoid at all costs.

[72] EU ETS Handbook (2015), European Commission, 4
[73] Zhang, Y. J., & Wei, Y. M. (2010). An overview of current research on EU ETS: Evidence from its operating mechanism and economic effect. *Applied Energy*, *87*(6), 1813
[74] Meltzer, J. (2014). A Carbon Tax as a Driver of Green Technology Innovation and the Implications for International Trade, 35 Energy L.J., 51
[75] *Ibid.*
[76] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 75

EU ETS' inclusion of aviation is a much-debated issue to this day. In case C-366/10[77], a group of American airline operators challenged the application of it on extra-EEA flights[78] – flights between aerodromes in the EEA and aerodromes in third countries – leading to the application of ETS being suspended on that front until the end of 2016 despite the ECJ stating that the disputed ETS Directive was valid. Again, this resulted in no action in relation to third countries as this exemption was prolonged in EU legislation until 2021 to make an implementation of the ICAO's Global-Market-Based-Measure more convenient.[79] With the decision to defer the application of the Directive, the EU ignored its own Court to alleviate political pressure coming from various corners of the globe.[80] In terms of showing global leadership in the climate race, that decision was questionable to say the least.

In the bigger picture, EU ETS has failed at reducing emissions because extra-EEA flights were not included in the system and a substantial amount of emissions originate in those flights[81]. Furthermore, its inclusion on emissions generated during intra-EEA flights has not succeeded at decreasing emissions either. In fact, *verified CO2 emissions* have risen by an average of 2.69 million tonnes or 4 to 5 per cent per year between 2013 and 2017 instead.[82] That is not to say ETS has been completely ineffective, as EASA estimates that the system will have "saved a net amount of 193.4 Mt CO_2 or twice Belgium's annual emissions."[83]

2.3.1 The Chicago Convention & Open Skies Agreement breached by ETS? (Case C-366/10)

A European carbon tax on aviation would undoubtedly generate the same political pressure as EU ETS, if not more. In the widest possible scope, the tax is levied on flights that are intra-EEA, extra-EEA and even flights that have a trajectory that (partly) runs through the EEA airspace such as a flight from, for example, Rabat, Morocco to Moscow, Russia. If such a tax were to be challenged in front of a European court, the outcome is uncertain. The main issue being article 15, section 3 of the Chicago Convention on International Civil Aviation, which reads as follows:

> *"All such charges shall be published and communicated to the International Civil Aviation Organization, provided that, upon representation by an interested contracting State, the charges imposed for the use of airports and other facilities shall be subject to review by the Council, which shall report and make recommendations thereon for the consideration of the State or States concerned. No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon."*

[77] Case C-366/10 [2011] Air Transport Association of America and Others v Secretary of State for Energy and Climate Change
[78] Limitations of scope for aviation activities in the EU ETS, Briefing European Parliament, May 2017, 1
[79] Regulation (EU) 2017/2392 of the European Parliament and of the Council of 13 December 2017 amending Directive 2003/87/EC to continue current limitations of scope for aviation activities and to prepare to implement a global market-based measure from 2021
[80] Sosnowski, J., van Calster, G. (2013), Duty Free? The Rationale of the ECJ in C-366/10, on the Inclusion of Air Transport into the Emissions Trading Scheme, 2
[81] Proposal amending Directive 2003/87/EC (n 4), 2
[82] ANNEX I
[83] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 9

Such charges, in short, refers to charges imposed for the use of airports and air navigation facilities.[84] When the CJEU was confronted with ETS allegedly breaching this provision in the Chicago convention because it amounted to a tax[85], it found that the Union itself was not bound by the Convention. All Member States are individually bound since they are signatories to the Convention but the Union itself is not.[86] This allowed EU ETS to include extra-EEA flights. It opens up the question whether a tax levied upon airlines that simply cross the EEA airspace – without landing at any aerodromes located within the EEA - would be prohibited. If we follow this reasoning by the CJEU, then the Chicago Convention's provisions on taxation does not constitute a legal obstacle to a carbon tax on aviation. Subsequently, the CJEU was not able to use a similar reasoning when evaluating the potential conflict with the Open Skies agreement[87] since the Union is a signatory party.[88] When reading the Open Skies agreement, the biggest issue was to be found in article 3 (4):

> *"Each Party shall allow each airline to determine the frequency and capacity of the international air transportation it offers based upon commercial considerations in the marketplace. Consistent with this right, neither Party shall unilaterally limit the volume of traffic, frequency or regularity of service, or the aircraft type or types operated by the airlines of the other Party, […]*

Particularly, the American airline operators felt that the *unilateral limitation of the volume of traffic, frequency or regularity of service* part of the provision was not respected. In its reasoning, however, the Court stated that this would only be an issue if non-European operators were treated in a different manner compared to their European colleagues. This *legal if equally treated* rationale was extended to the entire assessment of the Open Skies claim.[89] In case a carbon tax was established for the aviation sector in both the US and the EU at the same time, reciprocity is respected which resolves issue. On that basis, the tax would also comply with article 11 of the Open Skies agreement:

> *"On arriving in the territory of one Party, aircraft operated in international air transportation by the airlines of the other Party, their regular equipment, […] fuel, […] and other items intended for or used solely in connection with the […] shall be exempt, on the basis of reciprocity, from all import restrictions, property taxes and capital levies, customs duties, excise taxes, and similar fees and charges that are (a) imposed by the national authorities or the European Community, and (b) not based on the cost of services provided, provided that such equipment and supplies remain on board the aircraft."*

[84] Article 15 (2) Convention on International Civil Aviation, Chicago, 7 December 1944 (Chicago Convention)
[85] Case C-366/10 [2011] Air Transport Association of America and Others v Secretary of State for Energy and Climate Change, para 136
[86] *Ibid.* paras 70-72
[87] Air Transport Agreement Between the Government of The United States of America of the one part and the Republic of Austria, the Kingdom of Belgium, […] of 30 April 2007, hereafter referred to as the Open Skies Agreement
[88] *Ibid.* para 79
[89] *Ibid.* paras 82-100

If the tax was established by the EU and applied exclusively to airmiles flown within the territory of the EEA, the EU cannot rely on the reasoning used in C-366/10. The Court ruled that the ETS Directive does not violate the Open Skies Agreement as "the condition of reciprocity in Article 11(1) and (2)(c) of the Open Skies Agreement does not constitute, in particular in circumstances such as those of the present case, in which the contracting parties have reciprocally performed the obligation in question, an obstacle preventing the obligation, laid down in that provision, to exempt the fuel load from taxes, duties, fees and charges from being relied upon directly for the purpose of reviewing the validity of Directive 2008/101."[90] Sosnowski and Van Calster (2013) also mention that "The Court makes the distinction between a tax which is fixed, and a regulatory strategy, that fluctuates with market price. In this way, the Court was able to justify that the Directive was not a tax, but a market-based measure, and therefore consistent with the Open Skies Agreement."[91] For a carbon tax to dodge that bullet is highly improbable unless a similar provision – as in Directive 2008/101, meaning that exempting the fuel load from taxes, etc. is not able to affect the validity of the tax - is built into the legislation.

Taking both the Chicago Convention and the Open Skies Agreement into account, a carbon tax on aviation is possible if it reciprocally applied to both the airspace of the European Union and the United States (and ideally all over the globe). Moreover, since other sovereign states have entered into similar agreements[92] with both parties and for the sake of – once again – maintaining fair competition, a global tax on aviation may be more difficult to get approved but is likely to cause the least amount of unfair effects in competitive markets. The more states enter into a multilateral agreement, the easier it is for those who have **not** yet done so to (i) get national support to join the agreement – because of international pressure - and (ii) to revisit existing treaties with countries that may prevent full commitment to the agreement.

2.4 The European Citizens' Initiative

Apparently, people in Europe have noticed the aviation sector's unfair competitive advantage over other sectors. They want change and have clearly expressed that through using the citizens' initiative regulation.[93] On 30 April 2019, the Commission made their decision public to officially register the initiative.[94] At the time of writing, the tax is drafted as a kerosene tax, asking 0,45€/litre for short flights up to 600 Km, 0,38€/litre for flights from 600 to 1500 Km and 0,33€/litre for long flights over 1500 Km.[95] Of course, the Council is allowed to change contents of this proposal but this nevertheless remains a strong sign that there is public support to install carbon tax measures for the aviation sector in Europe.

[90] *Ibid.* paras 93
[91] Sosnowski, J., van Calster, G. (2013), Duty Free? The Rationale of the ECJ in C-366/10, on the Inclusion of Air Transport into the Emissions Trading Scheme, 6
[92] An example of such an agreement is the Euro-Mediterranean Aviation Agreement between the European Community and the Kingdom of Morocco. This is part of a series of agreements all modelled after the Chicago Convention. Reciprocity is taken up as one of the main principles in these agreements and it constitutes a substantial legal obstacle in a unilateral decision to levy a tax.
[93] Regulation (Eu) No 211/2011 Of the European Parliament and Of the Council Of 16 February 2011 On the Citizens' Initiative, Oj L 65, 11.3.2011, 1
[94] Commission Decision of 30.4.2019 on the proposed citizens' initiative entitled 'Ending the aviation fuel tax exemption in Europe'
[95] The citizens' initiative titled: 'Ending the aviation fuel tax exemption in Europe', Draft legal act (http://ec.europa.eu/citizensinitiative/public/documents/4472/Draft%20legal%20act.pdf), accessed 13 May 2019.

Chapter III: Global Initiatives & Apathy

3.1 Why Communication is the Key to Success

Imagine the following example: Country A levies a carbon tax on all its flights, including those that go out to country B. The GDP of country B is largely dependent on tourism and because of this tax they see tourist numbers decrease at an alarming rate. B therefore decides that it will pay (part of) the tax of passengers coming from A for them in an effort to persuade tourists.

Through introducing its carbon tax on aviation, country A wanted to (i) create an income that can be allocated towards offsetting emissions and/or research and development. On top of that, it wanted to (ii) dissuade people from flying altogether and make use of more climate-sustainable alternative modes of transport. The policy of country B has not had an impact on the first goal, but definitely on the second, making it a ground for potential "retaliation or legal challenge".[96] One avenue that allows both countries to avoid further discussion is the route-based approach in which B can either negotiate softening mechanisms to alleviate some of the impact on tourism or – because it has to sign an agreement in this case – prepare for the consequences which it can then anticipate. The softening mechanisms will have to be tailored to both countries' needs and capabilities, one example could be – say between Germany and Italy – that they launch campaigns that encourage tourists to use a more sustainable means of transport to get from one country to the other instead of cancelling their trip altogether.

3.2 Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

Outside of the parties involved in drafting and negotiating CORSIA, not that many people know what the scheme is or how it plans to offset emissions originating in aviation because it is not yet active. "In 2016, an agreement was reached at the International Civil Aviation Organization (ICAO) to set up the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). As of November 2018, 76 States intend to volunteer to offset their emissions from 2021, representing 76% of the international aviation activity."[97]

CORSIA theoretically forms one of the cornerstones of climate change mitigation with the offsetting of emissions being the prominent objective. As mentioned before, the fact that it is not set up as a *cap and trade* system makes it so that it is different from ETS. On the other hand, it is also a *market-based measure* like ETS. Because this is the first global measure to be put in place, it requires participants to adapt their jurisdictions to the provisions of CORSIA, which is why the pilot phase will only start in 2021. For this research, it is difficult to evaluate the carbon tax in function of CORSIA since there are no effects in practice to analyse yet. There is the theory, and then there are a number of researchers who have commented on its plans of implementation.

[96] Bullock, D. A. (2017). Combating Climate Recalcitrance: Carbon-Related Border Tax Adjustments in a New Era of Global Climate Governance. *Washington International Law Journal, Pac. Rim L. & Pol'y J.*, *27*, 637

[97] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 75

How will CORSIA prevent being challenged on the same grounds as in case C-366/10? The scheme is planned to operate on a "route-based approach and applies to international flights, flights between two ICAO states".[98] In practice, CORSIA will require airline operators to "monitor, verify and report their fuel use according to the approved plan."[99] The amount of emissions they have to offset is subsequently calculated by the State, and they can meet the requirement by "purchasing and cancelling CORSIA eligible emissions units."[100] One issue so far is that the eligible emissions units still have to be "definitively articulated"[101], which brings uncertainty to States that have already chosen to commit to CORSIA as well as to States that are still more or less on the fence, like China and Russia.[102] Chris Lyle (2018) also mentions that "some countries, including Brazil and China, reportedly reject the idea that the list of eligible units should be determined by the ICAO Council and prefer that States be allowed to apply the EUC criteria directly."[103]

Unfortunately, this issue is identical to the one that would arise in discussions over a global carbon tax on aviation. These emissions units are – behind the mask – core price determinants. To avoid endless discussions, it is indeed pivotal that every State is treated equally. The ICAO's usual top-down form of governance[104] should, especially in this case, come with a non-arbitrary and robust decision-making process on the list of eligible units. Consequences of such an arbitrary articulation could be partial or complete ineffectiveness of CORSIA in reducing emissions and it could cause severe distortion of competition.

Since Mr. Lyle has a lot of experience in the aviation sector and now works as an international aviation policy consultant, his insight and opinion on some of the aspects concerning CORSIA but also other elements mentioned in this thesis is invaluable. After kindly agreeing to help, he was given three questions. The answers to these questions were very in-depth and will thus, for the sake of retaining focus on the main issues, be redacted.

1) In your last article (Beyond ICAO's CORSIA), you mention that international aviation is "treated in a silo" and does not take "differing national circumstances" into account. Discussions in Belgium have resulted in a call for a **general carbon price[105],** which could be a first step in taking aviation out of the silo. The carbon tax system discussed in this thesis could be part of that bigger picture. However, to solve the problem of differing national circumstances (and potential social injustice), do you think that assigning flight credits to individual persons within a carbon tax system could work to mitigate that to a certain extent? This credit assignment would entail that one-off (or less frequent) passengers could make use of their credit to pay a lower rate than the recurrent passengers that fly more frequently – and most likely possess the resources to be able to do so –. With a system like this, the aim is to e.g. prevent market-destroying shocks for countries that depend on tourism.

[98] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 79
[99] *Ibid.* 80
[100] *Ibid.*
[101] Lyle, C. (2018). Beyond the ICAO's CORSIA: Towards a More Climatically Effective Strategy for Mitigation of Civil-Aviation Emissions. *Climate Law*, *8*(1-2), 7
[102] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 80
[103] N 97, 9
[104] N 97, 3-4
[105] Belgian National Debate on Carbon Pricing, Executive Summary, June 2018

Mr. Lyle states: “Your idea of assigning flights credits to individuals is something that is rational, and which has been addressed in several fora. Some years ago, the concept of a general ‘carbon card’ through which individuals would be given credits to use for major purchases - such as heating, vehicle fuel and air travel – or traded with others was mooted but was considered ‘too socialist’.”[106]

By way of reflecting on his answer, the general carbon card example illustrates it is difficult to put forward measures that are regarded as (too) invasive. Even though the objective is to make the tax fairer, from the moment it is something citizens are confronted with regularly, that makes it more difficult to accept. Again, air travel is not something most persons are confronted with on a daily basis whereas heating and vehicle fuel are very common necessities.

2) Do you have any insight into the current situation concerning the “eligible emission units” taken up in CORSIA? Is it clear whether the ICAO Council will determine them, or is there still too much uncertainty?

Mr. Lyle answers: “Eligible emissions units will now be taken up through ICAO’s Technical Advisory Body (TAB) as was announced by the organization on the 28th of March 2019.[107] The eligible emissions units will now be decided upon through applications that any country may contribute to. These applications will be tested against the Emissions Units Criteria that have already been agreed upon.”[108] According to Mr. Lyle, given the composition of the “membership of the [Technical Advisory Board], we are likely to see weak criteria which will allow regional and national variants (eg in support of palm oil, sugar cane)”.[109]

While it might become problematic to achieve the highest effectiveness, this composition of the TAB does make CORSIA more appealing to countries that are uncertain whether to participate. On top of that, it takes aviation out of the silo it is currently treated in. The TAB has – amongst others - members from Brazil, China and the Russian Federation. Those States are “expected to participate from 2027 and can communicate their intention to volunteer to participate in offsetting CO_2 emissions from 2021 to 2026.”[110] If that direct influence is what it takes to get every country - especially the biggest polluters - on board, then taking that option may be better than to not have them participate at all. That same principle uniformly applies to the establishment of a carbon tax.

3) In a case before the European Court of Justice (C-366/10), ETS was ruled not to have violated the Chicago Convention but was then still limited in its scope because of political pressure and to allow the ICAO to develop CORSIA. In short, the Court stated that ETS does not constitute an actual tax that could affect the validity of the Directive that introduced ETS. If we apply the same doctrine to CORSIA, it is likely to pass the test in front of the Court if it ever had to as well. The carbon tax which this thesis revolves around could have more trouble passing the test.

[106] Correspondence with C. Lyle in interview format (7 April 2019)
[107] ICAO – CORSIA publication
[108] Correspondence with C. Lyle in interview format (7 April 2019)
[109] Correspondence with C. Lyle in interview format (7 April 2019)
[110] European Union Aviation Safety Agency (2019), European Aviation Environmental Report, 80

In that light, do you think that any amendment to the Chicago Convention is desirable and/or plausible to make either an aviation-specific carbon tax or a general one possible?

Mr Lyle answers: “Contrary to oft expressed views, taxes on international aviation are not proscribed by the Chicago Convention (Article 24 refers only to fuel being brought into a country being retained on board for onward travel) but in conformity with a non-binding recommendation by ICAO, are very frequently proscribed through bilateral air services agreements.”[111] A specific example of that was given in section 2.3.1. He continues: “A multilateral agreement amongst, for example, EU states to apply taxes is perfectly acceptable.”[112] The Chicago Convention is, in the end, a model that is used and can still be deviated from. In his consultancy services, Lyle states he has “been espousing a plurilateral agreement amongst interested parties – over-riding any bilateral agreements between them - for a few years to help overcome any benefit resulting to competitors on a route.”[113] The latter idea is one that almost marvellously aids the introduction of carbon tax measures. If several countries decide to sign such an agreement, it makes it one less legal obstacle to overcome at the international level. To be clear, this means that an amendment to the Chicago Convention is not at all required to facilitate carbon taxation. Mr. Lyle concludes: “Thankfully, because even relatively straightforward administrative amendments have taken years to develop and even longer between adoption and entry into force.”[114]

As the writer of an article named ‘Beyond CORSIA’, Mr. Lyle believes that more can be done to surpass CORSIA and mitigate CO_2 emissions originating in air travel in a more comprehensive approach.

3.3 Beyond CORSIA, Beyond the Aviation Silo

The break-down-the-silo perspective strongly supports carbon taxation on aviation, especially in a general carbon pricing scheme because if done well, it actually breaks down the ‘silo’ that has been mentioned before. After answering the last question, Lyle mentioned one of his latest ventures that has started to gain traction both in the European Parliament and with a few NGOs. The plan is “to include international aviation into the Nationally Determined Contributions (NDCs) of States under the Paris Agreement and concomitantly enable individual or regional groups of States to take mitigation measures beyond those agreed upon within ICAO.”[115]

Using those Nationally Determined Contributions is a unique gateway to develop mitigation of aviation-induced CO_2 emissions into a soft obligation since they are part of the Paris Agreement.[116] It simultaneously addresses an issue that has not been mentioned in this thesis so far: climate justice or enforcement of climate-related and environmental policy. Connecting this to a carbon tax is fairly simple.

[111] Correspondence with C. Lyle in interview format (7 April 2019)
[112] *Ibid.*
[113] *Ibid.*
[114] *Ibid.*
[115] *Ibid.*
[116] Paris Agreement, UN Treaty Collection, Article 4, § 2: Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

The budget that is created through the tax revenue and its specific allocations can be submitted as Nationally Determined Contributions.[117] If participating States are granted a margin of discretion in allocating the acquired tax funds, they can choose to mitigate CO_2 emissions in a way that is the least damaging to their specific economies. By allowing regions of States to work together, they can reduce the administrative burden that comes with issuing measures. All these elements serve in the interest of getting as many States on board as possible, which has been stressed as a prerequisite for success and fairness of carbon taxation.

Such proposals may sound appealing to policy makers, but a feasible implementation is another concern that cannot be glossed over. Through discussions in consultancy, that as well has been developed. This was part of Mr. Lyle's comments in the interview: "A variety of data are nowadays readily available (not so much at the time of the adoption of the Kyoto Protocol in 1997). The attribution methodology could even include a creative form of Common but Differentiated Responsibilities."[118] He makes a relevant remark, those attributed emissions could be based on the originating market for passengers, ideally comprising round trips. In turn, this would take the strain off developing countries and help prevent social injustice since most 'frequent fliers' live in wealthier countries.

At this point, it is clear that policy makers can make use of many smaller mechanisms to make the introduction of a tax more appealing. In the scenario where a state is not willing to cooperate, however, the other countries need tools to prevent free-riders in their own markets and to generally reduce frustration among citizens of countries that *do* cooperate.

3.4 Coping with Non-cooperation

For taxation purposes, a concept called border tax adjustments has been going around in academic circles for some time.[119] Bullock (2017) "argues that carbon-related border tax adjustments ('CRBTAs') can be used effectively to complement compliance mechanisms of the Paris Agreement against a truly recalcitrant party."[120] The OECD defines border tax adjustments (in general) as: "any fiscal measures which put into effect, in whole or in part, **the destination principle** (which enable exported products to be relieved of some or all of the tax charged in the exporting country in respect of similar domestic products sold to consumers on the home market and which enable imported products sold to consumers to be charged with some or all of the tax charged in the importing country in respect of similar domestic products)".[121]

[117] Article 4, § 9: "Each Party shall communicate a nationally determined contribution every five years in accordance with decision 1/CP.21 and any relevant decisions of the Conference of the Parties serving as the meeting of the Parties to this Agreement and be informed by the outcomes of the global stocktake referred to in Article 14." On top of communicating new NDCs every five years, the existing NDCs can also be adjusted at those moments.
[118] Correspondence with C. Lyle in interview format (7 April 2019)
[119] Ismer, R., & Neuhoff, K. (2007). Border tax adjustment: a feasible way to support stringent emission trading. *European Journal of Law and Economics*, *24*(2), 137-164.
[120] Bullock, D. A. (2017). Combating Climate Recalcitrance: Carbon-Related Border Tax Adjustments in a New Era of Global Climate Governance. *Washington International Law Journal, Pac. Rim L. & Pol'y J.*, *27*, 609
[121] GATT, Border Tax Adjustments, Report of the Working Party, 2 December 1970.

A CRBTA that applies to kerosene purchases would be a plausible option. In that case, it would be much easier to link it to the consumption of a certain good (i.e. kerosene). To apply it to a tax that focuses on carbon emissions themselves is a bit more difficult.

While CRBTAs may work for other sectors, their one-sided functioning makes them by definition (*cfr. footnote 115)* dangerous to apply to aviation. That is because aviation relies on crossing borders to create value. In general, border tax adjustments in a carbon tax system or measures similar thereto are impeded by two obstacles that block their approval. First off, the consensus that is often needed to implement global measures meant to mitigate climate change – which is already hard to find – is of the same size as the consensus required to implement the corresponding CRBTAs[122]. Legally, this can prove to be difficult as the legitimacy of international law is constantly questioned.[123]

Secondly, constructing contemporary, viable CRBTAs is a process of navigating through an astronomical minefield of both national and international sources of law.[124] This is where the 'plurilateral' agreements[125] technique could prove its worth. While the concept was developed for trade agreements in the WTO, its use that allows countries to sign separate parts of international agreements is the form of dynamism that is required to circumvent or override existing legislation in the light of a higher objective – i.e. abatement of CO_2 emissions -.

In any event, it is clear that all forms of international policy measures aimed at reducing in-aviation-originating CO_2 emissions (even outside of the scope of a carbon tax) will need to build in safety mechanisms so that cooperating regions do not completely fall behind their non-cooperative counterparts. If legislators decide to have kerosene as part of their calculation base, then CRBTAs are a viable option. At the same time, to the knowledge of this author, no border tax adjustments have been approved so far – or at least none that have had a significant positive effect in climate change mitigation – for other purposes so that CRBTAs do not have that much going for them. That could change since a European head of state showed his explicit support.

3.4.1 Threats of Retaliation between France and The United States

On the 25th of April 2019, French President Emmanuel Macron held a press conference discussing his plans for the future regarding climate change action. He announced the introduction of a 150-person 'citizen participation council', among other things. With the recent protests of the yellow vests movement, he did not use the word 'carbon tax' as such. Instead, he made a different concession, stating that he had the desire to defend, at the European level, a 'minimum carbon price' or a carbon tax at borders – which is exactly the same as the carbon-related border tax adjustments mentioned *ut supra* -.

[122] Bullock, D. A. (2017). Combating Climate Recalcitrance: Carbon-Related Border Tax Adjustments in a New Era of Global Climate Governance. *Washington International Law Journal, Pac. Rim L. & Pol'y J.*, *27*, 611

[123] Pauwelyn, J., Wessel, R. A., & Wouters, J. (2014). When structures become shackles: stagnation and dynamics in international law-making. *European Journal of International Law*, *25*(3), 762

[124] E.g. a group of Member States of the EU choosing to adopt a certain CRBTA to avoid free-riders is likely to have their measure challenged in front of the Court of Justice on the basis of a violation of internal market rules or bilateral/multilateral agreements with third countries, etcetera.

[125] Hoekman, B. M., & Mavroidis, P. C. (2015). Embracing diversity: plurilateral agreements and the trading system. *World Trade Review*, *14*(1), 102

How would that work in practice? We could have a carbon price on certain goods and services installed in Europe. It means that goods imported into the internal market that were not subject to a similar tax would be taxed at the border.

Some have argued that the United States is in a dangerous position when this happens because Macron could plan to use United States President Trump's favourite policy weapon – tariffs – against him.[126] That is not unthinkable since in deciding which countries' goods will be subject to a carbon border tax, the Paris Agreement could play a major role. Coincidentally, or maybe not so much, the United States is the only country on the planet that is not a signatory party to the Paris Agreement.

While the envisioned carbon tax on aviation is not necessarily directly affected by this, imagine a carbon price being levied on the production of aeroplanes. Birds of a feather flock together and almost every airline operator on the globe uses either *Boeing* or *Airbus* aircraft in their business.[127] With *Boeing* being based in the United States, the potential impact on the commercial aviation sector becomes all too apparent. This is why, in a general carbon pricing scheme – as it is recommended in Belgium[128] - carbon-related border tax adjustments seem like they are relevant remedies against truly recalcitrant parties. Obviously, the political tensions that these adjustments may bring are inevitable and require a separate analysis from a political sciences perspective.

3.5 Further Initiatives and Lessons from the Past

While there is much to be done around the globe to have aviation transition into a more sustainable sector, policy making has come a long way. The inclusion of the sector in ETS, albeit with a limited scope, shows that there is a certain willingness to act. In section 2.1.2 it was mentioned that aviation has an inherent subsidy in the exemption of Value Added Tax on airline tickets. Regrettably, both for the sake of maintaining fair competition and reducing the impact on the climate, the sector has been favoured over other forms of transport through various government programmes as well.[129] In this enumerative part, the goal is to uncover where the willingness to act collides with certain other interests that policy makers may have, what kind of effects that causes and how carbon taxation interacts with it all. If the technical bottlenecks and legal impediments are codified, then projecting those onto the carbon tax model will enhance our understanding of the possibilities to implement it in the aviation sector.

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[126] Justin Worland writes for *Time* and wrote the article "Europe May Use Trump's Favourite Economic Weapon to Punish His Inaction on Climate Change", reviewing the press conference (http://time.com/5582034/carbon-tariff-tax-fee-europe-macron/01/), accessed 6 May 2019. While Mr. Worland's article is not written in the form of an academic research paper, he brings an interesting perspective to the table since he is on the other side of the discussion as an American.

[127] In ANNEX III, it is already clear without actual calculations that *Airbus* and *Boeing* dominate the aircraft manufacturing sector. For 2017, aircraft manufacturers collectively delivered 1,652 planes. 89.6% of those were delivered by *Airbus* and *Boeing* together. Of all airplanes delivered for commercial aviation purposes in 2017, *Boeing* had a share of 46.2%.

[128] *Cfr.* footnote 1

[129] Daley, B., & Preston, H. (2009). Aviation and climate change: assessment of policy options. *Climate change and aviation: Issues, challenges and solutions*, 350. In this overview of policy options, Daley and Preston mention that "airlines and new regional airports receive direct aid, the industry receives investment grants, government loans, infrastructure improvement subsidies and launch aid; aircraft landing fees are cross-subsidized with parking and retail revenues at airports and production of aircraft is exempted from VAT."

A first lesson from the past: When the United Nations Framework Convention on Climate Change (UNFCCC) was first established, the drafters "expressly excluded the international aviation sector".[130] Even though the ICAO was established as a separate institution to monitor international aviation emissions, it did mean that aviation would always be stuck in its own silo as UNFCCC was, and still is, one of the main sources referred to in climate debates. In order to integrate new aviation policy in a broader carbon pricing plan, perhaps aviation would be in a better position if it was included in UNFCCC instead.

With ICAO as a separate branch, the one advantage *is* that there is an international channel for policy proposals. In this thesis, the need for that international channel to be used for cooperation and communication has emerged from different arguments. Havel & Sanchez (2012), however, put forward 'international Paretianism' to show that regional and sectoral agreements are more likely to succeed because of their increased flexibility.[131] This ultimately leads to higher effectiveness as a cluster of multilateral agreements – through the higher success rates - has a larger impact than postponing the approval of a worldwide emissions abatement measure ad aeternam.

There is another reason some academic researchers prefer finding an agreement between clusters of states. In describing the current policy perspectives, Daley and Preston (2009) mention the ICAO's position that asks for "international action on the issue of aviation and climate change" and is simultaneously "opposed to the taxation of kerosene".[132] Seeing as the ICAO is still the prominent authority that countries refer to when debating on any aviation-related taxes, it is not at all a revelation that kerosene taxes have not yet seen the light of day. If states are willing to deviate from these conflicting ICAO standards, that may aid in the development of aviation policy including a carbon tax because kerosene is often put forward as the ideal basis of calculation. (cfr. Section 2.4)

The two previous arguments suggest that international action through ICAO may take too long, which does not mean that the idea has to be abandoned completely. Combined with the arguments in sections 3.2 and 3.3, the fastest way to achieve a worldwide result is through a chain of multilateral (i.e. plurilateral) agreements.

3.5.1 Expanding the Scope in the UK

In chapter I, there was already a whole section devoted to the Air Passenger Duty initiative in the United Kingdom and how it could be amended to effectively tackle carbon emissions.[133] In 2010, the United Kingdom's Treasury wanted to reform the Air Passenger Duty but back then it lacked substantive law to back it up since aviation was not taken up in the original Climate Change Act of 2008[134]. It resulted in the APD only undergoing minor changes between 2010 and 2015.

[130] Havel B.F. & Sanchez, G.S., (2012). Toward an International Aviation Emissions Agreement, 36 Harv. Envtl. L. Rev. 352
[131] *Ibid.* 384-385
[132] N 121
[133] Section 1.4.2 as well as the following research paper "Truby, J. M. (2010). Reforming the air passenger duty as an environmental tax. *Environmental Law Review*, *12*(3), 200-210."
[134] An Act to set a target for the year 2050 for the reduction of targeted greenhouse gas emissions; to provide for a system of carbon budgeting; to establish a Committee on Climate Change; to confer powers to establish trading schemes for the purpose of limiting greenhouse gas emissions or encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere; to

All of that changes with the Committee on Climate Change's (CCC) new report, published in May 2019.[135] The report supports an amendment of the UK's current Climate Change Act, following the objectives committed to in the Paris Agreement. In their foreword on page 8, the Committee writes: "Committing to net-zero will reaffirm the Act's strength, but it is essential that the commitment is comprehensive, achieved without use of international credits and covering international aviation and shipping." With this, it strongly recommends the inclusion of aviation into legally binding targets. It is also meant to be more than a gateway to approval of CORSIA, as "the scenarios in [their] report go beyond those targets, suggesting increased ambition and stronger levers will be required in the long run."[136]

At the same time, the Committee is realistic in the options available to us today. It recognizes aviation as a harder-to-treat sector within a net zero framework and that CORSIA does not currently satisfy the goals in that framework.[137] Aviation is subject to a number of technical limitations which make it so that emissions reduction simply cannot be as substantial or deep as in other sectors. That is why the sector – especially through CORSIA – will end up being the leader in the demand for offsetting. Still, there are a few technical improvements that can be made according to the Committee:

> "We have identified technical potential for additional emissions reduction beyond the Core scenario, including through more ambitious uptake of the Core options plus some use of hybrid-electric aircraft from the 2040s, and from reductions in design speeds of aircraft. However, the Further Ambition options for aviation would still result in emissions of 31 MtCO2 emitted in 2050. This is because a fully zero-carbon plane is not anticipated to be available by 2050, particularly for long-haul flights which account for the majority of emissions."[138]

This is where human inventiveness could change the way we think about aviation entirely and where the carbon tax mechanism really comes to fruition. CORSIA organizes a one-on-one offsetting operation whereas the tax - as mentioned in section 1.6 on the direct format – creates a new, separate budget that leaves more options open to policy makers in terms of allocation. While the Committee also recognizes that electric or hybrid-electric aircraft are still in the earlier stages of development, perhaps a part of the budget could be used to accelerate that process. A few companies in the world like *Pipistrel* and *Eviation*, already have electric aircraft for sale today.[139]

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make provision about adaptation to climate change; to confer powers to make schemes for providing financial incentives to produce less domestic waste and to recycle more of what is produced; to make provision about the collection of household waste; to confer powers to make provision about charging for single use carrier bags; to amend the provisions of the Energy Act 2004 about renewable transport fuel obligations; to make provision about carbon emissions reduction targets; to make other provision about climate change; and for connected purposes.

[135] Net Zero: The UK's contribution to stopping global warming, Committee on Climate Change, May 2019

[136] *Ibid.* 35

[137] *Ibid.* 72

[138] *Ibid.* 148

[139] Commercial developments of these companies are happening at the time of writing and thus cannot be supported by academic sources as there are none. *Pipistrel* did succeed at securing funding for development of their four-seater electric aircraft through the Green Flight Challenge of 2011, organised by NASA. Tomažič, T., Plevnik, V., Veble, G., Tomažič, J., Popit, F., Kolar, S., ... &

In the current stages, it is of course not possible to transport 150 passengers at once.[140] As efficiency and energy capacity increase, however, electric aircraft could slowly start being a sustainable alternative for short-distance flights. From that point onward, the possibilities are endless.

Legal developments can only facilitate the improvement of technical solutions in various ways (e.g. by allocation of tax budgets, by lowering the barriers of entry into these new markets). Nevertheless, getting more countries to invest in research and development of these solutions allows the transition to a net zero emissions society whilst maintaining economic activity.[141] Of all aviation-related climate change measures, a carbon tax is – in the light of ETS as it currently is and CORSIA as it is planned to work - the most capable of forcing the sector and governments to fund development of the solutions of tomorrow.

An adaptation of the Climate Change Act in the UK is what we need to see from other countries as well if they wish to approve new legislation in accordance with the Paris Agreement. This is pivotal for the net zero end goal and even more so for the approval and validity of international bilateral or multilateral agreements.[142]

Miles, K. (2011). Pipistrel taurus G4: on creation and evolution of the winning aeroplane of NASA Green Flight Challenge 2011. *Strojniški vestnik-Journal of Mechanical Engineering*, *57*(12), 869

[140] Currently, *Eviation's* 'Alice' model will be capable of carrying up to nine passengers. This specific type of aircraft will have its first test flights in 2019 and is expected to launch in 2021-2022, as the company communicated on the 8th of January 2019 through *Flightglobal*. (https://www.flightglobal.com/news/articles/eviation-secures-funding-for-all-electric-alice-454830/), accessed 6 May 2019.

[141] Giddens, A. (2009). *Politics of climate change*. Polity, 4. Giddens recognizes that the public opinion is worried about the social and economic implications of policy measures that aim to tackle climate change. The above is a perfect example of why economic implications may not be as bad as some envision them to be.

[142] No consensus on the national level means a country cannot commit to international agreements, which in turn causes a standstill.

Conclusion

As a theoretical concept, a carbon tax for commercial aviation is a method that ticks all the boxes to create revenue to mitigate the CO_2 emissions which the sector produces. It can serve as a sole or supplementary measure to deal with the impact of the unprecedented growth we see in the commercial aviation sector today. Its function as, *inter alia,* 'a great leveller' may finally restore the transport sector's competitive balance because aviation still benefits off an inherent subsidy. In particular, it can dissuade persons from flying in situations where they have a substitute means of transport available.

If organised correctly, it is fair in the light of environmental and climate policy objectives such as the polluter pays principle. Correct organisation means having the correct goal for the tax. Treating it as a source of income to fund general government expenditure therefore undermines the use of the tax completely. National initiatives have shown that it is almost impossible to prevent free-riders in the tax system, especially on a continent. A renewed motivation, public support and those national examples are powerful arguments in favour of a supra- or international system to be installed.

While the analysis seems to support the case of a carbon tax, there are a few pitfalls policy makers should avoid or take into consideration. Going back to a situation where flying becomes a privilege set aside only for the wealthiest in society is without a doubt detrimental to economies worldwide and may result in social unrest and recession. Regions dependent on tourism, for example, are likely to oppose a (strict) carbon tax for that reason. One idea has been mentioned before to increase fairness on those fronts as well. This is the system of flight credits through which frequent fliers are supposedly paying the largest amount of the tax. It is a way of installing progressivity in a system that is not attached to a person's income, but rather to their flying habits.

Regions dependent on aviation may and are advised to make separate agreements to ensure that one of them does not gain a competitive advantage over the others at the cost of the climate. Individually, the format of the tax can help these countries organize the transport which facilitates the functioning of important sectors. An example of this would be to subsidize a (climate-neutral) public transport network for tourists so they have alternative means of getting to certain destinations, primarily focusing on longer journeys that would otherwise be filled in by flights. Without the direct format, the tax risks losing credibility. In politics, one of the reasons climate and environmental policy is difficult to find support for, is because many of the proposed measures are considered 'too socialist'. This was mentioned by Chris Lyle who is an aviation consultant involved in discussions on this subject on a daily basis. Making it clear to taxpayers that the tax is "paying off" in a climate sense and in their spending capacity shows the utility of it in an unmistakably intelligible manner.

Now that politics is in the picture it is high time Europe took action, preferably through its Union. In the long run, the transition to a carbon-neutral economy could be the cornerstone of a strong internal market policy. Although it is to be reiterated that the European Union is stuck between two fires. On the one hand it has, through the Treaties, been given the obligation to preserve the climate (and the environment) in all policy decisions that it makes. On the other, the Union does not possess the power to act on levels that are crucial in bringing this exact objective to a successful conclusion. Or does it?

Interfering with direct, national taxation policy is out of the question. While almost anything - i.e. EU Treaty amendments - is possible with unanimous consent, finding that unanimous consent is, in and of itself, borderline impossible. Even with voices that have called for a revision of tax policy on the EU level, change is not on the horizon and by the time it is, human-induced climate change is likely to have outpaced us.

All of that does not mean that the option to introduce indirect taxation has to be forgotten. In fact, an analysis of the articles governing that policy area shows that articles 191 and 192 TFEU can be used to motivate the Union as they contain an obligation to "promote measures at an international level to deal with regional or worldwide environmental problems, and **in particular combating climate change."**[143] On top of that, if clashing Treaty provisions are reviewed in a level-down approach, it means that the approval of the tax can go through an ordinary legislative procedure instead of a special one. Still, unanimity is required and that makes the introduction of any tax on an EU level a Sisyphean effort.

On a global level, there is the notion of 'international Paretianism' to consider. Countries are unlikely to commit to a carbon tax - or any other international policy measures - unless they are certain that that will be beneficial to them. On a relative scale, the only possible situation in which that Paretianism condition is satisfied, is when all countries sign up to the effort. CORSIA has, through its route-based approach, managed to avoid that obstacle to a certain extent. This all gain no pain attitude countries have is an unrealistic approach to emissions reduction. Some degree of concession is inevitable, at least in the short term.

International cooperation and communication are vital to mitigating global emissions from commercial aviation, even if it does not result in having every single country aboard in an agreement. In that case, states can agree to disagree which is far better than battling each other in a climate race to the bottom as is sometimes happening today. That being said, the only significant, recalcitrant party – on all climate-related fronts – is the United States. Its withdrawal from the Paris Agreement may ask for a method of last resort. Carbon-related border tax adjustments may be a viable option to legally brute force climate justice in this situation.

For those countries that *are* willing to cooperate, there is a plan of action to increase the likelihood of a carbon tax for the aviation sector to be approved. If we assume they are all signatory parties to the Paris Agreement, the next step is to implement that commitment in national law – which is slowly materializing inter alia in The Netherlands[144] and in the United Kingdom[145]-.

There is much work to be done, and the aviation sector is subject to gargantuan technical limitations in comparison to other sectors. Sustainable alternatives over shorter distances are available, and others are still being developed. A carbon tax can push people towards those alternatives and accelerate the development of other sustainable means of transport. On top of that, it encourages airline operators to make minor improvements wherever it is possible and if the effects of those improvements are aggregated, that can ultimately make a substantial difference in the sector's impact on climate change.

[143] Article 191 (3) TFEU
[144] N 39
[145] N 132

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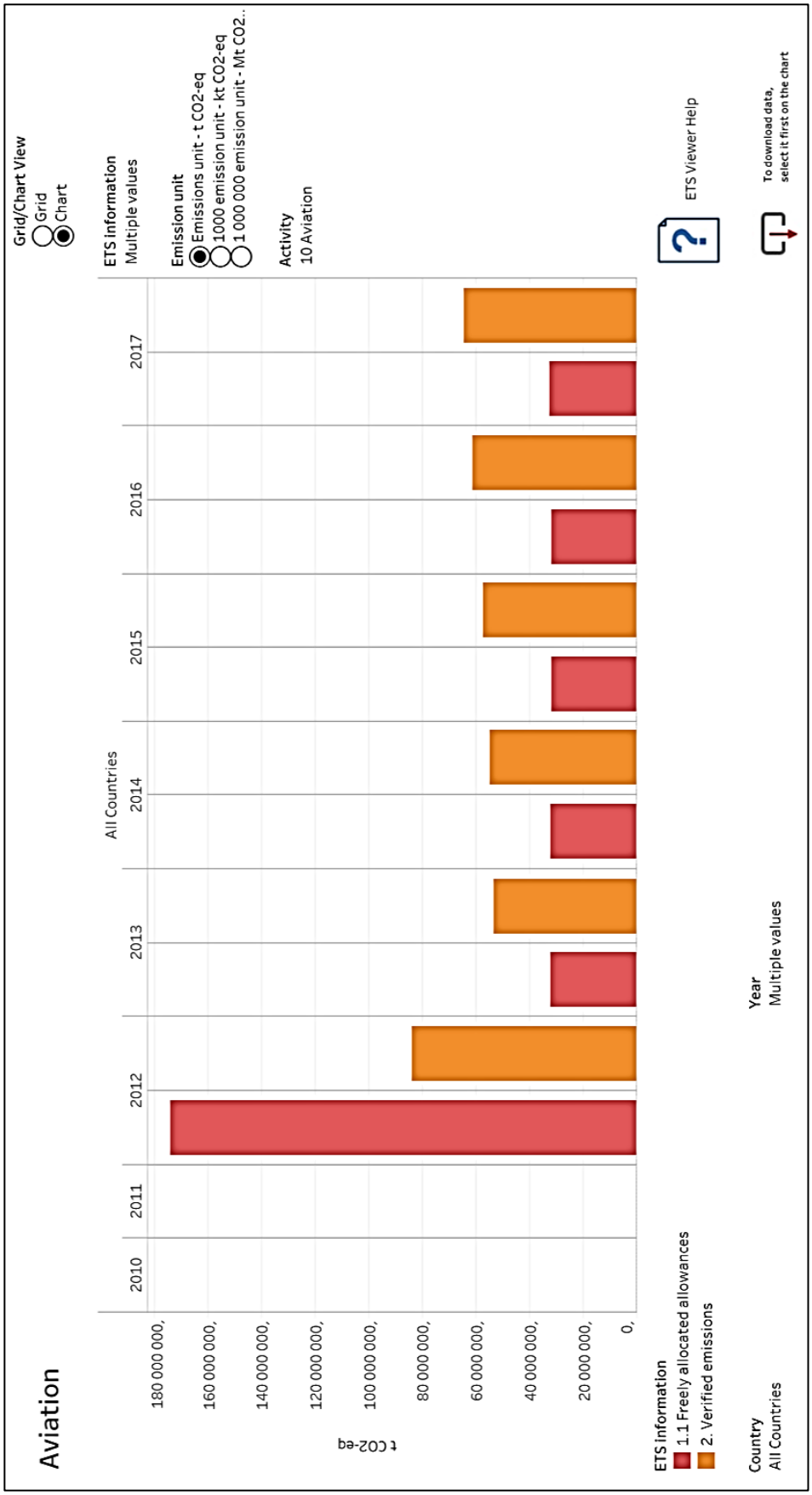
ANNEX I – ETS allowance acquisition, results for aviation from 2012 to 2017
Source: European Commission



ANNEX II – Corporate Tax Rate Evolution in Europe from 2005 to 2017

Source: European Commission (DG Taxation and Customs Union, based on Eurostat data)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Difference (1) 2007 to 2017	Ranking 2017	Revenue (2) 2017
EU-28	37,5	37,9	38,0	37,7	37,1	37,2	37,7	38,3	38,7	38,6	38,5	38,7	39,0	1,1		6 004 278
EA-19	38,2	38,7	38,8	38,4	38,0	37,9	38,5	39,5	40,0	40,1	40,0	40,0	40,2	1,4		4 510 130
Belgium	43,5	43,3	43,0	43,6	42,7	43,1	43,7	44,8	45,7	45,5	45,1	44,3	44,9	1,8	3	196 916
Bulgaria	30,5	29,9	31,6	30,7	27,2	26,0	25,3	26,7	28,3	28,4	29,1	29,0	29,5	-2,1	26	15 250
Czech Republic	34,3	33,9	34,5	33,2	32,2	32,7	33,8	34,2	34,8	33,9	34,0	34,8	35,4	0,9	15	67 784
Denmark	48,0	46,5	46,4	44,8	45,0	45,0	45,0	45,8	46,3	48,9	46,4	45,9	45,7	-0,7	2	133 802
Germany	37,0	37,3	37,4	37,7	38,0	36,7	37,2	37,8	38,2	38,1	38,4	38,8	39,1	1,7	8	1 281 490
Estonia	30,0	30,5	31,3	31,4	34,9	33,3	31,5	31,7	31,6	32,1	33,2	33,5	32,8	1,5	22	7 738
Ireland	30,0	31,4	30,8	29,0	28,1	27,8	28,1	28,3	28,8	28,8	23,4	23,5	23,0	-7,8	28	67 787
Greece	31,9	31,0	31,8	31,8	30,8	32,0	33,6	35,8	35,7	36,0	36,6	38,7	38,9	7,1	9	70 141
Spain	35,2	36,0	36,4	32,2	29,8	31,3	31,2	32,2	33,0	33,6	33,7	33,4	33,8	-2,7	20	393 702
France	42,8	43,3	42,7	42,6	42,2	42,3	43,4	44,5	45,5	45,7	45,7	45,8	46,5	3,8	1	1 065 979
Croatia	36,3	36,9	37,1	36,8	36,4	35,9	35,2	35,9	36,3	36,7	37,3	37,8	37,8	0,7	13	18 502
Italy	38,9	40,1	41,4	41,2	41,7	41,5	41,5	43,5	43,5	43,1	43,0	42,3	42,1	0,7	6	725 845
Cyprus	31,4	32,1	36,1	34,8	31,8	31,9	31,9	31,6	31,6	33,4	33,3	32,9	34,0	-2,1	19	6 649
Latvia	27,9	28,7	28,3	28,0	27,6	28,5	28,4	29,1	29,3	29,7	30,1	31,1	31,0	2,7	24	8 381
Lithuania	29,2	30,1	30,0	30,6	30,2	28,3	27,2	27,0	27,0	27,5	28,9	29,7	29,5	-0,5	25	12 455
Luxembourg	37,9	35,9	36,3	36,8	38,4	37,6	37,2	38,5	38,4	37,6	37,5	38,1	38,9	2,6	10	21 488
Hungary	36,5	36,4	39,4	39,4	38,9	37,2	36,6	38,3	37,9	38,1	38,8	39,3	38,3	-1,1	12	47 518
Malta	31,6	32,0	32,8	32,1	32,4	31,9	32,2	32,4	32,6	32,4	30,7	31,2	31,9	-0,9	23	3 608
Netherlands	35,0	36,0	35,5	35,9	35,1	35,5	35,5	35,6	36,1	37,0	36,9	38,4	38,8	3,2	11	285 620
Austria	41,2	40,6	40,7	41,5	41,1	41,1	41,2	41,9	42,7	42,8	43,2	41,9	41,8	1,1	7	154 723
Poland	33,0	33,6	34,6	34,1	31,2	31,4	31,8	32,1	31,9	31,9	32,3	33,5	34,1	-0,5	17	159 511
Portugal	30,8	31,3	31,8	31,7	29,9	30,4	32,3	31,8	34,1	34,2	34,4	34,1	34,4	2,6	16	67 007
Romania	27,7	28,4	28,4	26,8	25,2	26,4	28,3	27,8	27,3	27,5	28,0	25,8	24,9	-3,5	27	46 704
Slovenia	38,0	37,6	37,1	36,6	36,4	37,1	36,7	37,1	36,7	36,4	36,6	36,7	36,5	-0,6	14	15 692
Slovakia	31,3	29,2	29,1	29,0	28,8	28,0	28,5	28,2	30,1	31,0	32,0	32,2	33,0	3,8	21	27 960
Finland	42,1	42,2	41,5	41,2	40,9	40,8	42,0	42,7	43,6	43,8	43,9	44,0	43,3	1,8	5	96 949
Sweden	46,6	45,9	44,9	44,0	44,0	43,2	42,5	42,5	42,9	42,5	43,1	44,2	44,4	-0,6	4	210 822
United Kingdom	33,5	33,7	33,7	34,5	32,2	33,5	34,0	33,2	33,0	32,6	33,0	33,5	34,1	0,3	18	794 256
Iceland	39,4	40,2	38,7	34,6	31,3	32,4	33,3	34,0	34,5	37,3	35,5	50,5	:	:		:
Norway	42,6	42,8	42,1	41,4	41,2	41,9	42,0	41,5	39,9	38,8	38,4	38,7	38,9	-3,2		137 809

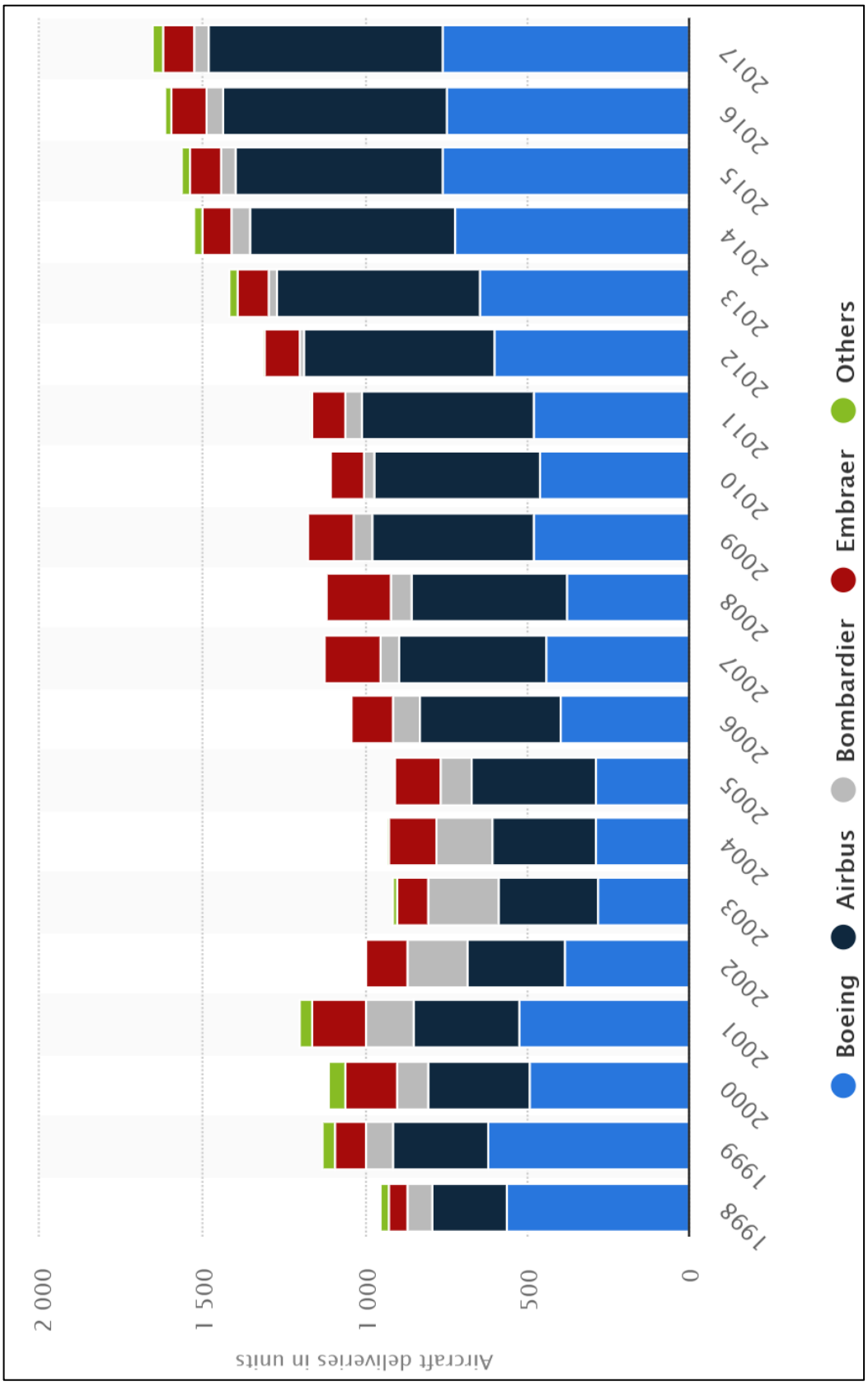
(1) In percentage points.

(2) In millions of euro.

See explanatory notes in Annex B.

Source: DG Taxation and Customs Union, based on Eurostat data

ANNEX III - Number of jets added to the global aircraft fleet from 1998 to 2017, by manufacturer (in units)
Source: STATISTA (https://www.statista.com/statistics/622779/number-of-jets-delivered-global-aircraft-fleet-by-manufacturer/), accessed 7 May 2019.



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