How would the Norwegian Aviation Industry be affected by an Empty Seat Tax?

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How would the Norwegian Aviation Industry be affected by an Empty Seat Tax?

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Abstract

The goal of this thesis is to explore the short- and long-term ramifications of various taxation regimes on the Norwegian aviation industry. The bulk of the research is focused on the probable effects of a tax placed on empty seats on commercial aircraft operating in Norway. This "empty seat tax" is contrasted in various ways with both the current taxation scheme, namely the flight passenger tax, and with other methods in which the Norwegian government could alter taxing the commercial aviation industry to combat CO2 emissions while keeping revenues constant.

A selection of previous research on the subject is presented through the themed lenses of environmental taxation, the economic implications of aviation taxes, elasticities of demand and supply, and green innovation in aviation. The authors developed an original microeconomic model for the empty seat tax, and use this and other theoretical foundations in order to gain a better understanding of various methods of taxation. An original flow chart model which illustrates the consequences of an empty seat tax for airlines, other industry stakeholders, the market equilibrium for air travel, and the wider society follows.

The analysis is based on a series of semi-structured interviews with various experts linked to the Norwegian aviation industry, in both the public and private sectors. Word clouds were used as a tool to facilitate analysis of these interviews, alongside additional comparisons categorized by respondent group in order to elucidate different points of view. The results are discussed through the themed lenses approach developed by the authors, and linked back to the theoretical foundations of the thesis. Overall, the authors find that neither the empty seat tax nor the current taxation regime is the most efficient or ideal, and recommend instead a distance-based tax on kilometers flown or a simple root tax on jet fuel burned, both of which are better aligned with the environmental motivation underlying aviation taxation and fairer to airlines operating with different business models.

Foreword

The completion of this thesis marks the fulfillment of the requirements for the Master of Science in Business Administration at the University of Stavanger Business School. Completing this thesis has been a personally and academically enriching research experience which has given us a wealth of insights into both the aviation industry and the process of qualitative analysis. The following is the fruition of more than six months of research efforts which were motivated by an interest in aviation and environmental economics.

We would like to express our gratitude to the interview candidates for taking time out of their busy schedules to share their expertise with us, and whose knowledge about the aviation industry has been invaluable. Without your contributions, this thesis would not have been possible. We would also like to extend our gratitude to the people who have helped us to get in touch with our interviewees. Last but not least, a big thank you to our thesis advisor, Professor Gorm Kipperberg, for sharing his immense knowledge, good ideas, and great feedback, which have been extremely helpful. We hope you enjoy reading this thesis and that it provides you with some fresh insights into the Norwegian aviation industry and the potential impacts that different taxation schemes would have in this market.

Stavanger, Norway
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Kayla Rupp & Rasmus Sande Spanne

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Chapter 1: Introduction

During a company performance presentation to shareholders in February 2016, Bjørn Kjos, the CEO of Norwegian Air Shuttle ASA, made the following statement to the media:

"Add the fee to the empty seats instead" – Bjørn Kjos (Lilleby, 2016).

Kjos' statement, made not long after the tax was introduced, represents one of many different opinions on the heavily debated and controversial introduction of an air passenger tax by the Norwegian government in 2016. The air passenger tax is an excise duty levied on each passenger physically occupying a seat on an airplane in Norway on both domestic and international flights. The fuller the plane, the larger the total passenger tax collected from that flight. The current air passenger tax was passed by Parliament on December 14 2015 as a part of the budget agreement between multiple parties (Toll og avgiftsdirektoratet, 2015). Recently, Parliament has been implored to review the current air passenger tax, and there is an ongoing debate over changing the current tax to give it a clearer environmental profile (Finanskomiteen, 2017).

In 2017, the Norwegian government collected 1 813 million NOK from the air passenger tax alone, and is expected to collect 1 850 million NOK in 2018 (Stortinget, 2017). In the immediate aftermath of its passage, it was unclear whether the air passenger tax was implemented purely as a fiscal tax, or if it was supposed to have an actual environmental effect in the form of lower emissions from aircraft. Norway's finance minister, Siv Jensen, was soon quoted as saying that the air passenger tax was meant as a fiscal fee, but that it could also have an environmental effect if it resulted in a decline in air travel (Stortinget, 2016). A decline in air travel would mean lower overall carbon emissions from passenger airplanes, but these emissions could be partially or fully compensated for if would-be passengers substituted another form of travel instead of avoiding travel altogether. Recent studies have shown that the new tax does not appear to have an effect on consumer demand for air travel, and therefore does not have a significant effect on aviation-related emissions in Norway (Runsjø & Moum, 2017).

Aviation is vital to the Norwegian economy, and the industry has a variety of different stakeholders who hold differing views on how the future of aviation should look. It is therefore of great interest to explore the potential economic ramifications of an empty seat tax and other different taxation regimes on these various stakeholders and the industry's effects on the environment. Norway has a unique and often extreme topography which is characterized by long, steep fjords and vast mountainous regions. The country itself is also long and vast, with a constellation of cities and towns ranging up past the Arctic Circle and sparse populations sprinkled in between. The winter also brings snow and at times difficult driving conditions with mountain roads closing on short notice due to weather. For these amongst other reasons, aviation is of particularly vital importance as a form of transportation in Norway, for both leisure and business travelers on domestic and international routes. This can be illustrated by the example presented in Figure 1, which shows the different travel times from Stavanger to Oslo via train, car, and airplane:

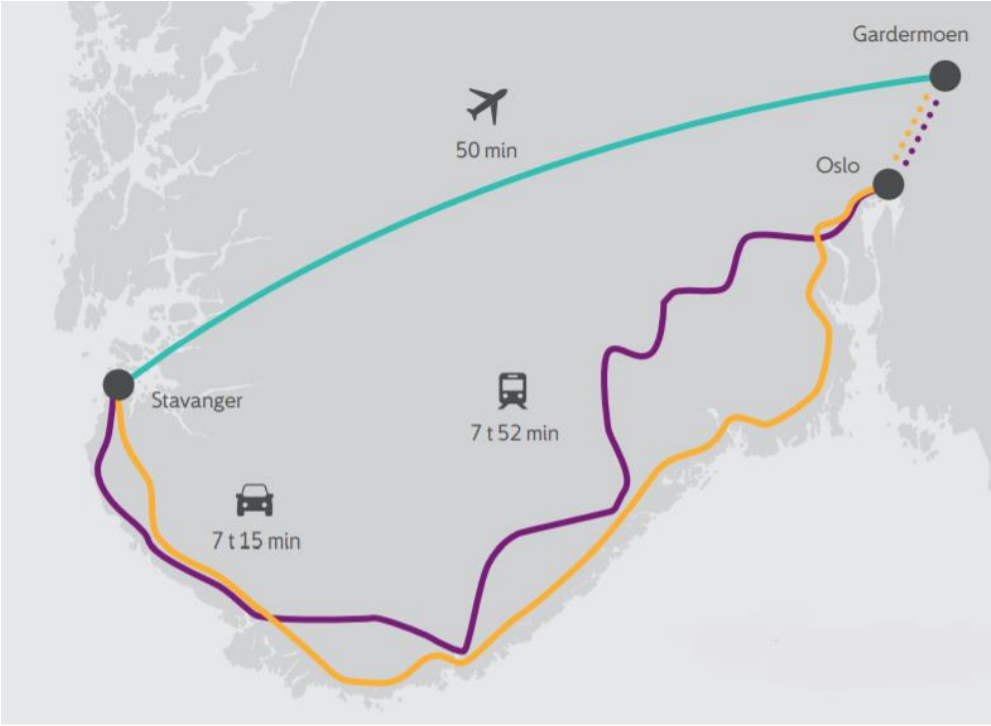

Figure 1 *Travel times Stavanger – Oslo with different transportation options (figure copied from Avinor, 2017a)*

Motivated by the statement by Kjos, the authors have chosen to write a thesis that will look into the potential effects of placing a tax on empty airplane seats. Given this topic, the authors have formulated the following simple research question:

How would the Norwegian aviation industry be affected by an empty seat tax?

The authors explore this alternative to the current air passenger tax, looking into its potential effects on different airlines operating in Norway, the aviation market in general and the rest of society. There is currently no academic research done on an empty seat tax, which gave the authors the additional motivation of performing original research in unexplored territory. If an air passenger tax were placed on unoccupied seats instead of individual passengers, the tax would effectively impose a penalty on airlines flying with open seats. Adding a tax on empty seats would give the airlines an immediate incentive to fill them beyond the inherent profit motivation of selling additional tickets. This could potentially improve efficiency on already scheduled routes by increasing load factors, meaning that an airline's resources would become more fully utilized. On the other hand, an empty seat tax could also cause negative effects for the industry by crimping profit margins and flexibility of supply.

There are many possible approaches on how the Norwegian government could change the current air passenger tax. Related research questions that materialized during the writing process include "What are the effects of the current air passenger tax?", "What are the effects of a distance-based tax?", and "What are the effects of a root tax on fuel?". The results from the author's research conclude that both the current tax and a tax on empty seats would be bad for Norwegian aviation and that other, more effective options such as distance based taxes would be more appropriate.

The thesis continues as follows: Chapter 2 provides an overview of the recent dynamics of the Norwegian aviation industry and previous as well as existing taxes in Norway. Chapter 3 presents the literature review which samples previous research on aviation and environmental economics. The authors' understanding of the literature is presented through the themed lenses of environmental taxation, taxes on aviation, economic and financial implications of aviation taxes, elasticities of demand and supply, and green innovation in aviation. In Chapter 4 the theoretical foundations of this thesis will be presented. This includes an original microeconomic model of the empty seat tax developed by the authors of this thesis and an adapted model of an individual airline's supply function. Chapter 5 is devoted to an original flow chart model designed to show interrelations between stakeholders in the Norwegian aviation industry. Chapter 6 gives a practical outline of our methodological approach of collecting qualitative data through interviews. The authors will then analyze, present and discuss the results found during the research in Chapter 7. Since the current Norwegian air passenger tax is often the subject of

discussion in the media, political arena and business community, the authors will tie in current events where they are tangent to the discussion. The thesis concludes with a brief summary of the above in Chapter 8. Appendices 1-5 provide interested readers with additional information, including full transcripts of all interviews.

Chapter 2: Background

This chapter aims to provide readers with a concise overview of the complex workings of the aviation industry in Norway. It begins with an overview of the Norwegian aviation industry before discussing the current aviation taxes paid by airlines operating in Norway.

2.1 Overview of the Aviation Industry in Norway

The following section presents an industry overview of the commercial aviation sector in Norway, including its three major players, traffic development, and recent passenger volumes. The chapter will then examine the competitive environment present in the industry. Emissions levels from commercial aviation, in Norway and globally, will also be briefly discussed.

2.1.1 Introduction to the Norwegian aviation industry

Norway is a geographically unique country with large distances between its cities and a challenging, mountainous topography. There are limited suitable alternatives to flying in Norway for efficient and quick travel over longer distances. It is estimated that only 30 percent of domestic and international flights from Norway have viable transportations alternatives to flying (Avinor, 2017a). Nearly all Norwegian airports are owned and operated by Avinor, a wholly-owned state limited company which falls under the country's Ministry of Transport and Communications. Avinor is also responsible for the operation and maintenance of air traffic control towers and other infrastructure necessary to the aviation network. Interestingly, Avinor's airport operations are managed collectively as a single unit. Thus, the airports which operate with a financial profit pay for those which operate at a financial loss. This is a decisive factor for the availability of transportation for those residing outside of the major hubs of Oslo, Bergen, Trondheim, and Stavanger, who are dependent upon smaller, less profitable airports. Despite the lack of profitability of smaller, regional airports, they are prioritized by the government in both this way and through public subsidization of many routes in order to maintain national air connectivity (Avinor, 2017b).

In 2017, nearly 53 million passenger trips were made from Avinor-run airports, an increase of 4,1 percent from the previous year (Avinor, 2018b). The increase is mainly accredited to the growth in the Norwegian economy, with increased optimism leading to more business and leisure travel by residents, as well as an increase in international visitors. A study on the social benefits of Norwegian aviation conducted in 2014 showed that 99,5 percent of the Norwegian population can travel to the capital Oslo and back home again by plane on the same day It is also estimated that aviation contributes to between 60 000 – 65 000 jobs to the Norwegian economy (Avinor, 2017a). In addition, 300 000 patients travel to receive medical treatments by way of commercial aviation each year, and hospitals in northern Norway are structured in part based on the availability of air transport (Avinor, 2017b).

There is a huge demand for commercial aviation in Norway, which has the largest number of airline trips per capita in all of Europe. In 2016, people residing in Norway conducted roughly 5,6 million round trips by air to both international and domestic destinations, on average 1,07 round trips per capita. There are also over 200 direct international routes with at least one weekly departure from Norway. The number of tourists arriving by air has nearly doubled recently, from 2,4 million in 2011 to 4,4 million in 2016 (Avinor, 2017a).

There are a variety of commercial airlines operating in Norway. On domestic routes, the three main players, SAS, Norwegian, and Widerøe, account for the majority of the traffic. There were over 40 different airlines flying international routes from Norway in 2015 (Thune-Larsen & Farstad, 2016). The amount of direct intercontinental, long-haul flights from Norway has also increased, with 22 unique routes in 2017 (Avinor, 2017b).

2.1.2 The three main players in Norwegian aviation

In Norway, there are currently three airlines that are characterized as the main players in the Norwegian aviation market: Scandinavian Airlines System (also called SAS), Norwegian Air Shuttle, and Widerøe, which had 46%, 35%, and 18% of the total market share of domestic routes in 2015, respectively. On international routes from Norway in the same year, Norwegian Air Shuttle held 36% market share to SAS' 30%, while Widerøe held only 2% (Thune-Larsen & Farstad, 2016).

The first major player in the domestic Norwegian market is SAS. SAS can trace its roots back to 1946, when it was founded by a merger between the national airlines of Denmark, Sweden, and Norway (SAS, 2018a). SAS' business model builds on its' broad network, with frequent departures and a range of services that provide customers with a high freedom of choice to, from, and within Scandinavia. SAS' strategy is to focus on frequent travelers, and it has the most focus on business travel of the three major carriers. SAS offers more destinations and departures than any other Nordic airline, a core strength of their business model (SAS, 2018b). In the fiscal year 2016-2017, SAS transported 30 million passengers on its diverse fleet of 158 aircraft, earning a total of MNOK 1 805 before tax (SAS, 2018c). At the beginning of November 2017, SAS had an additional 18 aircraft on order.

The second major player, Norwegian Air Shuttle, was founded in 1993 when it began flying regional aircraft on domestic routes on behalf of Braathens, an agreement which lasted until 2002 (Norwegian Air Shuttle ASA, 2018a). Norwegian Air Shuttle subsequently launched its own domestic operations in September 2002. Norwegian Air Shuttle defines itself as a low-cost carrier. The company's vision is to give everybody the opportunity to fly, which they aim to realize by offering a wide variety of destinations and good service at competitive, low prices (Norwegian Air Shuttle ASA, 2018b). Norwegian achieves this by "unbundling the ticket", letting the customers choose and pay for only what they need, besides the ticket itself, such as checked in luggage and advance seat reservations. Norwegian Air Shuttle has expanded rapidly, and now offers around 500 routes to 150 destinations in Europe, Northern Africa, the Middle East, Asia, South America, and the USA. The company currently has around 250 aircraft on order (Norwegian Air Shuttle ASA, 2018c). For 2017, full year financial key figures show a net loss of MNOK 298,6 despite the airline having carried over 33 million passengers on its current fleet of 145 aircraft (Norwegian Air Shuttle ASA, 2018d).

The third and final major player in the domestic Norwegian aviation market is Widerøe. Widerøe was founded in 1934, making it Norway's oldest airline (Widerøe's Flyveselskap AS, 2018). The airline started by flying taxi, ambulance, school and aerial photography flights. In the 1970s the airline was reorganized to play a role in the development of intraregional routes in Norway and is today the leading carrier of Norwegian regional routes. Widerøe's route

network is twice the size of SAS' domestic route network. 60 percent of the routes operated by Widerøe are commercial and the remaining 40 percent are Public Service Obligation (PSO, or FOT in Norwegian) routes operated on behalf of the government (Widerøe AS, 2017a). The Widerøe group's operating profit for 2016 was positive, at MNOK 377,1. The airline transported 2,84 million passengers on its all-turboprop fleet of 41 aircraft operating between 46 airports, mainly domestically (Widerøe AS, 2017b). In April 2018, Widerøe became the global launch customer for the Embraer E190 E-2, its first jet aircraft, which has lower CO2 emissions than comparable aircraft (Dalløkken, 2018). The airline currently has a firm order for three jets with options for 12 more.

2.1.3 Competition in the Norwegian aviation industry

The Norwegian aviation market is in a state of hard competition between the airlines, at times experiencing weak profitability overall (NHO Luftfart, n.d.). Figure 2 (copied from Thune-Larsen & Farstad, 2016) shows the market share of the airlines operating in Norway for the period 2003-2015. Note the rapid growth of Norwegian's market share at the expense of SAS', and Widerøe's relatively stable development over time:

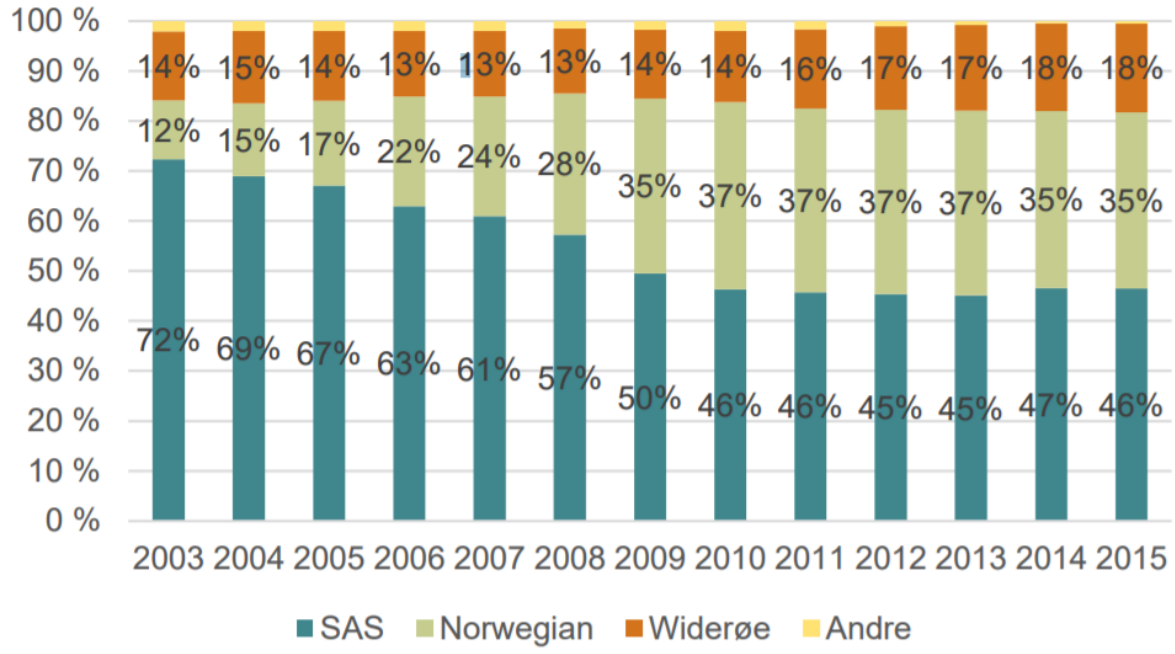

Figure 2 *Market share between airlines in Norway*

According to Statistics Norway, between 2002 and 2012 the total yearly result for the entire Norwegian aviation industry was only MNOK 803 overall. This gives the industry a profit margin of only 0,3 percent (NHO Luftfart, n.d.).

2.1.4 Traffic development

Numbers from the International Air Transport Association (IATA), the world's largest trade association for airlines, show that global consumer demand for air travel is growing strongly. According to their January 2018 analysis, year-on-year passenger traffic increased by 8% from 2016 to 2017, an upward trend that is expected to strengthen in the coming years. The same study revealed that global capacity increased by 6,3% in this timeframe, and that load factor in 2017 reached an all-time high of 80,4% (IATA, 2018). Growth in the Norwegian market for air travel parallels these developments.

Over the years, traffic at Norwegian airports has grown considerably and Avinor has seen more international trips than domestic trips since 2005. During the 32 years leading up to 2015, international traffic increased with an average yearly trend growth of 5,6%. For domestic flights, the yearly average trend growth has been 3,9% during the same time period (Thune-Larsen & Farstad, 2016).

Norway continues to see growth in the number of departing passengers, with a 4,1 percent growth rate from 2016 to 2017 (Avinor, 2018b). Further growth is expected due to expected increases in the population and a general growth in income (Avinor, 2017a). This will most likely lead to improvements in the offered route network, which could cause an even higher demand for air travel. It is worth mentioning that there is a strong connection between the economy and demand for air travel. The development in the aviation industry generally follows the business cycle, but as air travel is a luxury instead of a necessity, it experiences a higher cyclical volatility. Avinor's internal projections of its expectations for strong year-on-year percentage growth in number of passengers into the future are shown in Table 1 (adapted from Avinor, 2017a):

Time period	Domestic	Europe	Intercontinental	Total
2016-2030	22%	64%	100%	41%
2016-2040	33%	107%	143%	66%
Million departures 2016	15,1	10,8	0,6	26,5
Million departures 2040	20,0	22,4	1,4	43,8

Table 1 *Expected growth in passenger departures from Avinor*

2.1.5 Current emissions from aviation

Aviation and other modes of transportation produce both direct and indirect emissions. Indirect emissions include emissions from the building of infrastructure and its maintenance. It is estimated that indirect emissions account for 40 percent of the total emissions for cars, 50-70 percent for trains and around 20 percent for aviation. However, the numbers on indirect emissions can vary greatly depending on the assumptions used to calculate them, and are more ambiguous than direct greenhouse gas (GHG) emissions produced from fossil fuels burned during the actual operation of a car, train, or airplane. GHG emissions are of huge and growing concern to the international community, and the aviation industry is a relatively small but fast-growing emitter of greenhouse gases. Overall emissions from the activities of the aviation industry are currently at 2-3% of total energy-related emissions, but are projected to dramatically increase up to 22% by the year 2050 due to strong and continually growing demand (European Parliament, 2015).

Statistics Norway's figures for 2015 show that domestic civil aviation in Norway emitted 1,28 million tons of CO2, about 2,4 percent of Norway's total domestic emissions, figures which more than double when adding in international flights departing from Norway (Avinor, 2017a). Norwegian travelers' long-haul travel routes usually also pass through hubs outside Norway, such as Stavanger to Amsterdam to New York, and is therefore not shown in the numbers above.

To put things into perspective, a typical two engine jet aircraft during a 1-hour flight with a load of 150 passengers would consume 2 700 kg of kerosene. By burning this fuel, the aircraft would emit 8 500 kg carbon dioxide (CO2), 3 300 kg water vapor (H2O), 30 kg of nitrogen oxides (NO_x), 2,5 kg of Sulphur dioxide (SO_2), 2 kg carbon monoxide (CO), 0,4 kg

hydrocarbons (HC) and 0,1 kg of particulate matter (PM) and soot (EASA, EEA, and EUROCONTROL, 2016).

2.2 Overview of Aviation Taxes

This section will provide an overview of aviation-related taxes and their importance to the workings of aviation industry in Norway.

2.2.1 Non-passenger taxes on Norwegian aviation today

In addition to the current air passenger tax which will be discussed further in the next subsection, airlines operating in Norway are also subject to a multitude of other mandatory taxes and fees. Those fees are which are ultimately used to finance the operations of Norwegian airports are referred to as airport fees.

There are currently four different airport fees. The fees for 2018 in NOK are (Avinor, 2018a):

- Start fee: This fee is based on the aircrafts maximum takeoff weight (MTOW). If the aircraft is under 75 ton the fee is 62 NOK per ton MTOW, if between 75-150 ton the fee is 31 NOK per ton MTOW, and if above 151 ton, the fee is 12,4 NOK per MTOW.
- Passenger fee: This fee is not to be mistaken for the recently implemented air passenger tax, but is a fee is based on the number of passengers departing Avinor airports. It is currently set at 48 NOK per passenger. The fee for transfer passengers on international flights is 34 NOK per passenger.
- Security fee: This fee is used to finance security measures at the airports, and is calculated based on the number of passengers with passengers transferring from other flights being deducted. The security fee is 64 NOK per passenger.
- De-ice fee: Some airports also charge a fee for de-icing. This is used to safely recycle and dispose of de-ice fluid.

The fees are more or less the same across all of Avinor's airports, but some of the smaller regional airports offer airlines a 30% discount on the start fee.

In addition to the airport fees mentioned above, airlines also have to pay an air traffic control service fee. This fee is split into two. The first part is an en-route charge which applies for all aircraft flying through Norwegian airspace regardless of whether the aircraft touches down in Norway or not. The en-route charge is calculated on the basis of distance flown and aircraft weight. The other fee, which applies only to aircraft taking off or landing in Norway, is called a tower fee and is charged for the use of air traffic control services on arrival and departure, and is calculated based on aircraft weight.

Airlines also have to pay a fee for aircraft emissions. One of these fees are for nitrogen oxide (NOx) emissions. The fee is calculated on the basis of actual amount of NOx emitted. For fixed wing aircraft, the fee only applies to the takeoff and landing phase. The NOx fee only applies to domestic flights (Skattedirektoratet, 2018). In 2018 NOx fee was set at 21,94 NOK per kilogram (Skatteetaten, 2018a). However, airlines can obtain payment exemption from the NOx emission fee if they adhere to the environmental agreement called the "NOx Fund for 2018-2025" put together by NHO (Næringslivets Hovedorganisasjon) and 15 participating organizations, which is a fund that finances emission reduction measures with regard to NOx emissions. Participating airlines then pay 6 NOK per kilogram NOx emitted to the fund instead of paying 21,94 NOK per kilogram to the government (NHO, 2018).

In addition to fees on nitrogen oxide emissions, there are also fees on carbon dioxide (CO_2) and sulfur emissions (Toll og avgiftsdirektoratet, 2015). Norway is one of the few countries in the world that has implemented a CO_2 fee on domestic flights. In 2017, the CO_2 fee was 1,10 NOK per liter jet fuel used or 431 NOK per ton of CO_2 emitted. International flights are exempt from Norwegian carbon dioxide and sulfur emission fees.

On top of all of this, since 2012 the Norwegian aviation industry has also been bound by CO_2 emission quotas from the EU emissions trading system (Avinor, 2017a). The EU emissions trading scheme (EU ETS) works according to the 'Cap and Trade' principle. The scheme is in place in 31 countries including all EU countries, Iceland, Liechtenstein, and Norway, and covers 45 percent of the EU's greenhouse gas emissions. The idea of the quota scheme is to set a cap on the total amount of certain greenhouse gases and then to reduce the cap so that total emissions fall over time. When adhering to the scheme, companies can receive or buy emission allowances that they can subsequently trade (European Commission, 2018a). Each allowance gives the holder the right to emit 1 ton of carbon dioxide (CO2) or the equivalent amount of

more powerful greenhouse gasses such as nitrous oxide (H_2O) and perfluorocarbons (PFCs). Aviation, as a part of the EU ETS has its own cap that remains the same each year of the 2013-2020 trading period. This cap is fixed at 5 percent below the annual average level of emissions in the period 2004-2006 (European Commission, 2018b).

2.2.2 The current air passenger tax in Norway

The air passenger tax currently enforced in Norway was put into effect on June 1, 2016 (Regjeringen.no, 2016). Currently, the tax is 83 NOK on each passenger, which comes to 93 NOK per passenger after adding VAT (Skatteetaten, 2018b). The air passenger tax has not had a significant effect on consumer demand for air travel on Norwegian domestic routes, as this demand is quite inelastic. However, the tax has caused a 3 percent reduction in the supply of routes from airlines (Runsjø and Moum, 2017). Airlines operating in Norway have complained about their profit margins taking a hit as a result of the added tax in an already tough market (Hovland & Lorentzen, 2017). Airlines have absorbed parts of the tax since they are not able to pass all of it on to consumers in the form of higher ticket prices due to the highly competitive nature of the aviation industry. This has driven up the airlines' costs leading to airlines cutting capacity even though demand for air travel has not dropped.

Change in number of domestic departures		
Year	**SAS/Norwegian Air Shuttle**	**Widerøe**
2013	-1,2%	5,4%
2014	1,9%	2,6%
2015	-1,5%	-0,2%
2016	0,9%	-3,4%
2017	-1,9%	-3,6%
2018 (Planned first half)	0%	-4,2%

Table 2 *Change in number of departures (from Widerøe)*

A Widerøe representative provided the information in Table 2 to this paper's authors (numbers from internal Widerøe document "Rammebetingelser for kommersielle distriktsruter"). Widerøe maintains that, holding all else constant, the air passenger tax has had direct and negative consequences on its operations:

Prior to the introduction of the air passenger tax in 2016, most of the regional routes Widerøe operated were profitable. By 2017, most of the routes Widerøe operated had become unprofitable (personal communication, Widerøe, 2018). This information is supported by the information on the negative trend in Widerøe's domestic departures supplied in Table 2.

The reason for the reduction in domestic departures for Widerøe is the increased level of fees, not only from the introduction of the air passenger tax, but also annual increases in other taxes and fees levied on the aviation industry as described in the previous subsection. Consequently, many routes have recently become unprofitable. Note that public service obligation routes operated by Widerøe on contract by the government are compensated for the air passenger tax (Toll og avgiftsdirektoratet, 2015). Even though the other airlines have to pay the air passenger tax, Widerøe takes a relatively big hit. This is because most of the routes operated by Widerøe are domestic routes, where passengers have to pay the air passenger tax two times on a domestic round trip. Passengers travelling on international flights only have to pay the air passenger tax upon leaving the country, not upon the return. Therefore, if the airlines are struggling to pass the air passenger tax on to passengers, the airlines with a majority of domestic routes will have a higher burden than airlines with a majority of international.

2.2.3 Air passenger taxes in other countries

Many countries in Europe and beyond have also introduced air passenger taxes over the years. It is estimated that total passenger taxes in European aviation will raise 6 billion euros in tax revenues during 2017 (PwC, 2017). It is worth noting that the size of the tax and way the different taxes work vary from country to country and therefore in some cases, making a direct comparison more difficult. For more details about these taxes' rates and functioning's, the authors refer the reader to appendix 4.

These air passenger taxes are taxes that are paid to governments with the purpose of raising revenue instead of being collected with the intention of offsetting the cost of a service provided, as aligned to the IATA list of ticket and airport taxes and fees (PwC, 2017). Sweden is implementing an aviation tax in 2018 (Statens Offentliga Utredningar, 2016). This will be a tax where the rate is based on distance traveled. The proposed rates are, within the EU 60 SEK,

outside the EU but closer than 6 000km 250 SEK and for flights longer than 6 000km 400 SEK. This tax will enter into force on 1 April 2018 (Sveriges Riksdag, 2017).

2.2.4 Industry view on aviation taxes

As the representative for the vast majority of the world's airlines, the International Air Transport Association (IATA) publicly opposes aviation taxes, especially those that "single out aviation simply to raise revenue for non-aviation purposes." (IATA, 2016). The IATA also calls them "a quick money grab" for governments and cautions that imposing aviation taxes is shortsighted and will lead to negative economic effects in the long term (IATA, 2016). These negative effects are the ripple effects from an increase in the cost of travel, which theoretically, per the law of demand, decreases consumer demand which further impacts supply of flight routes and takeoffs, and ultimately damages connectivity. Worsened connectivity within or between countries has a negative effect on the global economy through limiting business opportunities and other chances for economic growth. Essentially, the industry argues that abolishing or limiting aviation taxes will lead to an overall increase in national wealth.

Chapter 3: Literature Review

The literature review samples from the vast body of literature on environmental taxes in general before delving more specifically into a selection of the literature dealing with taxes on aviation. After, there will be an overview of the literature on some of economic implications of these taxes, specifically for airlines but also on other stakeholders. Next, the authors will review evidence of elasticities of demand and supply for air travel and briefly overview "green innovations" in aviation before concluding by pointing out a few existing gaps in the academic research.

As will be detailed further in the methodology chapter, the literature review relies on four major themes that emerged as especially important to the scope of the research – environmental taxation, including taxes on aviation, implications of these aviation taxes, elasticities of demand and supply, and green innovation in aviation.

A total of 33 sources were used in the literature review, and are listed in Table 3 in the order they are cited in the following literature review. As can be seen in Table 3, these sources were classified by category and by source type. To begin with the former, the four categories adhere to the structure of the following subsections 3.1-3.4, respectively. Category 1 refers to literature on environmental taxation, category 2 refers to the economic and financial implications of aviation taxes, category 3 refers to elasticities, and category 4 refers to green innovation in aviation. The last category has fewer sources than the others, mainly because information on environmental innovations in aviation generally comes from news media sources and therefore falls more naturally into other sections of the thesis. These four categories will be further detailed in their respective subsections.

Author(s)	Year	Category	Source Type
Kosonen and Nicodème	2009	1, 2	Working paper
Leicester and O'Dea	2008	1	NGO report
Hsu	2008	1, 3	Journal article
Keen and Strand	2007	1	Journal article
Jones, Keen, and Strand	2013	1, 2, 4	Journal article
Krenek and Schratzenstaller	2016	1, 3	Working paper
US IAWG	2016	1	Government report
Bhattacharyya	2011	1	Academic textbook
Khan	2015	1	Journal article
Brouwer et al.	2008	1	Journal article
Andrew	2008	1	Journal article
IMF and World Bank	2011	1	NGO report
Milne	2016	2	News article
Bottini and Morphet	2015	2	Industry report
Tol	2007	2	Journal article
WTTC	2017	2	NGO report
Koopmans and Lieshout	2013	2	NGO report
Starkie and Yarrow	2013	2	NGO report
Wang et al.	2017	2	Working paper
Truby	2010	3	Journal article
Runsjø and Moum	2017	3	Academic thesis
Jorge-Calderón	1997	3	Journal article
Sivrikaya and Tunç	2013	3	Journal article
Gillen et al.	2004	3	Government report
Levine	1987	3	Journal article
Borenstein	1989	3	Journal article
Bilotkach and Lakew	2014	3	Journal article
Ciliberto et al.	2016	3	Working paper
de Jong et al.	2016	3	Working paper
Captain and Sickles	1997	3	Journal article
Takriti et al.	2017	4	NGO report
Macintosh and Wallace	2009	4	Journal article
Avinor	2016	4	Industry report

Table 3 *Overview of sources used in literature review*

The majority of sources presented in the literature review are academic in nature, mainly journal articles from various academic and industry journals and academic working papers not published in structured journals. "Government report" includes sources sponsored by government organizations, while the category "NGO report" refers to non-governmental organizations / non-profit organizations. For example, the Takriti et al. source is a white paper written for the International Council on Clean Transportation. Some of the sources used are more technical, but provided valuable supplementary information to the more traditional literature, and were therefore included in the literature review.

3.1 Environmental Taxation

Aviation, like most other industries, imposes external costs onto society in the form of greenhouse gas emissions and other forms of pollution. These external costs are called "negative externalities," and are borne by society, which is an external third party to the market transaction between airlines and passengers. Negative externalities are a form of market failure. Environmental taxes are market-based instruments that are important to environmental policy because they can potentially contribute to achieving environmental goals in a cost-effective way (Kosonen and Nicodème, 2009). In economic theory, the goal of these kind of taxes is to "internalize externalities", which provides the primary rationale for governments to choose to impose specific taxes on the aviation industry (Leicester and O'Dea, 2008; Hsu, 2008; Keen and Strand 2007). The most obvious implication of aviation taxes is that they raise money for governments through revenues collected by passengers and/or airlines.

A quality environment is a public good whose provision is not ensured by the market mechanism. As Jones, Keen, and Strand (2013) point out, anthropogenic climate change that affects this public good is simply an externality problem which can be tackled most effectively through fiscal means. Ideally, a government's imposition of taxes can be used to correct this market failure. When designed correctly, they are called Pigouvian taxes, and involve charging a price for emitting a unit of CO2 which is equal to the present value of the marginal social damage caused by that unit of emissions (Krenek and Schratzenstaller, 2016). The social cost of carbon (SC-CO2), is a term which captures "the monetized damages associated with an incremental increase in carbon emissions in a given year," including damages to a wide variety of actors in society at large, and is most conservatively estimated at $11 per metric ton of CO2 in 2015, with a higher-impact SC-CO2 over $100 (US IAWG, 2016). A global charge on aviation emissions even on the conservative side of this range would raise billions.

However, climate change is an extremely complex externality problem, with innumerable sources emitting greenhouse gases into the atmosphere, and effective fiscal measures to mitigate it are thus challenging to design (Bhattacharyya, 2011). Mitigating climate gas emissions is particularly difficult in the international arena, due to the obvious spillover issues stemming from the fact that a single country's emissions ultimately affect all others.

3.1.1 Taxes on Aviation

Aviation taxes are said to be Pigouvian in nature, because they aim to internalize the range of externalities brought about by the operations of airlines. The negative externalities specific to aviation are both local, for example noise pollution and NOx emissions when aircraft takeoff and land, and global, as CO2 and other GHG emissions ultimately affect the entire world (Krenek and Schratzenstaller, 2016). As mentioned, the main rationale behind implementing such taxes is that they internalize these externalities of aviation, which motivates consumers to choose alternative, and presumably less carbon-intensive, transportation methods (Hsu, 2008). This means that revenue raised should be considered as an ancillary benefit of environmental-based taxation for policymakers, not the main reason for it.

Theoretically, under a Pigouvian tax, polluting firms will abate up to the point at which the marginal private benefit to the polluter is equal to the marginal social costs (i.e. the external costs) of the pollution. This is also known as the "polluter pays principle," because the polluter pays the cost of the pollution incurred by the wider society in the form of a tax (Khan, 2015). When buying a plane ticket online, customers can often pay a bit extra on top of their flight purchase in order to offset their carbon emissions. This is an example of the polluter pays principle in action. Although this is not mandatory, many consumers are actually willing to pay to compensate for their portion of the damage caused by their personal air travel. In fact, willingness to pay (WTP) estimates are in fact close to the estimated marginal cost of this damage done (Brouwer et al., 2008).

Some economists argue that of the wide range of fiscal instruments available, the best way to target a policy is to charge emitters an appropriate price for units of greenhouse gas emissions into the atmosphere (Andrew, 2008). This is colloquially referred to as "carbon tax". In the case of aviation emissions, a root carbon tax would be imposed upon the fuel burned by aircraft from takeoff to landing. The major problem in respect to collective action on climate change in this instance is that per the fuel tax exemption developed at the 1944 Chicago Convention, taxes are not levied on fuel used on international shipping and aviation. Finding an "appropriate price" per unit is a challenge in itself, and falls outside of the scope of this research.

However, real-life market distortions, such as multilateral air service agreements and commitments to international treaties, especially the Chicago Convention, hinder the potential effectiveness of carbon pricing and a root tax on fuel used on international flights. Jones, Keen, and Strand (2013) state that in the case of international aviation, per-ticket taxes such as the current Norwegian air passenger tax can therefore be beneficial, though still a second-best option. This and other possible solutions to the international negative externalities of aviation are also explored by other key studies (Keen and Strand, 2007, IMF and World Bank, 2011).

3.2 Economic / Financial Implications of Aviation Taxes

Environmental taxes do more than simply affect a company's bottom line. International competitiveness may be affected when a country unilaterally sets a tax, as was the case when the Ryanair pulled out of the Rygge airport, which quickly led to the airport's closure, as a direct result of the Norwegian government introducing the air passenger tax (Milne, 2016). This tax put the Norwegian aviation industry at a competitive disadvantage, and has the possible future consequence of airlines moving out of Norway.

Theoretically, the sectors that are the most vulnerable to being placed at a competitive disadvantage are those characterized by a high degree of energy intensity, a large share of products and services exposed internationally, and a modest ability to pass cost increases through to consumers (Kosonen and Nicodème, 2009). The aviation industry checks all three of these boxes – it is currently entirely dependent on fossil fuels to power aircraft, the most profitable airlines operate internationally, and some cost increases are difficult to pass on to consumers due to the fiercely competitive environment.

It can be argued that air connectivity and consumer choice are also public goods which enhance consumer welfare overall and also boost global trade opportunities. Bottini and Morphet (2015) argue that air connectivity is essential to the economic growth potential of a country, partially because a well-connected country can better attract business investment and partially because national connectivity props up a country's entire tourism industry. Tourism is important to the Norwegian economy in terms both of tourism-related employment and an important non-petroleum-related contribution to GDP. Some researchers argue that imposing special taxes upon the aviation sector could have damaging effects on the tourism industry in Norway by encouraging European visitors to travel closer to home (Tol, 2007). International tourism, in

particular, is a flourishing industry, thanks in part to the emergence of newly developed markets, especially China. For reference, in 2016 the growth rate of the global GDP was 2,7%, but the growth rate of the tourism industry was estimated at 4% by the World Travel & Tourism Council (WTTC, 2017).

3.2.1 Cost pass through

"Pass-through" refers to airlines' ability to pass changes in costs through, on to their customers, via increased ticket sales prices. A general rule of thumb for cost pass-through is the more competitive the market, the lower the percentage of cost changes that can be passed on to consumers, and that market-wide cost increases have higher pass-through rates than individual firms' cost increases (Koopmans and Lieshout, 2013). The level of pass-through is important to both airlines' profit margins and the actual environmental effects realized by the imposition of an aviation tax, in terms of changes in travel patterns.

Charges to airports and other aeronautical charges, for example air traffic control fees, are relatively easily recouped by airlines from passenger fares (Starkie and Yarrow, 2013). These charges have a relatively high degree of pass-through into airfares compared to environmental taxes, where the burden falls more upon the airlines in a competitive environment. Therefore, changes in airport and other mandatory fees are generally reflected by changes in ticket prices, suggesting a classical price elasticity of demand, i.e. that consumer demand for seats on an airplane decreases. A secondary effect of this decreased consumer demand, besides the obvious effect on airlines' bottom lines, is the dampened profitability of marginal services at airports (Starkie and Yarrow, 2013).

Airlines tend to pass a higher proportion of fuel-related cost increases onto passengers than those of non-fuel related costs. Wang et al. (2017) find that an increase in nonfuel costs per passenger, i.e. the flight passenger tax, mandatory charges to air traffic control, etc., has a significantly smaller effect on airfares than does an increase in average fuel costs per passenger. Overall, airlines respond more to fuel cost changes than to any other change in variable costs. Jones, Keen, and Strand (2013) also find that the level of pass-through depends largely on the elasticity of airlines' fuel supply response – the more inelastic, the higher the impact on

producer prices. This finding is applicable in all markets, and is the result of fuel cost making up the lion's share of airlines' operating costs.

3.3 Elasticities of Demand and Supply

Elasticities can measure whether or not aviation and other environmental taxes truly have an effect on reducing emissions by affecting demand. According to Grethe Dahl, an official from the taxation department in the Norwegian Ministry of Finance, the current flight passenger tax in Norway "is fiscally justified, but can also have environmental effects by reducing the demand for flights" (personal communication, March 7, 2018). It has been argued that an air passenger duty is a misconceived instrument which is far removed from its stated environmental objectives (Truby, 2010). Other academics argue that environmental taxes on aviation are a good thing, given that all revenues collected from them are used to reduce overall emissions contributions of the countries which implement them (Hsu, 2008; Krenek and Schratzenstaller, 2016). However, this is not the case in Norway, where the revenues collected from the various taxes go towards the general government budget, without any earmarking.

A comparable recent study in this line of research concentrated on elasticities of demand for air travel in its literature review, finding that consumer demand for flights is primarily dependent on geo-economic and service-related factors (Runsjø and Moum, 2017). For an example of the former, the higher the GDP and average disposable income of a country, the less price sensitive its inhabitants are towards purchases of plane tickets (Jorge-Calderón, 1997). This is a key factor behind relatively wealthy Norwegians having the most flight trips per capita in Europe. Service-related factors are encompassed within a consumer's perception an airline's overall quality, in addition to its route map and departure frequency (Sivrikaya and Tunç, 2013). Of course, the law of demand is, as always, relevant here, and consumer demand for airfare is in no way inelastic regardless of the wealth of the population. The higher the ticket prices, the lower the consumer demand for tickets, ceteris paribus.

When faced with higher prices for air travel, more budget-conscious consumers might choose alternative forms of transport when this is geographically possible. Others may forego travel entirely. The air demand elasticities of business and leisure travelers are both negative, however

it has been shown that leisure travelers are more than twice as responsive to a price increase in airfare than are passengers traveling for business (Gillen et al., 2004).

Consumers (passengers) and producers (airlines) are not the only stakeholders relevant to the aviation industry. Airports are an indispensable part of the transport network, and are dependent upon the performance of the airlines they host, since they earn money by collecting various charges from the downstream airlines and selling goods and services to passengers. Starkie and Yarrow (2013) conclude that consumer demand as measured by total passenger numbers is affected both directly and indirectly by airline response to these charges to airports. This is due to the aforementioned result of easier cost pass-through of airport charges which results in higher final ticket prices for consumers.

Within the aviation economics literature, it is well established that airlines do exhibit some degree of market power, despite their existing within competitive environments (Levine, 1987; Borenstein, 1989; Bilotkach and Lakew, 2014; Ciliberto et al., 2016, etc.). Newer studies show that airlines tend to have relatively more market power in their domestic countries relative to internationally (de Jong et al., 2016). The extent to which airlines face price-elastic demand for their tickets is a key factor behind their level of market power, which impacts the overall competitive environment. Captain and Sickles (1997) argue that the market power of European airlines has less influence on ticket price increases than does the high cost structure of the aviation industry. The total number of airlines has blossomed in the two decades since the publication of their paper, a fact that ultimately lends support to their conclusion that the airline industry is characterized more by the competitive paradigm than the monopolistic.

For airlines, “supply” means an airline’s ability and willingness to provide consumers with a number of seats on their aircraft. Therefore, elasticity of supply for airlines means the change in number of seats supplied in response to a change in the ticket prices airlines can feasibly charge. In the short term, an airline’s available fleet (level of capital) cannot be changed, as new aircraft take a long time to be ordered and delivered, so there is an upper limit on the available supply.

3.4 Green Innovation in Aviation

Analysts from the International Council on Clean Transportation predict that the international aviation sector will continue to grow significantly over the next few decades, increasing at a rate of up to 4.3% each year (Takriti et al., 2017). Expansion in the aviation sector is expected to go hand in hand with a faster pace of development in increased fuel efficiency measures and other technological and operational improvements, but for now it is not hyperbolic to assume that there will be a corresponding increase in carbon emissions from the aviation sector. Researchers doubt that international aviation emissions can be stabilized into the near future without restricting demand growth (Macintosh and Wallace, 2009). However, there are strides being made to make the industry greener and less carbon intensive, and better prepared to handle climate-related disruption.

Jones, Keen, and Strand (2013) argue that mitigating climate change necessitates public intervention, but successful adaptation to climate change in the long term will ultimately be dependent on the private sector. They hold that the key role of the public sector is determining an appropriate carbon price pathway, which will be the key driver behind the private development of less carbon intensive technologies.

A very large percentage of airlines' variable operating costs come from jet fuel. As stated earlier in this chapter, fuel costs have a downward-trending component due to improvements in overall fuel efficiency with time. Developments such as electric passenger planes and biofuel as the main component of the jet fuel mixture are not yet commercially viable, but their development is important to the Norwegian aviation authorities, with Avinor investing hundreds of millions of kroner in research and development as part of its short-term strategic plan (Avinor, 2016). Airlines will also have to consider the short- and long-term costs of introducing new technologies which mitigate CO2 emissions from their aircraft.

3.5 Limitations of Current Research

Academic literature on the aviation industry, especially that pertaining to pricing strategies, is broad. However, there are a variety of gaps in the existing research, and to conclude the literature review and background chapter, the authors will briefly point some of these out. This

thesis endeavors to help fill a hole in the research gap on how the aviation industry, specifically in Norway, responds to different taxation scenarios.

Wang et al. (2017) found that the bulk of airline pricing literature is biased towards the United States' domestic market, and is therefore less relevant to other important markets. Furthermore, market segments such as the Asia-Pacific market, where aviation emissions grow rapidly to keep up with exploding demand for air travel, have rarely been subjected to academic scrutiny. Another research gap highlighted by Wang et al. (2017) is the lack of empirical studies on airline cost pass-through under competition. This is important because of the need to understand pass-through in the intensely competitive nature of the aviation industry in Norway and beyond.

The authors began this research project with an interest in exploring the effects of a theoretical empty seat tax. The authors quickly found that there is currently a dearth of academic research on the taxation of empty seats in passenger travel. Therefore, the selection of literature reviewed in this section focuses on related, broader aspects of the topic at hand, including the economic and climate-related effects of aviation taxes.

Chapter 4: Theoretical Foundations

In this chapter, the authors will present theoretical, microeconomic perspectives on our research topic. The chapter begins with an original microeconomic model for the empty seat tax and then links it to a generalized airline supply function before discussing abatement.

4.1 Microeconomic Model of the Empty Seat Tax

The short-term decision margins of an airline include fleet configuration, number of seats available for consumer purchase, and route configuration. The following will serve as the short-run theory basis for airlines for the quantity decision margin of number of seats available for purchase.

A general microeconomic model to represent profit to an airline for each flight under the assumption of a tax (T) on empty seats is presented in Equation 1:

$$\pi = p(q) * q - c(q) - T(\bar{q} - q)$$

Equation 1

The first term in Equation 1, $p(q) * q$, represents the generalized revenue structure of the monopolist or firm with market power, and is stated in terms of inverse demand. For a monopolist or firm with market power, price is negatively affected by an increase in the number of units produced. Showing price as a function of quantity recognizes that airlines have at least some degree of market power.

As the airline increases its quantity supplied in terms of seats sold, it gets a revenue of p per unit, but a lower unit price. This is due to the standard microeconomic result of the monopolist facing the downward-sloping demand curve. The price that the monopolist receives falls as it increases its output, therefore there exists an inverse relationship between a monopolist's marginal revenue and its output.

The second term in Equation 1, cost as a function of quantity produced, or c(q), represents the generalized cost of producing each unit.

The final term in Equation 1 represents the empty seat tax, where T is conceptualized as a financial penalty per empty seat, where $\bar{q}$ represents the full capacity utilization and q represents actual seat sales per flight. Note that $\bar{q}$ is equivalent to q^{MAX} from the perspective of an individual flight.

Taking the derivative of this Equation 1 gives Equation 2:

$$\frac{d\pi}{dq} = \frac{dP}{dq} * q + P - \frac{dc}{dq} + T \text{ ; and set} = 0$$

Equation 2

A penalty on a negative externality is usually negative, but T is positive in Equation 2. This leads to the result that for every seat filled, the airline is receiving the theoretical equivalent of a unit subsidy in that they do not need to pay the penalty for having an empty seat on a flight. Quantity is another piece of the marginal cost expression $\frac{dc}{dq}$, but it is negative here.

Rewriting Equation 2 gives Equation 3:

$$P + T = \frac{dc}{dq} - \frac{dP}{dq} * q$$

Equation 3

The left hand side of Equation 3 gives the marginal revenue of the airline. The right hand side of Equation 3 represents the marginal costs of an increase in quantity, which rise due to higher costs of production. In our example, a higher fuel price is associated with added passenger weight from additional passengers, among other factors. If the airline decreases quantity, for example by using a plane with less seats on board, there is another perspective to consider. A decrease in quantity leads to the missed opportunity cost of lost marginal revenue, but is also associated with a lower marginal cost. Note that the final term in Equation 3 is negative, but later becomes positive due to the mathematics involved in multiplying a negative term with another negative term.

Equation 3 solves for the airlines' profit maximizing quantity of seats sold, q^M, which represents the short run decision basis for the firm, specifically the firm's quantity decision margin in terms of seats available for sale. In the longer term, amounts of capital, specifically the aircraft which make up the airline's fleet, are not fixed as they are in the short run. Therefore, longer term effects of a tax on empty seats could include pricing changes (as airlines must decide how much to cut prices to sell all of their seats) and route changes (ex. scaling down aircraft size or stopping certain routes entirely), leading to a societal welfare loss in terms of less consumer choice.

Note again that airlines, while generally not pure monopolists, do have market power. Basic microeconomic theory tells us that since airlines are in market power situations, they produce a quantity (of available seats on airplanes) which is less than equilibrium output. To put it succinctly, $q^m < q^*$, while the free market under perfect competition tends to produce more than the equilibrium output, or $q^c > q^*$. By taxing a monopolist, q^m could fall even further below q^*.

4.2 Airline Supply Function

Demand for air travel is cyclical, meaning that it fluctuates along with the business cycle and general macroeconomic conditions. Estimating this demand on a month-to-month or even week-to-week basis is further complicated by the wide heterogeneity of the consumer base and uncertainty about travel dates and final destinations (Cento, 2009, pp. 33). Successful airlines must reconcile the volatile nature of consumer demand with their relatively stable available capacity (supply) – a simplifying assumption is that the total number of available seats for sale is fixed in the short term (disregarding leasing opportunities). Another complication for airlines is that their supply is perishable, meaning that empty seats cannot be "re-used" after a flight is completed, or kept as inventory to sell later.

The implicit supply function of an individual airline is conceptualized in Equation 4 as (equation and explanation adapted from Vasigh et al., 2016):

$$Q_s = \{P_t, P_r, T, C, R, G\}$$

Equation 4

Equation 4 shows that the quantity of seats supplied for any individual flight by an airline is a function of the ticket price, the price of resources, technology, competition, random factors, and government. These variables are further explained below.

In Equation 4, P_t represents the ticket price. According to the law of supply, airlines are more willing to supply seats as ticket prices increase. Changing ticket prices are represented as movements along the supply curve.

P_r represents the price of resources, including fuel prices, labor costs, operations and maintenance fees (including fees to airports), et cetera. When the prices of resources increase, airline production costs increase. If they increase enough, airlines may cut unprofitable routes, which would be represented as a leftward shift in the supply curve. If the price of resources declines, more seats could be offered at the same ticket price, shifting the supply curve rightward.

T represents technology. The technological development of commercial aircraft has continually trended towards larger and more fuel-efficient planes, gradually shifting the supply curve to the right over time as airlines introduce newer aircraft into their fleets.

C represents competition, or the competitive environment. As has been discussed, commercial aviation is a highly competitive industry, and individual airlines regularly adjust their supply to tackle developments in the competitive environment. Competition could also be taken to include developments in substitutes, meaning the availability and accessibility of other modes of transportation. The authors have already discussed how aviation is a non-substitutable means of transportation for some areas of Norway, but in other areas, train and car travel are viable alternatives.

R represents random factors, for example the sharp decrease in passenger volumes following the 9/11 terror attack (CAPA, 2011). Other stochastic factors could include employee strikes or even unexpected volcanic activity, such as the 2010 eruption of Icelandic volcano Eyjafjallajökull, which paralyzed European airspace for weeks (Andrews, 2017). Random factors generally shift the supply curve leftward.

G represents government regulation, including taxes. Imposing special taxes upon the airline industry causes an increase in operating costs and is meant to shift the airline's supply curve to the left, causing less flights and less GHG emissions.

4.3 Abatement Theory

Greenhouse gas emissions can be conceptualized as a function of the production level of a good or service. Therefore, GHG emissions are a production externality of airline operations, as shown in Figure 3:

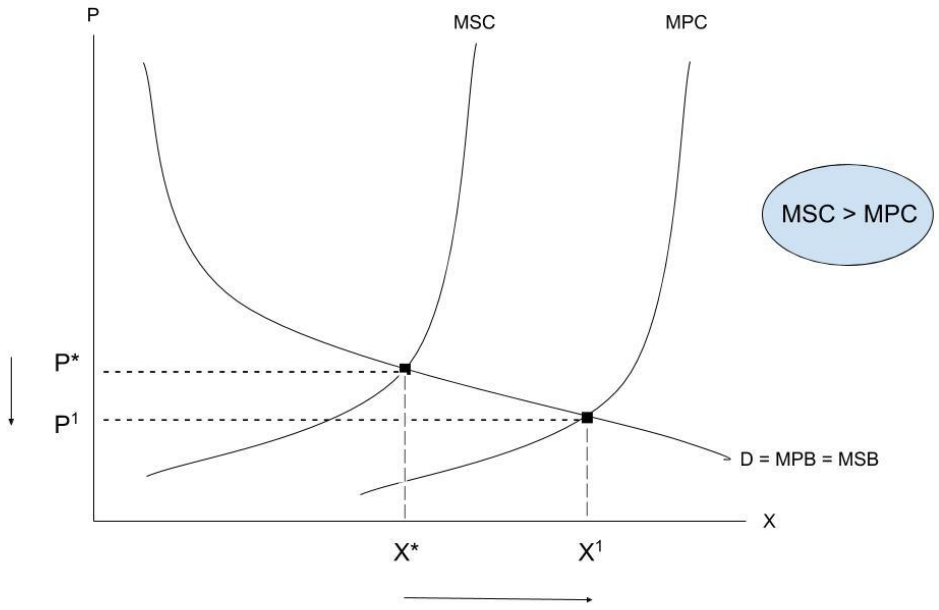

Figure 3 *Marginal social cost equilibrium versus marginal private cost equilibrium*

This externality can be corrected for with a decrease in production. This kind of market failure calls for a policy correction through the imposition of a Pigouvian tax equal to the marginal social cost minus the marginal private cost in order to force an airline to internalize this externality (Pigou tax= marginal social cost MSC – marginal private cost MPC). A Pigouvian tax on emissions is the most economically efficient way to solve the externality problem of commercial aviation.

Taxes, subsidies, and other market-based instruments are often, but not always, more efficient than regulatory instruments such as the implementation of sets of environmental standards. In the case of GHG emissions taxes (also called environmental taxes, pollution taxes, etc.), producers are incentivized to reduce their emissions up to the point at which the marginal cost of pollution is equal to the tax (Kosonen and Nicodème, 2009). In microeconomic theory, this is efficient in two main ways. The first is static efficiency, meaning that costs of reaching an environmental target are minimized since producers are automatically incentivized to reduce their emissions (given that their marginal costs of emitting are already *lower/higher* than the tax being introduced). Secondly, there is dynamic efficiency inherent in market-based instruments because polluting firms have the flexibility to choose how much to abate, and how (Blaug, 2001). This is a built in incentive for continuous innovation towards more and more emissions-efficient capital investments. Additionally, market-based instruments provide price signals to consumers, thereby pushing them to choose more environmentally friendly products.

As mentioned above, sometimes direct regulation can be a more efficient instrument to address excessive emissions. For example, quantity-based instruments such as the European Union's Emissions Trading System (EU ETS) can be favorable because they are more certain to achieve targets than price-based instruments (Kosonen and Nicodème, 2009).

In the case of either a tax on carbon emissions or a tradable permits system, the correct price to set on emissions (P_e*) is that which equates the marginal social cost of emissions MSC(E) with the marginal social benefit of emissions MSB(E), as shown in Figure 4:

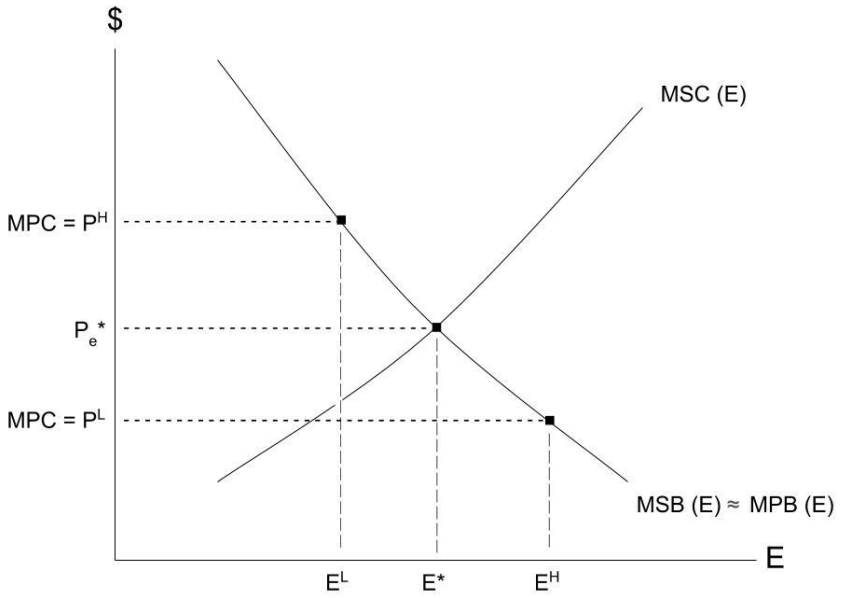

Figure 4 *Marginal social cost and marginal social benefit of emissions*

As shown in Figure 4, setting too high of a price (P^H) would lead to too few emissions (E^L), and a dead weight loss equal to the area to the left of the equilibrium. Having too few emissions is theoretically possible, as emissions support consumption and production. However, in a more realistic sense, there would be too low of a price (P^L), which would lead to too many emissions (E^H) and a deadweight loss equal to the area to the right of the equilibrium. The goal is to set a price equal to P*, which brings about E*, the socially optimal level of emissions.

Sections 4.1-4.3 serve as the theoretical microeconomic basis necessary to explore our research question in depth. The following chapter presents an original flow chart model developed by the authors of this thesis, which builds upon these theoretical foundations.

Chapter 5: Flow Chart Model

The following chapter presents an original flow chart model developed by the authors of this thesis. The model aims to give a comprehensive understanding of how a tax put on empty seats will affect the airlines, the market equilibrium for air travel, and the rest of society. The model was made by combining pre-existing knowledge about the aviation industry with data collected during the research process. Although basic, the authors believe that the model is sufficient in explaining the key effects that would result from the introduction of an empty seat tax.

5.1 Main Flow Chart Model

The main flow chart model is as follows:

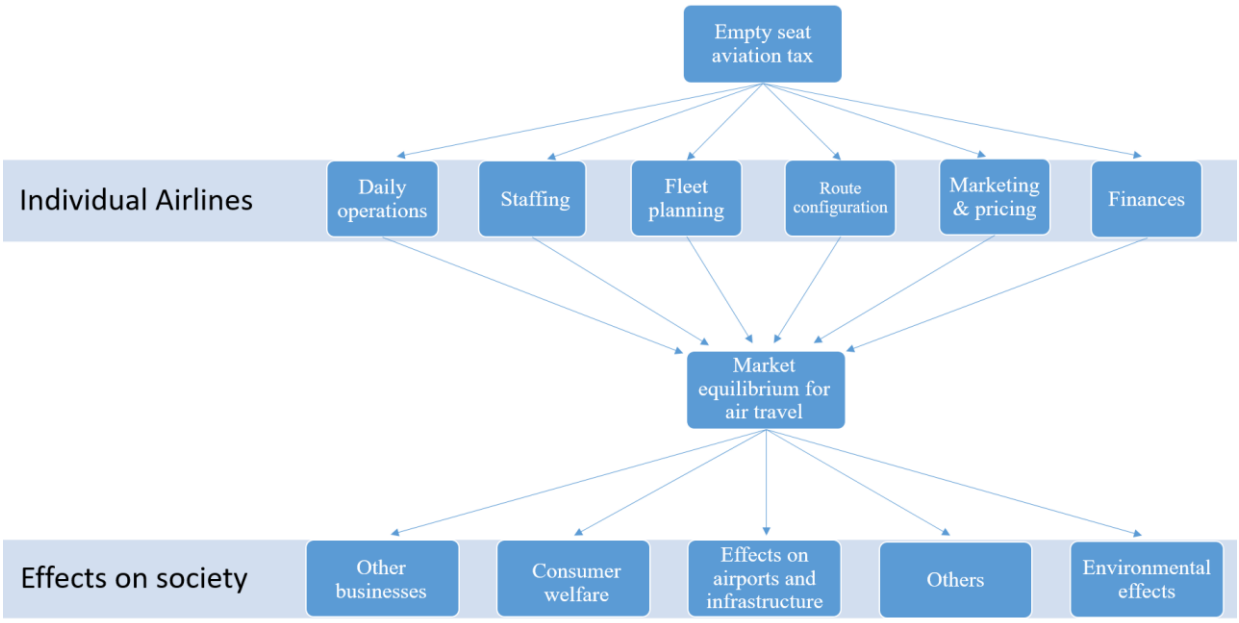

Figure 5 *Main flow chart model*

At the top of the flow chart in Figure 5 is the empty seat tax. Naturally, the first stakeholder affected would be the airlines, who would immediately need to take into account how the tax affected their daily operations, marketing and pricing, route configurations, future fleet planning, staffing needs, and finances. Microeconomic theory holds that elasticities, of both supply and demand, are generally lower in the short run than in the long run. Therefore, the short term response would be more muted than the long term response.

In the immediate aftermath of an empty seat tax's implementation, the daily operations of an airline would most likely not be affected to a large degree. Airlines would still be committed to operating scheduled flights in the short run, maintaining safe operations, and going about normal competition with other airlines. The same would apply to staffing, as it is difficult to make comprehensive changes with already-contracted employees in the very short run. On the other hand, finances would immediately be affected. An empty seat onboard an aircraft has never had revenue tied to it, but with an empty seat tax, empty seats would now represent financial penalties for airlines. Introducing a tax on empty seats on departing aircraft would therefore directly affect the margins of the airlines from day one. Fleet planning, route configuration and marketing & pricing are all categories where airlines would need to make decisions based on both the short run and the long run. These categories will however be expanded upon later in another subchapter.

Taken together, the sum of the various effects of applying an empty seat tax on the airlines would in turn affect the market equilibrium for air travel. There are several possibilities as to how this would turn out. The consumer demand could increase, as airlines would lower prices in order to fill up aircraft. Another possibility would be a decrease in supply if airlines reduced the number of seats available on the market. This shortage of supply would create a market inefficiency. Since supply would go down, the prices on the remaining seats would go up.

A change in the number of passengers traveling by air would therefore affect close stakeholders and even the rest of society in various ways. Airport and infrastructure could be affected as a result of an empty seat tax. The most likely short- and long-run effect would be the postponement or pushing ahead of airport expansion plans, depending on how the market equilibrium evolves. Of course, present infrastructure like airport terminals, air traffic control towers, and runways would still have to be maintained. Consumer welfare, with regards to both leisure and business travel, would also be greatly affected by changes to the market equilibrium. If frequencies and routes were cut, the consumers would be worse off from having less freedom of choice. On the other hand, if airlines drastically lower their fares, this could have a positive effect and increase consumer surplus in the commercial aviation market. A reduction or increase in the number of flights following from the changes in the market equilibrium, will have a definite effect on the environment through increased or decreased aircraft emissions. A change in the market equilibrium would also have an effect on other businesses and industries related to aviation. Many people work within the aviation industry in secondary positions such as

catering, handling, and other functions that could be affected if a change in the marked equilibrium was to occur. Many times, the full scope of ripple effects upon different stakeholder groups does not appear until some time has passed and the long-term effects are better known.

In the following subchapters, the authors will now expand the model in Figure 5, taking a closer look at the central factors such as marketing and pricing, route configuration and fleet planning. The authors would like to pinpoint that in this model, our definition of the short run ranges from 0-2 years depending on category. In the short run, the airlines' quantity of capital is held fixed, as it often can take years from ordering an aircraft to introducing it into operations. Therefore, from the author's point of view larger structural changes require a certain amount of time.

5.2 Marketing & Pricing

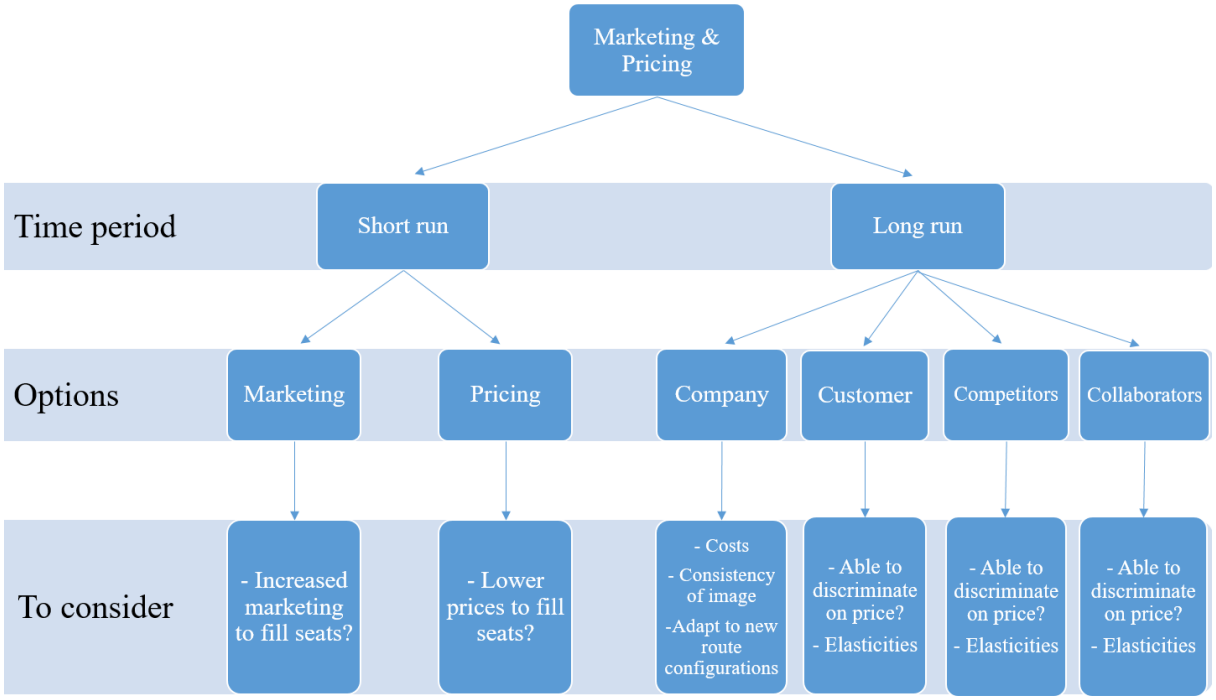

Figure 6 *Flow chart: Marketing & Pricing*

A department that would immediately feel a tax on empty seats is marketing and pricing. One area that airlines would be able to make immediate changes to is marketing. In the short run, airlines could increase their marketing efforts in order to fill up their planes, thereby bypassing some/all of the new empty seat tax. Airlines could also possibly adopt new and more aggressive pricing strategies to compensate for the new tax. One of these potential emerging strategies

would be dumping prices on leftover seats at the gate before departure, trying to collect some revenue instead of paying a tax on a seat with no revenue.

In the long run, airlines would have more options to deal with such a tax as shown by Figure 6. Within the company, cost reductions to ease the tax burden could be implemented. How to deal with customers would also be an issue to consider. Airlines would have to carefully consider price elasticities of demand to determine whether the empty seat tax could be compensated for by increased ticket prices. As mentioned in the short run effects of Figure 6, another scenario would be a lower average ticket price in order to fill the planes. Low cost carriers are already good at doing this today, and generally have higher load factors than network airlines. An airline would also have to consider its competitors' actions. Heavy competition is one of the reasons that airlines operating in Norway today are not able to fully pass the air passenger tax on to the consumers. If the general trend were lower ticket prices, a competitive airline would have to respond to this by lowering its own prices in order to remain an attractive choice. Airlines could also check into the possibilities of increased efficiency gains by working closer with collaborators.

5.3 Route Configuration

As Figure 7 expands upon, existing route configurations would also be reviewed by the airlines. Possible consequences in the short run would most likely not be too large, as tickets booked in advance for predetermined routes must be honored. The route structure of an airline is generally split into two main schedules, the winter schedule from the end of October until the end of March, and the summer schedule from the end of March until the end of October. These schedules are usually released to the public well in advance. This will most likely limit the amount of major available options for the airlines in the short run. Minor adjustments like frequency changes on trunk routes with many daily departures could potentially be viable. Depending on the current flexibility in the airline's fleet, substituting aircraft types according to capacity could also be an option.

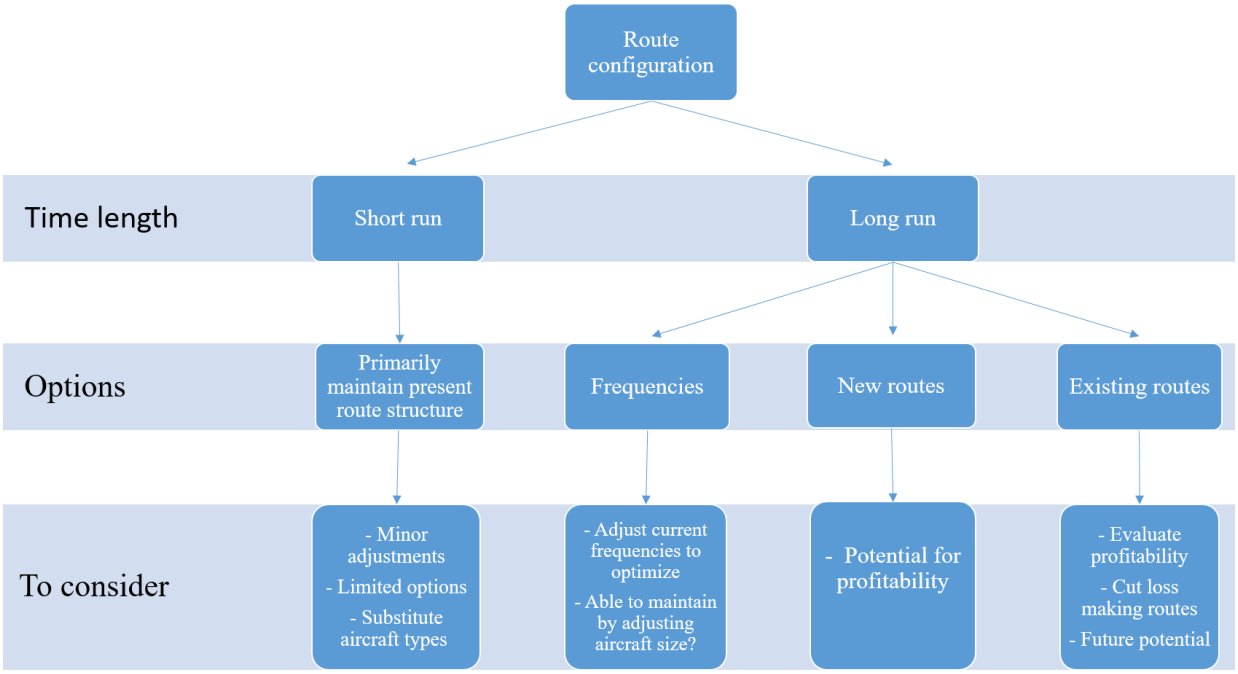

Figure 7 *Flow chart: Route Configuration*

In the long run, airlines have a wider range of options, as shown in Figure 7. Frequencies could be adjusted with regards to both demand and aircraft size. New and existing routes would have to be thoroughly evaluated. Depending on the size of the empty seat tax, there is a potential for many routes to be shut down as a result of no longer being profitable, especially on more regional routes with more variation in passenger loads and an uneven directional load. This could also have different effects depending upon if airlines operate a hub and spoke system or a point-to-point structure. The hub and spoke system involves channeling the traffic through hubs with stops instead of flying directly between the desired city pairs (Brueckner, 2004). An example would be flying SAS from Stavanger to Trondheim via the hub in Oslo instead of flying point-to-point, Stavanger to Trondheim directly. Another option for the airlines could also potentially be to open new routes and test new markets if existing routes are not able to deliver satisfactory load factors or due to hard competition.

5.4 Fleet Planning

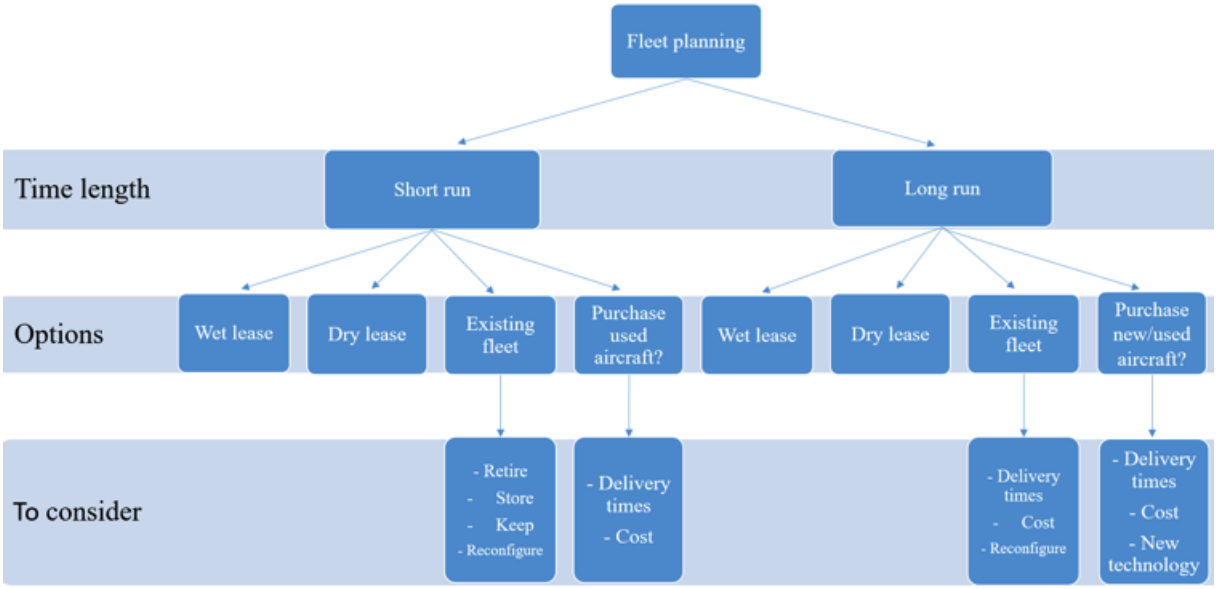

Figure 8 *Flow chart: Fleet Planning*

Figure 8 expands upon the aspect of fleet planning. Aircraft are expensive machines that, if maintained in a proper condition, have a long service life. After agreeing to purchase an aircraft, an airline would potentially have to wait several years to get the aircraft delivered, depending on the model and producer (Deloitte, 2016). Some type of leasing contracts also usually last for several years or more. As depicted in Figure 8, in the short run, airlines would have limited options. The airlines could consider retiring, storing or keeping existing aircraft. Dry leasing, where airlines only lease the aircraft itself, or wet lease, where airlines lease aircraft together with cockpit, cabin and maintenance crew, could be viable options. Used aircraft are also cheaper and can often be delivered quickly. As shown in Figure 8, in the long run, airlines would have a wider variety of options to optimize their fleets.

Leasing could also be a long term option both with regards to new and older aircraft, as well as purchasing new aircraft directly from the producers. Note that aircraft are legally required to go through rigorous and expensive service intervals. These type of checks often mean the end of an aircraft's service life if market conditions are slow and the costs of the check exceed the benefits of keeping the aircraft operational. In the long term, there is reason to believe that future investments also could be affected. As airlines will effectively be punished for flying

around with empty seats, airlines might be tempted to invest in smaller aircraft that would be easier to fill up. Instead of investing in smaller aircraft, another option could be to reconfigure the existing aircraft with a smaller amount of seats than before in order to keep the load factors high and avoid paying the empty seat tax.

Chapter 6: Methodology

This chapter will provide the methodological details of the processes used in this thesis, from the initial outlining phase to the final stages of data interpretation. The main sources of qualitative data used are the transcripts of in-depth semi-structured interviews carried out by the authors during the writing process.

6.1 Research Process

The entire thesis was inspired by Bjørn Kjos' statement in favor of an empty seat tax. It soon became clear that this idea was largely unexplored in the transport economics literature. The authors hope that their investigation into the idea of taxing empty seats aboard commercial aircraft helps to fill this research gap.

After reviewing many aviation- and environmental economics-related literature, eventually some key themes emerged as the most important to the scope of our research. Notes on articles and documents found during our research process were then categorized by these key themes, which were used to organize the body of literature reviewed. They were also used as a preliminary basis for coding the interview data, and the subcategories that eventually resulted from the analysis were based on these broader categories. The authors concluded that these themes were ultimately the factors are most important to our specific aviation economics research. In no particular order of relative importance:

1. Green innovation, including new technology for aircraft design, fuel efficiency, biofuel development, R&D for electric-powered infrastructure, and so on. The authors wanted to explore whether different taxation regimes would incentivize airlines and other stakeholders to modernize into less carbon intensive capital. In order to avoid over-specification in our non-technical thesis, everything in this category was grouped into one of two subcategories for green innovation: "present/short-term" and "future/long-term" efforts towards environmentally friendly innovation. The distinction was based on the classical economic definition of time horizons – "short term" indicates the time

period where capital, namely an airline's available fleet, is fixed, and "long term" indicates the time period in which all inputs are variable. This category includes both endogenous R&D efforts spearheaded within companies and exogenous, market-based developments in which pose a disruptive threat to airline business models.

2. Environmental taxation was a particularly broad category that yielded various subcategories, including the EU's quota system, the environmental rationale for taxing aviation, the taxation exemption on international flights, the actual environmental effects realized by taxation, and so on.

3. The implications of aviation taxes were split into two broad subcategories, financial and economic implications. Financial implications included financial impacts on individual firms, such as the level of pass-through. Economic implications contained impacts to the wider economy, for instance changes in welfare, such as impacts on consumer freedom and consumer choice, and the exogenous market environment.

4. Elasticities, including actual/projected changes in consumer demand for air travel and actual/projected changes in number of seats supplied on various routes by airlines. Elasticities of both supply and demand are important because they show the actual, measurable responses to the imposition of (environmental) taxes. This category was further broken down to include responses touching on the degree of substitutability between air travel and other modes of transportation.

5. Miscellaneous, a category which of course includes phrases and words unique to individual interviewees. The miscellaneous category became more condensed upon further analysis. For example, multiple respondents touched upon the idea of the "fairness" of different taxes vis-à-vis different stakeholders. Therefore, fairness was a category that eventually emerged here.

6.2 Research Design

The choice of using interviews as a method was natural for the authors' research goals, given that the authors intended to collect perspectives on empty seats, an area where there was not much in the literature. Individual, in-depth interviews with figures connected to the Norwegian aviation industry in various ways were the primary qualitative research method used in this thesis. The authors served as the interviewers, and followed a semi-structured interview format. As implied by the name, semi-structured interviews are a midway point between unstructured, conversational interviews and structured, quantitatively-oriented interviews. Semi-structured interviews roughly follow a predetermined script of open-ended questions, but allow researchers the flexibility to take conversational detours (DiCicco-Bloom and Crabtree, 2006). The more relaxed nature of this interviewing method led the authors to gain new insights into their research questions from a variety of perspectives.

In an effort to create continuity among the interviews, the authors emphasized asking as many of the same questions as possible to each interviewee to facilitate later comparison. However, the informants often touched upon multiple subjects in their responses. The coding method used while later analyzing the interview transcripts helped to capture these interconnections.

6.3 Methodological Process

The authors' methodological process is summarized by Figure 9, and detailed further in the proceeding subchapters:

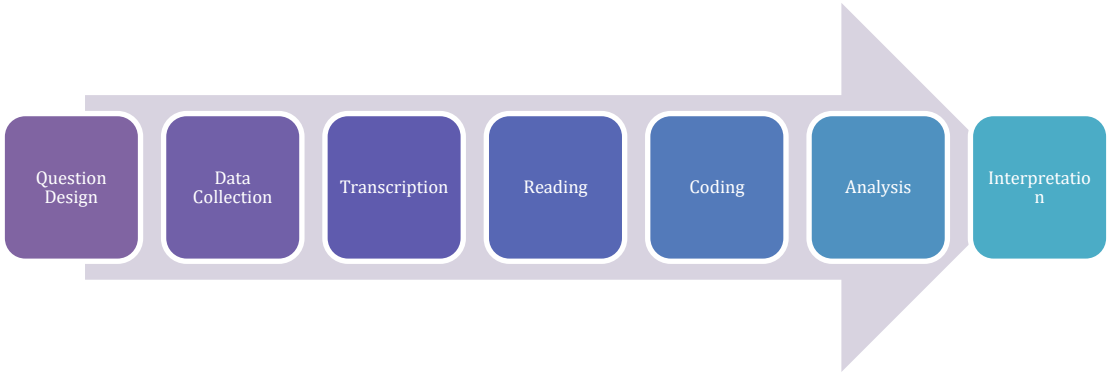

Figure 9 Methodological process

6.3.1 Question Design

Qualitative research interviews are structured conversations that serve as a primary data source for exploring research questions in depth. The design of the list of questions to be asked is an important step in the research process, because it is the basis for the qualitative data collection.

The questionnaire developed by the authors as the basis for the interviews is attached in Appendix 1. Note that the interviews were semi-structured and the authors/interviewers therefore did not stick to the script precisely. The authors aimed for neutrality in phrasing and word choice.

6.3.2 Data Collection

The authors wanted to come into contact with leading figures in the Norwegian aviation industry in order to gain a variety of perspectives. Therefore, the study's sampling strategy was to choose "key informants". The choice of candidates in this type of qualitative research is critical to its overall success, because the key informants "not only provide insights into a matter but also can suggest sources of corroboratory or contrary evidence" (Yin, 1994, p.90). The interviewees in this thesis were key informants who provided the authors with a wealth of expertise on aviation-related issues. These candidates represent various stakeholder groups in both the public and private sectors.

Potential interview candidates were selected based on their proximity to current affairs within the Norwegian aviation industry, and contacted via e-mail with interview requests. The primary objective of the research, exploring an empty seat tax, was withheld from these requests, which were intentionally vaguely written. Seven interviews were eventually conducted, with the authors of this thesis serving as interviewers and using the aforementioned questionnaire as the basis for the individual, in-depth interviews. The final field of interview candidates is listed in Table 4, in chronological order of interview date.

These interviews were conducted via telephone and video conferencing technology over a one-month span from March to April 2018, and lasted for 45 minutes on average. With each interviewee's permission, these interviews were recorded and later transcribed for use in our

final document. The interviews were conducted in an informal style, and conversation often drifted from the pre-set questionnaire into new directions, an advantage of the semi-structured interview method. For example, the authors decided to more explicitly incorporate questions on distance-based taxation into the interview protocol after the subject was brought up during the first few interviews.

Name	Position
Jon Inge Lian	Senior Advisor for Strategy and Development, Avinor
Jacob Pedersen	Head of Equity Research, Sydbank
Terje Skram	Director of Strategy and Infrastructure, Widerøe
Hans Jørgen Elnæs	Founder and Owner, WinAir AS
Torbjørn Lothe	Director General, NHO Luftfart (The Federation of Norwegian Aviation Industries)
Harald Thune-Larsen	Chief Research Economist, TØI (The Institute of Transport Economics)
Espen Andersen	Associate Professor of Strategy, BI (Norwegian Business School)

Table 4 List of interview candidates

6.3.3 Transcription

In order to create the data set necessary for analysis, the seven interviews were recorded through a lengthy transcription process. The authors recorded the text of the interviews as precisely as possible by listening to the audio files of the interviews. The validity of each transcription was verified by re-listening to each interview while reading the transcript.

Note that only two of the interviews *(with Espen Andersen and Jacob Pedersen)* were originally conducted in English. The other five interviews were conducted in Norwegian, recorded in Norwegian, and afterwards translated into English for use in this research. All efforts were made to preserve the original meaning of the candidates' words so that nothing was "lost in translation" despite the necessary liberties one must take in translating from one language to another. The seven English-language transcriptions can be found in Appendix 2. In this type of research, the content of the responses was the most important, as opposed to forms of qualitative research in which how something was said is pertinent to the outcome of the analysis. Therefore, the transcripts are "clean" versions, where language and grammar were cleaned up where necessary without affecting content.

Translation of data from one language to another in a qualitative research project is common methodological challenge which could potentially result in some semantic losses (Temple and Young, 2004). There are several possible drawbacks of the amateur translation used in this thesis, which range in severity from slight word cloud distortions to a fundamental misunderstanding of interview data in the worst case. However, the data were reviewed enough times in both Norwegian and English by the authors, who are native speakers of each language in turn, that any potential semantic losses have been minimized.

6.3.4 Reading

After making the transcriptions, the authors began the process of reviewing them all as a collective database. In the reading and re-reading process, the same broad categories of recurring themes were kept in mind to provide continuity. The coding process detailed in section 6.3.5 was conducted simultaneously with the reading process.

6.3.5 Coding

The seven transcriptions were thousands of words in total. The overall goal of any analytical process is to break larger amounts of data down into more easily understandable chunks.

Originally, the coding process consisted of a rudimentary color coding of the printed transcripts according to the aforementioned five categories: new technology, environmental taxation,

economic/financial implications, elasticities, and miscellaneous. The authors used Excel as a tool to organize this roughly coded information into a self-made database in order to facilitate comparisons. The five broad categories were divided into smaller subcategories which emerged as natural to the nature of the data. The coding process devised by the authors was organic and unrefined, but the conceptualization process of generating specialized categories helped the authors to organize the data and explain the wide range of effects of various taxation regimes.

6.3.6 Analysis

The qualitative data collected from analyzing the interview transcripts is presented in Chapter 7: Analysis of Results. A drawback of using qualitative data in the form of transcripts as compared to "harder" quantitative data is that the presentation of the data is a more ambiguous process. Therefore, the goal of the analysis chapter was to highlight not only connections and interrelations between the individual responses to certain questions, but to capture unique points of view.

Initial analysis began with comparing the interviewees' reflections on the empty seat tax, as exploring its' ramifications was the initial and primary research goal. However, the interviewees unanimously suggested alternatives that they felt were more appropriate than an empty seat tax. The analysis chapter therefore details our further study into distance-based taxation, a root tax on fuel, and the European Union's quota system.

The analysis of results was completed by splitting the interview data up into two broad categories – first, everything relating to the empty seat tax and second, everything else- and analyzing them separately. The interviewee's statements were compared against each other to compile the bulk of the Analysis of Results chapter. In addition to the main analysis described above, the authors also decided to include word clouds as a tool in the analysis. The word clouds consist of responses with the authors' questions filtered out. Word clouds allow a reader to easily see the most commonly reoccurring motifs in a text and were therefore included to provide a basic and initial analysis before moving on to the main analysis. The authors generated word clouds for various respondents, groups and by answer categories. The word clouds are presented in Chapter 7..

6.3.7 Interpretation

Chapter 7 also gives the authors' interpretations of the data presented in the chapter. The penultimate chapter aims to provide real-world meaning to the data, highlighting relevant explanatory factors, and link our findings both back to theory and with current events in the Norwegian aviation industry (will be done after May 15 budget comes out).

As in the literature review, the presentation and discussion of results are structured by a categorical framework in order to easily explain our findings related to these various dimensions.

In the next chapter, the authors will present, analyze and discuss the data collected from the interviews.

Chapter 7: Analysis of Results

This chapter begins with a general overview of the results using word clouds before going deeper into the wealth of data received from the seven interviews. The data was divided into two different categories for analysis. The first category of data collected is related to the initial research question and concerns only the potential effects of a theoretical empty seat tax. This data is presented in section 7.2. During the interviews, the authors also collected data on other forms of aviation taxation, which are analyzed in the second category and presented in section 7.3. Due to the quantity of data collected, not everything is presented and discussed in this chapter. If the reader is interested in viewing all of the interview data, full interview transcripts are in Appendix 2.

7.1 Overview of Results

Word clouds were produced in order to visualize the data received from the interviewees and to provide a quick, but basic, initial analysis. The more commonly repeated the words, the larger they appear in a word cloud. This was done by taking the interview transcripts and removing the author's own comments and questions. The remaining answers were fed into a word cloud program. The authors manually deleted common words they deemed not relevant to the word clouds.

7.1.1 Word cloud on empty seats

The word cloud below contains only the responses stemming from questions asked about the tax on empty seats. This word cloud contains these pooled answers from all of the interviewees.

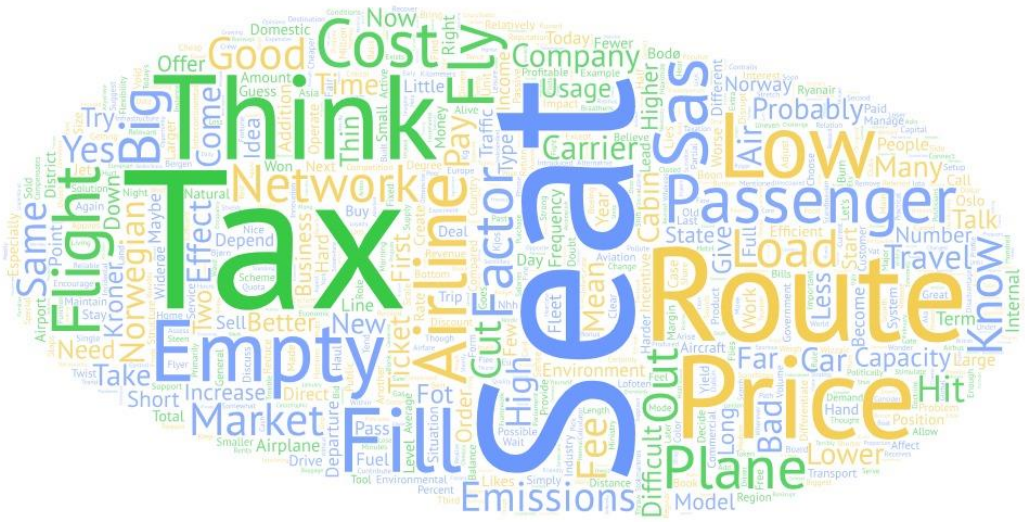

Figure 10 *Word cloud on empty seats*

In Figure 10, the dominant words include “seat”, “tax”, and “route”, which indicates that these are key concepts for the interviewees. An interesting word to notice is “think”. The authors chose to include this word as it may indicate that the interviewees simply are not sure when they answer. On the other hand, “I think” or “I feel,” et cetera, can also be simple figures of speech with no real meaning. Furthermore, they could have been affected by the authors’ own biases in translation from Norwegian to English. However, the authors chose to leave “think” in the word cloud because it reflects the inherent uncertainty of the consequences of introducing an empty seat tax. As Espen Andersen noted, “a tax like that sounds like an experiment, so I think people would sort of wait for a while to see what they do.” There is always a risk of unintended consequences when analyzing the effects a new form of taxation would have.

In Figure 10, the words “airlines”, “passenger”, and “price” are frequent in the data. Airlines, passengers, and prices are very likely to be affected depending on how a tax on empty seats would be designed. Of the airlines mentioned, “SAS” is dominant. This might indicate that the airline SAS might be especially affected by such a tax compared to other airlines, namely Widerøe and Norwegian.

7.1.2 Word cloud on other data

The word cloud in Figure 11 contains the pooled responses from the rest of the collected data when omitting responses pertaining to the empty seat tax.

Figure 11 *Word cloud on other data*

In Figure 11, the dominant word is, again, "tax," which indicates that taxes are still the general topic. Interestingly, the word "think" has increased in size compared to its counterpart in Figure 10. Again, this raises the question of whether the interviewees are uncertain of the effects under discussion or if the word is used as figure of speech. In Figure 11, words such as "Norway", "emission" and "quota" are more frequently used when respondents are not discussing the empty seat tax. This indicates that Norway itself is significant in relation to aviation taxation. The increased use of the word "emission" could indicate that in general, aviation emissions play a vital role from the interviewees' point of view. This could also apply to the word "quota". The different results from Figures 10 and 11 do show that there are differences in what the interviewees consider important when asked about the empty seat tax and when they discuss other aspects of aviation taxation.

7.1.3 Word clouds by respondent type

In this subchapter, word clouds based on the grouping of interviewees into categories based on their professions are presented. This has been done to see if there are any differences in responses between these groups, which are analysts, airline industry representatives, government institutions, and researchers. For each group, the authors present a word cloud for answers regarding the empty seat tax and other data collected. There were several possible combinations of professional groupings, but this is the final division used:

- Analysts: Jacob Pedersen and Hans Jørgen Elnæs
- Airline industry representatives: Terje Skram and Torbjørn Lothe
- Government Institutions: Jon Inge Lian and Harald Thune- Larsen
- Researchers: Espen Andersen and Harald Thune-Larsen

The authors felt that Harald Thune-Larsen could fit into two different groups. Since he works as a Chief Research Economist at the Norwegian Center for Transport Research (TOI), a public institution, the authors felt that he could be placed in the government group, but also into the researcher group, given his line of work. As there were an odd number of interviewees, this double placement evened out the categories such that each included two respondents. Note that this could affect the comparison between the different groups to a degree, as Thune-Larsen's response is included in two clouds.

Figure 12 *Empty seat tax airline industry*

Figure 13 *Empty seat tax analysts*

Figure 14 *Empty seat tax government institutions*

Figure 15 *Empty seat tax researcher*

The word clouds in Figures 12, 13, 14, and 15 are made from data related to the empty seat tax. An interesting observation is that the word "think" is frequently mentioned in all word clouds except the word cloud in Figure 12, which is built upon statements made from airline industry representatives. This might indicate that airline industry representatives are more certain about their responses compared to the others. Another interesting observation is that the airline industry representatives mention "emissions" very frequently relative to the other groups. This might indicate that for the airline industry representatives, a tax on empty seat could be related to emissions in some way. As shown in Figure 14, representatives of government institutions do not mention the word "tax" to the same degree as the others. "Tax" is also mentioned more frequently by analysts and researchers compared to the airline industry representatives and airline industry representatives. It also appears that for the analysts, "price" is a relatively important word.

Figure 16 *Other data airline industry*

Figure 17 *Other data analysts*

The word clouds in Figures 16, 17, 18, and 19 are based on the other data collected during the interviews. "Tax" is frequently used in all of these word clouds. This could indicate that taxation of the Norwegian aviation industry is a subject that generally concerns all of these groups. Again, the word "think" is strongly represented in all of the word clouds except the word cloud based on the responses from the airline industry representatives. This group however, as seen in Figure 16, mentions the word "quota" frequently. This could highlight the importance the industry representatives' place on Norway already being a part of the EU ETS scheme. The word "quota" is also mentioned frequently by the government institutions group but is absent

from the words most frequently said by analysts and researchers. All the groups except researchers also frequently mention the word “emissions”. Researchers, on the other hand, seem to focus more on the word “effect”, together with the government institutions.

Figure 18 *Other data government institutions*

Figure 19 *Other data researchers*

These comparisons give some quick surface-level comparisons on the interview data collected by the authors. In the following subchapters, we will take a deeper look.

7.2 Empty Seat Tax Results

In this subchapter, the authors will analyze the results from our data specifically related to our research question about a tax on empty seats. Five of the seven interviewees had heard of the idea of an empty seat tax prior to their interview. All of the interviewees expressed a degree of skepticism towards the idea.

7.2.1 Varying effects on varying stakeholders

The empty seat tax would have different effects both on different airlines and on consumers living in different parts of Norway. Recall that aviation is a non-substitutable means of travel for many consumers living outside of major cities.

All of the respondents agreed that the probable effects of this taxation regime would differ in terms of their consequences on low-cost carriers versus network carriers because of the absolute importance an empty seat tax would place on load factors. Their unanimous consensus was that an empty seat tax would favor low-cost carriers, which already have relatively high load factors, relative to network carriers, which generally have lower cabin factors.

Elnæs, an analyst from WinAir, calls low-cost carriers such Norwegian Air Shuttle and Ryanair "yield passive, load factor active" airlines, and network carriers "yield active, load factor passive", and argues that a tax on empty seats would especially hurt the latter category of airlines. A diminishing of the position of the network carriers, namely SAS, could especially harm Norway's air connectivity both domestically and internationally by forcing cuts in the number of routes flown. In the face of financial penalties from flying with empty seats, airlines would reduce route frequencies, leading to weakened air connectivity on a national scale and less freedom of choice for consumers of air travel overall. Jacob Pedersen, Head of Equity Research at Sydbank, noted that the empty seat tax would push SAS to prioritize higher cabin factors over a better route offer – "if they fly on the same destinations, 7 or 8 times a day then they'll probably just fly 5 or 6 times a day" in the case of the more popular routes. This is not particularly dangerous in and of itself, but the future supply of seats on thinner and less popular routes could be jeopardized by an empty seat tax. Elnæs also points towards a potential situation of worse supply on these secondary routes to and from smaller cities in Norway.

Skram, Director of Strategy & Infrastructure at Widerøe and Lian, Senior Advisor for Strategy and Development at Avinor, both mentioned the uneven directional balance that many regional flights have, meaning that morning flights heading out to the districts to pick up passengers have lower load factors. Examples of these are FOT routes and similar commercial routes, which would be hit extra hard by an empty seat tax. Lian also says it would be hard to increase load factors on these routes through triggering more traffic by discounting tickets due to the way the market on these routes work. He thinks these routes will be cut as a result. Skram also mentions that this tax would not combat the main problem, which is the explosive growth on international flights. International flights have relatively more favorable framework conditions than domestic flights since they are only subject to Norwegian taxation one way, upon departure, compared to domestic flights which are subject both ways of a round trip.

Lothe, the CEO of the Federation of Norwegian Aviation Industries (NHO Luftfart), said that:

The disadvantage of taxing empty seats is that the marginal flight routes will be taxed the hardest. On smaller flights and on flights with multiple connections it is harder to achieve higher capacity usage.
(Lothe, CEO of NHO Luftfart)

Lothe also argues that in the end, how the tax ends up being designed does not matter too much anyways, because the government will want to maintain its level of revenues. According to Lothe, it is difficult for operators, especially Widerøe, to make a system that will increase their capacity usage significantly compared to today. Furthermore, both Skram and Lian mention that a tax on empty seats is redundant since airlines will always have a preexisting incentive to try to fill the seats. Lian illustrates this with the following statement:

So (airlines) have such strong incentives basically to fill the seats that a small fee on empty seats will not contribute to anything. Simply a bad idea....
(Lian, Senior Advisor for Strategy and Development at Avinor)

7.2.2 Financial effects and competition between airlines

It is obvious that a tax on empty seats would hurt the profitability of routes with low load factors. This subchapter contains the interviewees' further thoughts on how an empty seat tax would affect airline finances and the competition between the airlines.

The intensely competitive environment in the Norwegian aviation industry means that aviation taxes are usually not passed on to final consumers (passengers), leading to the unintended consequence of taxes being absorbed almost fully by airlines instead of by consumers. Therefore, airfare prices have not risen proportionately to the amount of the air passenger tax, which has had obviously negative financial effects for various airlines. The level of pass-through of taxes from airlines onto consumers is a decisive factor in how much airlines are financially affected by any taxation-related changes. Since the introduction of the air passenger tax, airlines in Norway have had a hard time passing it on to passengers. For example, Lian states that airlines have so far only managed to recoup 0 to 50 percent of the current air passenger tax through higher prices. However, much hinges on the level of competition.

Pedersen believes that if there is a steep competitive environment with a drag on demand and a lot of capacity coming into the market, then aviation taxes will be almost 100 percent paid by the airlines as they strive to lure customers with attractive ticket prices. Given the fierce competition present in the Scandinavian aviation market today, the airlines are not able to pass the majority of aviation taxes to the passengers. Pedersen notes that:

…in normal circumstances, probably around a third of taxes they'll be able to pass on to customers, and in a more benign environments, competitive-wise, it'll probably be around half.
(Pedersen, Head of Equity Research Sydbank)

An empty seat tax would most likely parallel the low pass-through rates of the current air passenger tax, or even make them lower. Thune-Larsen, a Chief Research Economist at Transportøkonomisk Institutt, believes that an empty seat tax would hit the bottom line of the airlines even harder because it would be more difficult for airlines to do anything about the ticket price with such a tax. The tax would simply reduce profitability. He also says that a potential tax would need to be much higher than the current air passenger tax to compensate for revenue loss for the government and therefore it would be relatively catastrophic. It would need to be higher because despite varying load factors among airlines, there are more passengers than empty seats overall.

Skram from Widerøe points out that as more routes become unprofitable and face being shut down, the government would need to buy more routes through the tender scheme in order to maintain connectivity to more scarcely populated regions. The higher government expenditure needed would somewhat defeat the purpose of aviation taxation. Today, the public service obligation network is exempt from this kind of additional taxation, but on the commercial routes, a tax would have an effect right on the bottom line as the tax today. The following quote by Skram describes the situation Widerøe faces under the air passenger tax:

We tried to pass this on to customers so that already high prices became even higher and then we saw that there was a large drop and the cabin factor, that's more empty seats … The market does simply not tolerate this. Then we chose to a larger degree to lower the ticket prices again, something that also affects the bottom line.
(Skram, Director Strategy & Infrastructure at Widerøe)

Skram's fellow airline industry representative Lothe agrees that Widerøe is heavily taxed and that they have a relatively high tax burden because they fly short distances. An empty seat tax would exacerbate this difference between airlines following different business models.

In contrast, Elnæs believes that airlines such as Norwegian and SAS will eventually be able to pass any tax adjustment on to consumers through the gradual and cautious adjustment of ticket prices. However, he believes that for low cost airlines, the story will play out differently, because the tax represents such a large part of the average ticket price for a short domestic flight versus, for example, an intercontinental one. Going back to the literature, Lu (2009) concluded that the percentage loss in demand for flights in response to environmental taxation on aviation would be greater for low-cost carriers, for both business and leisure travelers.

In general, the interviewees agreed that network carriers, who have higher supply-side costs, would take a much larger hit as a result of a tax on empty seats compared to low-cost carriers. Pedersen said that due to differences in average load factors, a tax on empty seats would necessitate an increase in SAS' ticket prices, so that SAS can continue to provide the product they offer today. Andersen, an Associate Professor at the Department of Strategy and Entrepreneurship at BI, agreed, saying:

It will be a boon for people like Ryanair or Norwegian. Mostly Ryanair and Wizzair, I think, because they are good at having high load factors. It would be a problem for SAS, which is much more of a network airline. A network airline needs to maintain a certain capacity in their whole network, their whole infrastructure, in order to provide necessary flexibility.
(Andersen, Associate Professor - Department of Strategy and Entrepreneurship –BI)

The fact that an empty seat tax would hit SAS harder than Norwegian is a returning point in all of the interviews. The effects on Widerøe are more ambiguous, as much would depend on the change in percentage of PSO routes they fly. Andersen also stated that an unintended side effect of an empty seat tax could potentially be experimentation on the pricing side to try to fill up planes, since airlines have a very un-differentiable product and high fixed costs.

Like I said, the competition is heartless.
(Andersen, Associate Professor - Department of Strategy and Entrepreneurship –BI)

Overall, an empty seat tax would be better for carriers like Norwegian who have high load factors than for airlines like SAS and, possibly, Widerøe.

7.2.3 Environmental effects

To use a quote from Espen Andersen, "I'm not sure there is any sort of environmental taxation at all in the Norwegian airline industry," a sentiment which was echoed by all but one of the interviewees. The consensus was that the 2016 imposition of the air passenger tax in Norway does not have any significant environmental effects. This is in part because the amount charged is too low to have any effect on demand were it to be reflected in ticket prices, and in part because the competitive environment makes the charge hard to pass on to consumers, so it is essentially hidden from them and absorbed by airlines.

In contrast to the other six interviewees, Thune-Larsen said that today's air passenger tax does have an environmental effect and in order for an empty seat tax to achieve the same emissions reductions, it would have to be double the amount to achieve the same overall effect. As a reminder, the current tax is 83 NOK per passenger. He also argues that a tax on empty seats would work much more efficiently than the current tax in terms of cutting out routes that are not profitable. Thus, an option would be to levy a similar amount as today on empty seats, even though the proceeds raised for the government would be lower. His research colleague Andersen also the idea of simply switching the current air passenger tax to apply to empty seats instead of passengers.

In summary, some of the interviewees were clear in their opinion that current taxation schemes are excessive and that the need for tax on emissions itself are well handled by the EU ETS. A tax on empty seats would have little if any positive impact on the environment according to the interviewees. However, to go back to abatement theory, it does not seem that the emissions are at a socially optimal level, as those interviewees who discussed the quota system all agreed that the quotas are priced too low. This could however change over time as the number of allowable quotas decreases. The possibility of trading these quotas will help to encourage the optimal outcome of the socially optimal level of abatement.

No other respondent was willing to venture a guess on a specific, concrete numerical range for the empty seat tax which in itself reflects the idea that such a tax could be unsustainable for the industry to bear. Espen Andersen colorfully noted that "as long as Norwegians are so stinking rich as we are," such a tax is highly unlikely to have an effect on demand. The general consensus was that Norwegians have too much disposable income and too high a desire to travel by air for any such tax to have a real environmental effect while still allowing for the aviation industry to prosper.

All seven of the interviewees shared the opinion that an empty seat tax would have little, if any, positive impact on the environment through reduced emissions. Pedersen says that no matter how one "twists and turns it, there will be a small positive, but it's only (an) incremental, on the margin positive effect". Airlines would increase their efficiency in that less planes would be flying with more passengers, but more heavily loaded aircraft need to burn a more fuel due to added weight from passengers and their luggage. A tax on empty seats would force Widerøe among other airlines to consider cutting down on route frequency. This would have an environmental effect, but to the disadvantage of passengers reliant on regional routes. Pedersen would rather call an empty seat tax an efficiency tax than an environmental tax, since he really cannot see what such a tax would do for the environment. The following quotation from Lian sums up all of the interviewees' thoughts on this subject:

No, it will maybe have a weak effect because I believe that I could happen that some frequencies are reduced. But this is totally dependent on what the companies do.
(Lian, Senior Advisor for Strategy and Development at Avinor)

Lothe argues that an empty seat tax would not have any effect whatsoever, because Norwegian aviation is already are a part of the EU quota system and that it would therefore not have any real meaning beyond symbolic value. Because the quota system is based on emissions trading, any reduction in emissions from the Norwegian aviation sector would be compensated for by more allowable emissions from some other European industry. However, some of the other respondents also felt that the EU quota price was too low, and served as more of symbolic politics than a well-functioning climate initiative. The only respondent who was fully in favor of abolishing national aviation taxes in favor of relying fully on the gradual emissions decreases implicit in the quota system was, unsurprisingly, an airline representative.

Additionally, Lothe holds that the empty seat tax would only contribute to the current explosive development on international flights, which of course have more emissions than shorter flights, which would have a relatively higher tax burden.

Espen Andersen mentioned that an empty seat tax could be counterproductive in terms of emissions as it may "lead to more spurious travel" in the form of people driving to the airport and waiting around to see if any cheap seats were auctioned off at the last minute by airlines attempting to bypass paying a tax on empty seats. This ties back into the microeconomic model of the empty seat tax as presented in Section 4.1 – the empty seat tax essentially functions as a subsidy on filled seats.

Elnæs argues that the first thing that would happen as a result of a tax on empty seats would be that routes on which medium sized aircraft are used, such as the Boeing 737 that SAS and Norwegian use domestically on routes with low load factors, would be switched out with smaller aircraft. This would in turn affect route quality and routes would eventually be scaled down. This would cause a reduction in emissions.

These flights will fly just as much, but in other places, with just the same emissions, the same air, just not in Norway.
(Elnæs, owner and founder of WinAir)

What Elnæs means with this statement is that an empty seat tax could cause airlines to flee Norway, as seen in Ryanair's response to the introduction of the air passenger tax. This would cause less flights and emissions in Norway, but these flights and emissions will just be moved elsewhere and still contribute to overall global emissions.

7.2.4 Effects on airlines in the short/long-run

The interviewees' predictions on short and long run effects regarding price strategy, route structures and fleet planning as a result of an empty seat tax varied more than their predictions on changes in emissions levels and financial impacts. Lothe said that this tax would not have a very big effect on airline operations. Andersen is also unsure of the effects, but indicates that it might have an effect in the long term. He said but that a tax on empty seats "sounds like an

experiment" and that airlines would therefore wait some time to see what happens with it before making major decisions. He does not think that this tax would have a direct effect on an airline's fleet planning:

You can't order a 100 million dollar plane, on some sort of tax experiment.
(Andersen, Associate Professor - Department of Strategy and Entrepreneurship –BI)

In terms of fleet planning, an empty seat tax would theoretically incentivize airlines, mainly those with lower load factors, to shift to flying airplanes that have less seats. However, introducing new aircraft as a result of this tax would be difficult, as aircraft manufacturers would not line up to build new planes simply as the result of one country's tax. There is relatively little that airlines can do in the short term to lower their emissions while maintaining current operations and upholding the same level of frequency on their routes, but in the long term when capital is variable, airlines can demand more and more fuel-efficient aircraft. However, this green trend is not influenced by taxation as much as it is by high jet fuel costs and an overall green shift in all sectors of the economy. Airlines want to minimize their operating costs to the greatest extent possible, but have no control over the oil price, which determines the price of jet fuel. Therefore, there is already a built-in financial incentive for airlines to invest in more modern, fuel-efficient aircraft, which would bring about lower operating costs in the long run. However, to use the classical economics definition, in the short term the level of capital is fixed. For our purposes, the short-term is taken to mean the time in which airlines must work with only the possibilities offered by their current fleet. Of course, leasing aircraft is an option in the short term, as are mergers and acquisitions. Instead, airlines would be more focused on their strategy, especially pricing strategy in response to an empty seat tax.

On the subject of pricing strategy, Pedersen questions if airlines would sell more tickets at a lower price to fill the last seats on the aircraft or if they actually would increase prices for some types of passengers in order for them to pay for the empty seats to have the flexibility they want. Lian stated that a potential long-term effect would be that airlines, to a greater extent than now, would have to discount some tickets in order to fill seats. The following quote illustrates his view on the long run price strategy:

There will always be an economic trade-off for companies to give away an additional discount compared to what it costs for the empty seat.
(Lian, Senior Advisor for Strategy and Development at Avinor)

In the long run, a tax on empty seats would maintain the pressure on airlines to offer ever-cheaper airline tickets, the interviewees agree that it would not significantly affect fleet planning.

7.2.5 Wider economic effects

Aviation taxes in general have economic implications to the wider society, on a whole country or region. The latter has been discussed throughout this thesis in terms of regional connectivity. The aviation industry is crucial to the health of the national economy in various ways. Several interviewees pointed out that introducing special taxes on Norway's aviation sector makes the country a less attractive place for foreign airlines to operate within. Additionally, aviation is of obvious importance to the tourism industry. Tourism is important to the Norwegian economy, supplying roughly 160,000 jobs and accounting for 4,2% of the country's mainland GDP in 2015 (Innovasjon Norge, 2016).

Consumer choice, also referred to as consumer freedom, can be conceptualized as a public good. Multiple interviewees mentioned that when airlines restrict supply, this amounts to "withhold(ing) this type of freedom from consumers" (Jacob Pedersen) or "restrict(ing) people's freedom to fly" (Han Jørgen Elnæs). This can be conceptualized as a shrinking of overall consumer and producer surplus.

7.3 Other Data

In following subchapter, the interview data collected that does not relate to the empty seat tax is presented and analyzed, including the interviewees' views on aviation taxes in general, alternatives to the current tax such as emissions- and distance-based taxes, new technology, and how these affect the aviation industry overall.

7.3.1 Environmental effects of aviation taxation

As a reminder, the current taxation scheme on aviation consists of the air passenger and CO2 taxes, among others, which come on top of national obligations to the EU quota system. Five of the seven interviewees, excluding the two government representatives, were negative towards the current taxation regime in Norway. The main reason for this opposition boiled down to the interviewees' perception of special aviation taxes constituting "triple taxation", meaning the CO2 tax plus the air passenger tax plus obligations to the EU quota system. The interviewees were especially critical of the air passenger tax, using descriptions such as "not well thought out", "a result of late night budget negotiations", "a political compromise because (the government) needed to raise another billion," and "symbolic politics," in relation to the environmental motivation behind it.

Lothe, the CEO of the Federation of Norwegian Aviation Industries, believes that the quota system, which will force a collective reduction in members' emissions by 43 percent by 2030 compared to 2005 levels, is the only way to achieve emissions reductions:

> *So the short answer is that this kind of extra taxation on, national taxation in Norway … it has little to do with real environment meaning collectively in Europe. It has a bit of local importance in Norway, but has no meaning when viewed as a part of the quota system's scope.*
>
> *(Lothe, CEO of NHO Luftfart)*

The two government representatives interviewed had slightly different points of view on the environmental effects of special taxation. Lian from Avinor recognized that there is "a balancing act" between emissions reductions goals and economic growth. He notes that there must be a political weighing of the consequences of aviation taxation, questioning how much one is willing "strike at their own country in the service of the environment," as Norway is so dependent on air travel. Thune-Larsen, a research economist at Transportøkonomisk Institutt, said that compared to other forms of transportation, he is unsure if aviation is actually heavily taxed. He says that he believes that cars, for example, are taxed significantly higher relative to their external costs than aviation is.

Andersen, a researcher and professor at BI, clearly wants aviation to be subject to meaningful environmental taxation, in contrast to the analysts and airline industry representatives. Andersen says that the taxes on air travel in Norway should be increased in order to have a greater environmental effect. In his opinion, the best and most efficient way to achieve this is to introduce a simple tax on fuel burned during flight.

7.3.2 Distance-based tax

The idea of an air passenger tax being based on distance was a returning point of conversation during the interviews and the most discussed tax alternative besides an empty seat tax. For a long-haul flight, the final ticket price paid by a consumer is generally higher than for shorter flights. A distance-based tax on aviation would therefore be relatively less impactful on the total price for longer flights, which are already relatively expensive.

In general, the interviewees supported distance-based taxation, sometimes referred to in our transcripts as "the Swedish model," over the current system. All of the interviewees said that a tax based on distance would be an objectively more efficient alternative to the current air passenger tax, as seen from an environmental point of view. Lothe raised the question of fairness, stating that a tax based on distance would for example favor Widerøe, which mainly operates short regional routes, compared to Norwegian which focuses more on longer, often international, routes. Lothe also argued that a distance based tax would introduce an environmental effect on intercontinental flights, as all flights exiting the European area are currently exempt from the EU emissions quota scheme.

Terje Skram, the director of Strategy & Infrastructure at Widerøe, presented to the authors' two different alternatives on how Widerøe would want to change the current air passenger tax into a distance-based tax. This model could also be used for other airlines. The first alternative builds upon different distance categories ranging from short-haul local flights to long-haul intercontinental flights, similar to the taxes found in other countries today such as Sweden and Germany. The other alternative is a tax based on the amount of offered seat kilometers. An offered seat kilometer is one airline seat flown one kilometer. How much one seat kilometer would be taxed would then be calculated of the basis of total yearly seat kilometers offered in and from Norway and on the required amount of revenue the government would need. Such a

model could decrease an airline's tax burden per passenger on a short flight, such as Hammerfest – Tromsø to 18 NOK instead of today's 83 NOK. On a longer flight, for example Bergen to Las Palmas, an airlines' tax burden per passenger would increase to 140 NOK. Skram also says that if a tax based on distance would be introduced tomorrow, Norwegian aviation, and especially Widerøe, would be better off than today, an argument supported by the other interviewees.

Even though a distance-based tax seemed to be the most popular and objectively, one of the fairer options, of the different taxes presented to the interviewees, it has its own drawbacks. A potential problem bought forward by both Lian and Thune-Larsen is that the aviation industry would be somewhat dependent on international agreements to achieve this. If Norway was the only country to introduce distance-based taxation, passengers might be encouraged to travel first to a nearby country in order to depart on an intercontinental flight from another place instead of Norway, which would actually lead to more emissions than a direct flight from Norway would have produced. In addition, as a general rule of thumb, international routes are longer and have more emissions than domestic routes, but since Norway is such a long and spread-out country, many domestic routes actually burn more fuel than popular, shorter international routes such as Oslo – Copenhagen or Stavanger – Amsterdam. The most commonly suggested model for distance-based taxation is a tiered system based on kilometers flown, but this could potentially have a negative effect on regional connectivity with regards to flights between southern and northern Norway.

Andersen argues that a distance-based tax is unnecessarily getting into very minute details. An aircraft consumes much more fuel during the climb phase than it does when cruising any distance, and fuel burn per kilometer is much lower on long-haul flights than on shorter flights. These are competing considerations that would have to be taken into mind in the design of a distance-based tax. Multiple interviewees felt that a distance-based tax alone would be inadequate in order to achieve lower emissions. Hans Jørgen Elnæs suggested a distance-based tax alongside some sort of bonus scheme, perhaps in the form of a tax rebate, to further incentivize airlines to fill up their planes, because "flights will fly anyways" and there are not significantly different emissions based on how fully the flight is loaded with passengers.

7.3.3 Emissions-based tax

The authors asked the interviewees for their views on differentiating a tax based on the actual greenhouse gas emissions produced by an aircraft in operation. The authors predicted that the main possible effects of such a tax could be airlines expediting their adoption of the newer and greener generation of aircraft hitting the market.

These findings partially overlap with the results found on the empty seat tax. Four of the interviewees argue that an emissions based tax would not be a practical solution, because airlines already have strong incentives to renew their fleets when taking into consideration fuel consumption. Andersen mentions that incentive is further strengthened when taking lower maintenance costs of newer aircraft into the equation.

Again, most of the interviewees also argue that when it comes to reducing overall emissions, airlines are already bound by the EU ETS, making a differentiated emission tax redundant - reduced emissions in Norway would mean that airlines in other parts of Europe can pollute more, because of the emissions trading mechanisms of the EU ETS. However, Lian agrees with the authors' prediction that an emissions based tax could lead to a tendency for airlines to push forward changes in their fleets. Lothe and Lian state that the main limiting factor on pure emissions-based taxes on the fuel burned, especially on international flights, are long-standing international agreements, namely the Chicago Convention, which prevents taxes on fuel burned on international travel. From an environmental standpoint, Thune-Larsen argues that the current fee could be dropped since it is solved in other ways, but the problem is that is has a fiscal effect that would need to be compensated for. On the other side, both Pedersen and Elnæs reacted positively to this type of tax, illustrated by the following quote from Elnæs:

I think this is a very reasonable idea, that those who have less emissions must come out of it better than those who have higher emissions
(Elnæs, owner and founder of WinAir)

Both Elnæs and Pedersen argue like the idea of a tax which differentiates based on emissions and states that it would be unfair that an airline operating a brand new aircraft would have to pay the same as an airline operating a 25-year-old aircraft which pollutes more. Aviation is a

capital-intensive industry and airplanes are long-term investments with long lifespans. Transitioning to a more environmentally friendly fleet is not an easy task for an airline due to the high capital costs involved with purchasing and maintaining newer aircraft, especially given that there is not a market for used airplanes that parallels the market for used cars, for example. Older airplanes are generally sold off for scrap parts instead of being refurbished and used for additional years, because newer airplanes are constantly becoming more and more fuel efficient. Therefore, even though Pedersen is positive to an emissions based tax, he also points out that encouraging airlines to change their fleets would be costly and time consuming.

An emissions-based tax would also create definite "winners and losers," meaning that airlines with different business models would be affected unevenly. Andersen shares this concern and notes that one of the main problems for legacy carriers in fleet renewal is a lack of financing for the newest and most fuel-efficient airplanes. Instead, Andersen favors simple taxation schemes like taxing fuel. He also points to the fact that CO2 and NOx emissions into the atmosphere are harder to measure than simple fuel burn.

7.3.4 New technology

Another recurring talking point was the interviewees' view on the potential of technological advances in aviation, in terms of growth for the industry and emissions reductions. Two long-term trends in green aviation discussed in multiple interviews were investing in biofuel as a larger part of the jet fuel mix and Norway's commitment to electric commercial aviation. In the long term, Avinor is investing in both biofuel and electric planes, and intends for domestic Norwegian aviation to be fully electric by 2040.

The authors explored the interviewees' opinions on whether paying aviation taxes would be more tolerable for airlines if the funds went towards climate mitigation efforts, through a fund for technological advances in aviation for example, than into the general government fund, as they do today. Pedersen states that it would possibly makes taxes more digestible for the industry, but no matter how much you twist and turn it, aviation taxes still negatively affect airlines. Four of the interviewees were positive to such measures, citing that the aviation industry is already considering a proposal for the CO2 tax currently placed on emissions today to be used to subsidize biofuel production, given that a sustainable solution for producing these

biofuels can be found. There are also discussions about doing the same with the proceeds from the current air passenger tax. Lothe mentions that in addition to the production of biofuel, the funds should also be used to stimulate the use of new, greener technology in commercial aviation. At the same time, Lothe says that most of the development is dependent on international progress and how the global industry sees other actors responding to opportunities for greener modernization.

Andersen holds a different view on earmarking proceeds from aviation taxes to fund biofuel. He argues that the current volume of biofuel in the jet fuel mix is almost negligible and that too much complexity is introduced by focusing on biofuel subsidization. Instead, Andersen argues for funds going directly into the government coffers.

Some of the interviewees are also positive towards researching and introducing electric aircraft. Skram believes that for Widerøe, it will be possible to fly electrically over short distances based on the current technological developments currently in progress. On the other side of the scale, we find Elnæs and Andersen. As both Andersen and Elnæs noted, electric planes will not be commercially viable for another few decades at least. This is partially due to the technology and infrastructure not being adequately developed as of now and partially because of the long and drawn out process of certifying aircraft for commercial use in civil aviation. Electric planes cannot be compared to electric cars in this respect. Electric planes would necessitate wider reforms in terms of revamped infrastructure systems at airports. Fully electric domestic aviation would mean that all Norwegian airports would have the capacity to recharge aircraft before departures. Of course, if electric aircraft were used on international routes, various international standards on electrifying infrastructure would need to be agreed upon. Elnæs also cites Norway's at times challenging operating conditions as a reason to why Norway might not be the best location regarding the introduction of such technology. Although positive towards the idea of electrical aircraft, Thune-Larsen finds it hard to believe that electrical aircraft will be profitable from an environmental perspective.

7.4 Critical Evaluation of Methods

Qualitative research in general has a potential for bias. Several possible drawbacks of our approach were considered by the authors during the research process. Firstly, the number of

respondents was small, although the authors could have potentially interviewed more candidates from a greater variety of organizations connected to the Norwegian aviation industry. The sample of interview candidates cannot be taken as representative of their respective groups, or even their respective organizations. The authors contacted a number of candidates who did not respond, or rejected, requests to be interviewed for this thesis.

Norwegians are the most well-traveled nationality in Europe in terms of total air passenger numbers (excluding the island nations of Iceland and Malta). As a group, Norwegians are extremely wealthy relative to the rest of the world, and even relative to Western Europe. A possible caveat to our analysis is that Norwegian data can therefore be seen as a sort of outlier in terms of comparing aviation data from other European Economic Area countries, or developed countries more generally.

Another drawback of our methodology is a reliance on first impressions to guide the process. Using pre-established categories of themes from the literature read as a basis for reading and analyzing the interview data risks a form of path dependency. However, breaking data down into more specific groups helped greatly in spotting patterns.

One negative of open-ended interviewing in general versus more rigid data collection formats is the lack of standardization amongst the interviews, which makes comparison difficult. This is a reason why the authors emphasized asking as many of the same questions from the interview guide as possible to each of the interview candidates.

The authors considered using qualitative research software in the analysis process, but reached organic conclusions without using it.

7.5 Personal Reflections

We will conclude the presentation and analysis of results chapter by offering our personal reflections on the implications of the results.

The authors are of the opinion that an aviation tax which is actually high enough to effectively discourage air travel would be detrimental to the aviation industry and Norwegian air connectivity. As Jacob Pedersen said, "I don't think it will hurt aviation – I'm confident that it will hurt aviation." Realistically, there will probably never be an aviation tax high enough to actually deter people who have the ability to pay higher ticket prices from flying. The authors are generally opposed to the current taxation system, which in our opinion hurts the Norwegian aviation industry and furthermore risks endangering the national economy in the long term. We hope that this research can potentially be useful to policymakers who have the opportunity to design a more ideal taxation regime.

All of the respondents agreed that the current aviation taxation system in Norway has very little, if any, environmental effect because the dampening effect on consumer demand for flights resulting from the air passenger tax is incidental at best. This is a direct contradiction to the stated goals of the government. Hans Jørgen Elnæs mentioned that the Norwegian government wants to have the transport sector, including aviation, boat, and ground transport, to make up 40% of a planned national reduction in overall annual emissions into the future.

An important implication of this thesis' research is that GHG emissions reduction policies should result in fuel cost increase in order to be most effective in terms of their stated environmental goals. Therefore, the authors are of the opinion that the simplest and most efficient aviation taxes that could be imposed are those which directly increase the effective jet fuel cost paid by airlines. To maintain profit margins in this case, airlines must increase their ticket prices, at least partially passing on the tax to consumers instead of absorbing it. All else equal, a higher price will dampen consumer demand and possibly lead to less flights flown. This is one way in which governments can partially internalize the externalities of the aviation industry. Of course, policymakers should consider the wider implications of air connectivity for the entire economy, and not just emissions reductions, when designing aviation taxes.

A final consideration is the more philosophical question of the fairness of special taxes on aviation. All of the interviewees referred to the concept of fairness, if not by name (using the words "fair" or "just"), then indirectly. The empty seat tax is considered to be unfair in that it would have different effects on different airlines, creating definite "winners" and "losers" based on different business models, versus the more even disruption caused by the current passenger tax. Of course, we have already discussed in depth how the current tax also has uneven

consequences. A distance-based tax was considered by the interviewees to be more fair than these, but the authors' share Espen Andersen's conviction that the most fair tax would be a simple tax on fuel burned while an airplane is flying.

Of all the taxation methods discussed both before and after conducting our interviews, in the absence of international restrictions such as the Chicago convention, the authors hold that taxing fuel burned is the most rational solution in order to achieve emissions reductions. Taxing fuel is the simplest solution, and has the potential to be the most widely applicable. A root tax on fuel burned in commercial aviation instead of a more complicated taxation system would be a direct application of the polluter pays principle. Having a single price per common unit of fuel, and charging each airline that same unit price for each unit of fuel burned, is undeniably the simplest solution discussed in this thesis. It would also be fair in that it would not have uneven effects across different types of companies. It is also a more direct form of taxing than the current carbon tax, which involves a (relatively) more complicated calculation.

The authors would recommend for the revenues from this, or any other purportedly environmental tax, to go into a specialized climate fund instead of into the general budget, where it will not have as large or targeted an effect in abatement efforts. The revenues raised through environmental taxation of aviation can be used specifically for the good of the environment, for example through earmarking revenues for specific purposes, such the financing of research and development of biofuels. The revenues could be collected into a fund, for example a CO2 fund for the private sector of the type advocated for by the Norwegian Center for Transport Research (Hovi and Pinchasik, 2016). Revenues could be used to finance tax subsidies for energy efficiency improvements, or in a variety of other ways, as an alternative to the indiscriminate placement into a government's general fund, as is currently the case in Norway.

The authors began this research process with an interest in exploring the ramifications of a theoretical empty seat tax. We can sum up our findings by concluding that on balance, an empty seat tax would not be the overall best solution for Norway's aviation industry.

7.6 Current Affairs

This subchapter is a summary of recent news regarding the air passenger tax in Norway, as of June 2018. As stated in the introduction to this thesis, Parliament has been implored to study alternatives to the current air passenger tax. In the time leading up to the publication of the revised national budget on May 15, 2018, which would include news about whether or not the air passenger tax was to be changed, the debate regarding the current air passenger tax reared up again.

In April, government researchers from Avinor together with the Ministry of Transport and Communications published a study on possible changes to the air passenger tax. Their resulting recommendations would mainly benefit Widerøe and transfer the majority of the burden of the air passenger tax onto SAS and Norwegian. The proposals were to either exempt all aircraft under 20 tons or to change the tax to apply only to international departures. Representatives from both Norwegian and SAS were strongly critical of these proposed changes (Gjerstad, Skard, & Trumpy, 2018). Publicly, there was speculation that the Ministry of Finance was leaning towards implementing a version of the "Swedish model", meaning a distance-based aviation tax system, which caused great concerns from the CEO of the Oslo airport, Øyvind Hasaas. In a news article published on April 24, he made it clear that the airport would fight such a tax, mainly because the airport's largest passenger growth is on intercontinental flights (Trumpy, 2018). A large increase in taxes on intercontinental flights would potentially have significant effects on the development of these profitable routes.

Some of the interviewees predicted that changes to the current air passenger tax would be presented in the revised national budget, viewing a distance-based solution as the most likely outcome. However, on May 15, 2018 it became clear that no changes would be made to the current air passenger tax in the revised national budget. In light of the news, Ryanair has publicly reconfirmed its affirmation to not invest any more in Norway, where the airline still flies to despite the 2016 closure of its base at Rygge airport, or in Sweden, where the distance-based tax was officially introduced in April 2018. Instead, the company will focus its Scandinavian investments into Denmark in the future, as the Danish government has promised

not to impose special taxes on aviation. CEO Michael O'Leary commented the development by saying, "If you tax aviation, you punish growth." (Ripegutu, 2018).

If and when there will be any change to aviation taxes in Norway in the future remains to be seen.

Chapter 8: Conclusion

The primary objective of this thesis was to investigate the potential consequences of introducing an empty seat tax on commercial aviation in Norway. Before collecting any original data, the authors focused their efforts on reviewing past literature on aviation and environmental economics in addition to becoming well acquainted with the structure of the Norwegian aviation industry and its major players. Data was collected by conducting in-depth semi-structured interviews of seven candidates who are linked to the Norwegian aviation industry in various ways. Their responses were analyzed so that the authors could develop a well-rounded understanding of the probable effects that the introduction of an empty seat tax might have not only on airlines operating in Norway, but on the wider web of stakeholders involved.

During the course of the interviews, it became apparent that the empty seat tax idea was not just unpopular amongst the respondents, but overall as inefficient an option as the current flight passenger tax in that it would favor certain airlines above others and lack any discernible environmental effect. The authors came to the conclusion that other options would be more practical for the airlines and for the wider society. The secondary focal points in the interviews became discussion on a distance-based tax, possibly one that introduces zones based on kilometers flown, and on a root tax on fuel, which would be an environmentally effective and simple option. However, we must note once more that aviation taxes do not seem to have any discernible dampening effect on consumer demand for air travel on either domestic or international routes beginning in Norway, due to Norwegian consumers' relatively high disposable incomes and demand for leisure travel. The authors caution that aviation taxes in Norway are essentially financial penalties on airlines in practice, because airlines in this competitive market environment have recently been shown to absorb the majority of cost increases from aviation taxes instead of passing them on to consumers via significantly higher ticket prices. Policymakers should carefully consider this result when designing future taxes on the aviation industry, which is critical for domestic and international connectivity and the health of the wider economy.

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Appendix 1

Questions for Interview Guide

Initial questions:

- Background info on candidate: state official job title etc.
- Thank you for taking the time to meet with us, brief intro on us. etc.
- Is it okay to refer to you by name/position in our final document?
- Aviation is taxed for environmental reasons. Given this information, what is your opinion on taxing aviation given air travel's lesser degree of substitutability as a means of travel within Norway relative to, for example, mainland Europe?
    - (if they have a question, have a statement prepared on unique geography, non-substitutability of air travel in Norway vs for example a really well-functioning train system in much of mainland Europe)

Main Section:

- What immediately comes to your mind when we say flypassasjeravgift?
- How do you feel that the current tax is working (Optional depending on answer from previous question)? Good sides, bad sides
- Have you noticed any consequences (positive or negative) of the current passenger tax since its implementation on the aviation industry in Norway?
- Some people, including Norway's finance minister, have said it is basically just a fiscal tax although it is being marketed as an environmental tax. What are your thoughts on this?
- Have you heard about the idea of only taxing empty seats on aircraft?
    - Even if they have heard of it, read this short statement after initial reply:

In the next part of the interview, we are going to focus more closely on our research are, which relates to different taxation schemes on Norwegian aviation. For example, we are exploring the effect of a theoretical flight seat tax placed on empty seats and how this will affect Norwegian aviation. We are basing this and our other research questions on statements from industry leaders and also on the ongoing debate in Parliament on how today's flight passenger tax can be most effective

Questions to gather in-depth data

- What immediately comes to your mind after hearing this statement?
- How would an empty seat tax generally affect the airlines?
    - Would this have different effects on different airlines?
    - What if FOT-routes were to be exempt? (state subsidized flight routes)
- How would an empty seat tax generally affect other key stakeholders, for example airports and other businesses that rely on air travel?
    - Business travelers in general but also businesses linked to airlines' operations ex. Catering, handling agents etc.
    - Ripple effects
    - Consumer choice overall reduction?
- In your opinion, how would this impact climate efforts in Norway?

- What are your predictions for the short run effects?
    - Regarding Price Strategy
    - Regarding Fleet Planning
    - Regarding Route Structure
    - If not interviewing an industry professional, instead ask how they think the industry will respond in the short run.
- What are your predictions for the long-term effects?
    - Regarding Price Strategy
    - Regarding Fleet Planning
    - Regarding Route Structures
    - If not interviewing an industry professional, instead ask how they think the industry will respond in the long run.
- If interviewing some airline representative: How do changes in taxes affect your profit margins?
    - Ask more specific questions from here based on response ex. What portion of aviation taxes can be passed onto consumers?
- If the empty seat tax were to be implemented tomorrow, would the aviation industry be better or worse off than it is today?
- What would you say would be a sufficient/effective price per empty seat for such a tax in order for it to achieve its stated environmental purpose? (Ask for specific number or numerical range)
    - If airline representative: sufficient/effective price between different aircraft/different price for distance?
- What would be the largest concerns regarding such a tax?

In the nest part of the interview, we look closer at other taxation alternatives.

- Is it better for an aviation tax on passengers/empty seats to be distance-based, as in other countries, or a flat fee, as it is now?
    - Give example of Stavanger -> Bergen as opposed to Stavanger -> Bødø having the same passenger fee although there are obviously more emissions from a longer flight
- Given the development of increasingly more fuel- and emission-efficient airplanes, could the tax also be differentiated to "reward" airlines for flying more efficient aircraft? (gives companies an incentive to avoid excessive taxation by flying more fuel-efficient aircraft)
- If a tax based on distance were to be introduced tomorrow, would Norwegian aviation be better or worse off than it is today?
- Would airlines be more receptive towards an aviation tax in general if the revenues from it were to be earmarked for aviation related climate efforts instead of going into the general fund?

Ending the session:

- Given the need for a tax on aviation. How would you design an optimal aviation tax (ex. empty seats, one time fee for entire aircraft etc.)?
- As long as there is going to be an environmental tax on airplane seats, would you prefer it to be on occupied or on unoccupied seats?
- *If we need more time filler*: Do you think this will have an overall positive, negative, or neutral impact on:
    - The aviation industry

    - Climate
    - Society in general
- Would you like a copy of the thesis when it is done?

Appendix 2

Interview Transcripts

In chronological order:

Jon Inge Lian

Senior Advisor for Strategy and Development, Avinor

Notes:

- Interview conducted via Skype voice call on March 6, 2018.
- Language of interview was Norwegian, originally transcribed directly in Norwegian by Rasmus, translated into English by Kayla afterwards.
- Bolded text = Rasmus, regular text = Jon Inge Lian

Transcript:

…Based on your experience, does Norwegian aviation contribute significantly to climate emissions in relation to the Norwegian transport sector more generally?

That's an empirical question which you can figure out for yourselves. But aviation's climate emissions are five percent total of Norwegian emissions, of which 2.5% are international and 2.5% are domestic flights.

Right.

If that's a lot or not, that's…yes.

Aviation is taxed for environmental reasons, amongst others. In view of this information, what is your opinion about taxation of Norwegian aviation given fewer available substitutes for flights as modes of transportation in Norway versus mainland Europe?

Here is a bit of a balancing act. Firstly, aviation is a part of the EU quota system, and it is true that the tax treatment is correctly handled there when the EU reduces quotas by two percent annually according to a plan. And now it has gone faster than two percent because it has gone badly for the industry and some of the industry has been phased out from Europe over to Asia for example. And so the quota prices are so very low, you can say, while the result is that the EU's CO2 emissions are reduced. So aviation is part of that system and so it would be unnecessary to make further national measures. That's one side. But at the same time, I understand the patience because the quota prices are ridiculously low. It's like talking about 20 øre per liter of fuel or something, that's ridiculously little. At the same time, we are much more dependent on aviation than any other country, both domestically, but also because we are remote in Europe and a very open economy. So there must be a political weighing of how much one will strike at their own country in the service of the environment.

Yes.

I think one should be careful, yes.

Right. So in a way, it can be seen as unfair that we may have to…

Fairness is not a term I wish to use here.

Or when thinking of domestic trips, for example, one thing is abroad, to other countries, but because aviation is part of our way of getting around the country relative to France, for example, when they much can take train much more easily, so maybe inland ...

Yes, we are much more dependent on aviation, so therefore one has to think about it because it affects people and business. But I can understand, for example, the desire to have special taxes, for example, for a period until the quota price becomes high enough, because it will be high. As one only reduces allowances for emissions year by year, there will be a higher quota. And now the industry, it's said they are good and power producers are also good, because it is becoming more and more non-fossil power that is produced in Europe and so emissions are sharply reduced. And hence the quota prices are low.

What is the first thing you think when we say airline passenger fee? What words are there immediately coming to mind?

Nothing special, to be honest.

Some people would associate it with a punishment on traveling…

No, I would not say that, we don't use those sorts of terms as professionals. So it's just what it is. Ok.

How do you feel the current air passenger tax is working?

Just fine.

Have you notived any consequences of the current tax?

No. No, that's, it's the airlines that must pay this, and what I have heard and had contact with companies about is that they, to a certain extent, are able to push over some of the tax onto the passengers, but to a very small extent. So most of this tax actually becomes increased costs for airlines. I know that the Norwegian companies, SAS, Norwegian, and Widerøe, feel that they have a bit of a bigger burden than the foreign companies because they are also punished in their home market when they fly domestically. For outbound abroad flights, it's only on the wat out and not coming in this tax applies to.

Some people, including Norway's finance minister, have said that this was initially a fiscal tax even though it is marketed as an environmental tax. What are your thoughts about that?

Yes, that's probably correct, because it is a type of fee that comes up in the final budget debate in December just before the budget is in the box, but some will argue that it works for environmental reasons. So it's a bit of both, depending on which party you listen to.

Have you and the rest of the team at Avinor seen that there have been positive environmental effects since the tax was introduced or is it more if you use statistics in your own?

There is very little effect to track so far really. Traffic continues to grow.

So basically it was simply a way for the authorities to get more money in the first place.

Yes, that how it works now as there are no traffic effects to talk about.

Have you heard of the idea of taxing empty seats on board flights before?

It's been up in the debate, I think it's a bad idea.

Yes, because as you saw on the sheet we sent, this part of the interview will focus ...

I see you have talked a lot about it. I think it's a bad idea because the companies will always try to fill the seats. An empty seat is no point for them, so they will try to fill the seats with discounts, and they do so very to a very large extent. But there are some markets where there is an uneven directional balance where it is difficult to fill, and there are typically thin markets in Norway. I'm referring to what are called FOT routes, what the Ministry of Transport put out. There, it is often that someone will fly Lofoten to Bodø in the morning and home in the evening. The aircraft are located in Bodø and must fly empty and retrieve. So in all the thin markets where there is an uneven directional balance around the clock it is impossible to get very high cabin factor and such routes will be hit extra hard.

As stated, the purpose of this thesis is to see how an alternative flight seat fee on empty seats will affect the Norwegian aviation industry. We have seen a little beforehand that a number of business leaders and other stakeholders who have talked about this before. We were motivated by an ongoing debate in the parliament where they said they would like to investigate alternative ways one can redo it today. We were quite well aware of what thoughts you are having immediately after this. Registering bad idea.

And what the companies will do then, at their stations, they will cut departures, cut frequencies where there is little coating, knowing there is little coating because they try to discount and they try to trigger more traffic at those times of poor coating. But, they do not manage anyway because the market is not there, and then they will cut those departures. So there will be fewer frequencies and it will hit primarily thin markets. And it will also hit the markets where the public purchases airline services, i.e. FOT off of Widerøe, because there are many routes that are not commercial but have been purchased on a bid from the Ministry of Transport. And then the price of the Ministry of Transport must pay then goes up right away because they have to pay attention because there will be an additional fee on just these routes.

How will a tax on empty seats generally affect the airlines? Will it have different effects on different airlines, since Norwegian might have a higher cabin factor than SAS has? You mentioned Widerøe who runs regionally.

Norwegian doesn't have a higher cabin factor than SAS domestically, on comparable routes it's reversed because SAS has a bit of a better grip on the market. But Norwegian has a much higher long haul cabin factor, aka long distance flights. There, cabin factor is always high, it lies over 90%. This applies to all companies which are involved in intercontinental flights. They always discount significantly to get the seats filled up, and they always do it. But on

short flights there is often a lower occupancy, where the proportion of business is larger and where it is difficult to fill up with leisure traffic.

…And where there is a slight direction of balance. And then you will try to just customize that offer so that you serve the business traffic because it has a willingness to pay, or otherwise reduce frequency. On the routes we are talking about here, there are more short-distance routes than long-distance routes. So it will hit Norwegian domestic much more than international traffic, and short Europe routes much more than intercontinental routes.

Right. Were it possible for example to make exceptions. You talked a lot about it being a problem for regional routes.

Yes.

Especially FOT routes. Were it possible to make an exemption…

Everything is politically possible, everything is politically possible.

In order to, as there is an additional, as said, group of flights postponed, it is after all a service the state buys, so if an exception to this was made and looked at the more regular routes, those who were run purely commercially, would it be as catastrophic then?

Yes, on the thinner routes, they could lose their profitability so that you have to reduce the frequency so much that it is not a good deal. And maybe even more routes must be bought publicly because the offer is politically not accepted, because it's too bad. This can help to increase the size of the public purchase. So I think it's generally a bad solution and the airlines are struggling. It's something that they work the most with in their yield management operation, it's filling the seats. So they have such strong incentives basically to fill the seats that a small fee on empty seats will not contribute anything. Simply a bad idea and in addition, I think it's a point to invoice the passengers traveling.

That it will be automatic …

That you put it on the ticket and say that there is a passenger fee of 88 kroner. It has been put on by the authorities. Because it will be a thought for passengers that they see it being paid, but in empty seats there are no passengers who can be billed there, just to the company as such.

How would this type of tax affect climate efforts in Norway?

No, it will maybe have a weak effect because I believe that it could happen that some frequencies are reduced. But this is totally dependent on what the companies do.

Exactly.

I don’t think this would be introduced because I believe there will be strong resistance from the whole industry.

The predictions regarding short-term effects for this branch about price strategies, route planning, and route structures…

Of a tax on empty seats?

Yes.

First they will cut, can come to cut frequency on short routes with a lot of work traffic and a bad directional balance on the thinnest routes. That is first and foremost.

Regarding the long-term effect, how will it affect price, flight fleet planning, and route structure?

No, nothing special at all. Only thing will be that they will, to a greater extent, even more likely have to discount such that it will be cheaper to fly. To make it so important to fill, it depends on how high the fee is in relation to the fare then. There will always be an economic trade-off for companies to give away an additional discount compared to what it costs for the empty seat. If the empty seat costs a hundred kroner, then it's nice to give off an extra discount of ninety kroner, then you still earn ten kroner more than just letting it get lost. So it will be a pressure to sell still cheaper airline tickets. This applies to the price strategy and when it comes to fleet planning, I do not think this will be so crucial. On route structure, I think that frequencies on thin routes may be exposed. Yes.

For example, SAS has taken more use of these CRJ900 machines from Cityjet among other things, for example, to fly inland. They offer a little less capacity than the smallest 737s. Do you think we could see more of this kind of activity at the expense of bigger aircraft or would it not have much of an effect?

I do not know. It is always a disadvantage to have a large aircraft fleet with a lot of different models. It will not be Norwegian that runs efficiently. I do not think SAS will do that very much, but Widerøe has bought new machines now, Embraer, which has 114 seats of first version coming in. So it is possible that they will try to create a few more direct routes such as Bergen - Tromsø and Bergen - Bodø and, linked to weekend then, especially where there is a private market. At the same time they will have major problems getting a fill rate on such thin routes . So it's hard to say what the consequences will be. And if they are unable to fill then they have to pay a lot of fees.

How much of the fees do you think are passed on the consumers?

Between 0-50%.

0 and 50 percent. So, even though if it is a fee intended to hit consumers, the competition is simply so great that ...

There is hard competition between airlines so it's difficult to turn up prices.

Yes, then we feel that question number 18 is quite obvious. It would become worse for Norwegian aviation if it had been introduced tomorrow.

Yes, I certainly think it would be worse for the supply, for the transportation offer in the regions in a way or where there are thin markets.

What would you say is a sufficient, if this had been introduced for example, no way out, what would you say would be a sufficient / effective price per empty seat so that such a tax could achieve an environmental goal that ...

It's hard to say anything concrete about. So I can not answer that.

No. Question 20 can we jump over. Number 21. Would it be better if a flight tax on passengers or empty seats were based on distance traveled, as in other countries, or would it be best as it is today?

No, it is clear that distance is more correct if one is to choose environmental reasons, so it is better, and that is the logic of the other countries in many places. If it's an environmental motivation, it's important. The problem here, and especially for long international travelers who contribute a lot to emissions here… The problem here is that you are somewhat dependent on the fact that there was some international agreement on this. Because if only Norway introduces such things, people traveling to Copenhagen will also take long-distance routes, or travel to Amsterdam and take long-distance routes from there. Because several of these countries rely on transfer traffic to develop their hubs and they can get a big route network that the whole country and business and the people can enjoy. They are very careful, have started, have had such fees but then they have reversed it out of competition considerations. So they are very careful to introduce fees that the others don't introduce. So, a Danish airline strategy, we say should have competitive fees. So that means they will not do it as they reach the Swedes doing it more or less as everyone else does.

I read articles where the Netherlands and Denmark simply removed them because they experienced escape to other countries ...

It is also true that even though the idea of distance-based taxation itself is good, they become intercontinental routes. At least if you are going to the United States then the big circle goes… the shortest way it returns is across Norway, so if you fly from Copenhagen, you fly right back across Norway again and across Iceland and Greenland and back down to, wherever you go, Seattle, New York. Such a journey is associated with much higher CO2 emissions than a direct journey with Norwegian from Oslo to New York. If there is a consumer adaptation to an eventual a high distance fee in Norway, then it's a balancing one must make as a politician, both that it affects the Norwegian aviation industry especially where it is our home market but also that you get unintended effects that actually contribute to more emissions.

So such a charge should be applicable for all or no one to give a ...

Yes, in principle, maybe it should be, maybe the EU could. In such areas, international agreements and the EU as an overseas body are really very smart constructions.

Certainly, given the evolution of ever more fuel and emissions-efficient aircraft. Can the current fee, or an eventual empty seat fee, be differentiated to reward companies that use more efficient and environmentally friendly aircraft? I am thinking about Widerøe who gets these new E2, you have the A320 NEO, B737 MAX, all these and the

dreamliners versus the A340 machines that SAS uses. Do you think that could be something?

Airlines will always have the incentive to spend as little fuel as possible because it's a very high proportion of their costs, especially on the intercontinental routes. The fuel share is about thirty to fifty percent of operating costs. So they have the incentive to use energy efficient aircraft already, so it has to be traded off against capital costs and possibly reduced maintenance costs for new aircraft. So it's a calculation they do, of course they have a market effect also of new aircraft. But, yes, it may perhaps increase the tendency to change to newer aircraft, but that's something they're already doing right. So, both SAS and Norwegian and they, yes, so that's part of the picture too.

Yes, of course.

So, of course, it's not negative, but how much extra power it would have and how it would be done practically, yes it would probably be possible. One of the problems is that we have a CO2 tax on domestic aviation fuel, yes it went up now in connection with a dispute, increased to 1.28, I think. 1.28 per liter, but it only applies domestically because you can not introduce it abroad, there are some rules that come with an ICAO and Warsaw commission or something like that, I'm not entirely sure. But there are at least international agreements that prevent fuel, national fuel tax on international departure. So, therefore, it is only domestic while a seat or passenger fee you can make apply both at home and abroad. It does not violate any international conventions.

Right. Because you have a NOx fee on domestic flights.

Yes, it is much smaller.

Newer aircraft will emit both less CO2 and NOx so there is already an effect. However, you see that it could have, that is, an even greater the gap in what you have to pay depending on newer and older aircraft. Do you have any idea about how big it might have to be to give that little extra incentive? Obviously there are capital costs associated with it so it's not an easy decision, but how drastically...

You have to consider if it's going to be, let's say that there will be one, you'll simply have a fee for consumption. That's because consumption is a problem, because it's the fuel that is burnt and released, so it's best to charge the tax directly on the source, really, the actual fuel consumption. When you can not do it internationally, there must be such a second best solution, which is to take the passenger fee and travel distance for example. However, this usually becomes a small amount in relation to the actual fuel cost. So it will not have such a big effect.

So could an alternative be to dismiss an airline ticket fee and instead introduce much stiffer taxes on, for example, CO2 or NOx?

Yes, but the problem is that you can not do it on foreign flights. So, therefore, you choose the solution of putting it on the passengers.

There is quite a lot of resistance to charges in general. It is something we know from studying economics, but would the airlines be a little more receptive to this fee if the

revenues were earmarked for aviation-related climate measures in a way that the NOx fund for NHO operates today?

Yes, and there is an initiative from the airlines if you go on the pages of NHO Luftfart, so you'll see what's their point of view. Because they want the money from this seat fee ,and possibly the CO2 tax, to enter a fund that will stimulate the production of biofuels. Norwegian biofuels, which can give industrial incentives, such that someone dares to invest in a production facility that can use residual waste from the forest, for example, not the log, but the remains, peaks and branches, and so on, to make biofuels. So, that's something we're positive about if the fee goes to it. Because instead of a requirement for a percentage of interference, there has now come sales orders that they think will apply from 01.01.2019, I think, which have been accepted, but the problems are access to approved biofuels.

So then it is a little difficult order when it is not possible to obtain, so I understand these airlines, I think that incentives are better for getting Norwegian production. It is a better procedure.

And then they are willing to take the fees. But exactly what is their precise position is mentioned on the pages of NHO aviation.

We will look into it. Now we will move into the closing part of the interview. In order to be able to get some views and provide the basis for further research and so forth. Given the need for an aviation tax such as the airline fee, how would you have designed an optimal tax? What we are looking at is empty seats, you have the airline fee that goes on empty seats, so there are a number of ways you can do this.

I looked at that question there, a one-time fee on the whole plane. You know, many of the planes are leased and you can rent them with crews. You can rent in many ways, so a one-time fee would be a bit strange, because there will come Irish airplanes, registered in Ireland and used by the companies here. So a tax, a one-time fee, on the whole plane is not a good idea at all.

In the case of empty and full seats, in principle, all such charges should follow the actual source of pollution, i.e. fuel consumption or fuel sales. It would be the best way, because it follows proportionally to the heating effect it has as fuel is burned. However, we do not do this on international flights and international flights should also be subjected to the same regime, not only domestic, one has to look for other solutions.

And in the EU we have this quota system which is really a very good idea, because it's global emissions and it's not unique to aviation. One should simply reduce CO2 emissions globally and in Europe, right? And if the price of quotas gets high, you may get twisted between sectors. The really energy intensive industries or coal-fired power plants also have to pay relatively much. And if they do not have the ability to, then they will reduce their business and that's fine. While other sectors may not… the aviation that is so in demand will not decrease, but the total emissions will decrease as long as the number of allowable emission quotas is reduced steadily and year by year. And then the price will eventually reflect how expensive it is to emit something, because then you only have to pay more and more and more and more to get it the right to let go. The penalties are very high in the system there. If you release without paying then it's very high, it's a hundred euros per tonne of CO2 or something,

it's very high. So they have to buy quotas. It does not help to bypass it. And there a system for recording all sales and follow-up on European sectors, it's not possible to get around it.

The problem is then flights from Europe to third countries, to the United States and China, and they would not accept the regime that Europe could try to introduce. So now it's an initiative under the auspices of ICAO to come to some market-based solution on how to get a tax on CO2 emissions. It will take a long time because it requires international unity as well, and certainly very small levels of taxation. But for a second best solution, I see a passenger fee differentiated by distance as not so bad.

But one has to think about it and you have to see what the neighboring countries do so that you do not get adaptations that will actually lead to more CO2 emissions than if you have direct flights. Especially from Norway, because all the intercontinental routes cross north on the northern hemisphere over Norway so we travel first down to Europe so back across Norway again, right? And the same will happen with our fish exports as well. Then the salmon, if there are not so many intercontinental routes from Oslo, the salmon will be driven by car to Amsterdam or something like that, and then fly over Norway again.

So you get some side effects that are not good if not everyone is in on it. But in principle, it's not that stupid of a solution to differentiate after distance. But then you have to look at the level and the adjustments that are taking place in the market.

Yes. Do you have any thoughts about how you could differentiate? Could there be a separate rate inland, abroad, intercontinental etc.? Since Norway is an elongated country, would it become more expensive on northern Norway trips than southern Norway?

Yes, if there was a clean climate fee, it would have to be distance based regardless of where it is. You could differ in zones, or you could set strategic distances so that most northern Norwegian flights are not affected particularly. All that is possible when designing such fees in detail.

That one differentiates a little after distance, I think in principle is a good idea.

…irrelevant section removed…

Do you have any more questions for us?

No, I was perhaps very critical of that idea with empty seats.

I can see that many will think it may be a bit of a bad idea, but…

But it will not hit intercontinental. Intercontinental is the biggest problem because they also release a lot of the emissions in the nighttime and it's worse than the daytime. In the day the visible sunlight is reflected partially in the contrails, especially in the night where you prevent heat emissions, radiation from the earth . So, night flights are worse than day flights and it's the contrails especially. So what you're looking for here as an additional effect from aviation, then in addition to the actual big emissions, and they are big, intercontinental flights are generally flown at night.

That was a fact that we did not realize. So, in view of that, you think, now, transatlantic flights from the US go to Europe at night, given the time of arrival and supply, and it is quite complex. It's not just just to do it for daytime flights, but ...

No, no, the market is like that, and it's true to Africa that you're a ten-hour flight to Johannesburg, so you're happy to fly in the night.

However, it could be a bit unfair that night flights could be taxed slightly higher than day flights.

No, I'm just thinking, no, I'm only thinking in general that intercontinental is a very big problem here and the travels are getting longer and longer. So that's the challenge and that's where there are international challenges too. To be able to get international agreements, I think that's the most important, but also the hardest to get to.

Of course it is true given regulatory requirements and policies and everything… I've read that Avinor has looked at the possibilities for this with electric aircraft.

Yes, surprisingly enough, we are. I was a little skeptical when we started it, but the more you concretize it, the more it looks to be possible. And when the big aircraft manufacturers have so many engineers and battery manufacturers, so many engineers have been employed full time with such projects, so it must mean they see commercial opportunities. They do not waste money. They are indeed commercial actors. So both Boeing and Airbus are heavily involved in this. We have subsidiaries and collaborations with others too, so we believe this. We are going to have a conference for specially invited people now in March about this where there are people coming from airlines, I think too. There will certainly be a lot of press releases around it then and then there will also be a new Avinor main report about the market where we've seen a little more. Prerequisites for power, charging and infrastructure on the side there to get it and such concepts. What type of route, what kind of places could this work and what may be needed. All of this is dealt with in this report, which comes before Easter.

I was very skeptical, I have to say that at first. The CEO was very excited about it there. But the more you start to count on it and think about it and battery capacity and so on. These planes have other operative features and, because they are blowing, many of them have some concepts, like propellers in front of the wings, and then you get at lower speeds before you blow the air over the wings and get the lifting effect. Yes, they can land on shorter runways. There are many things that are favorable to Norway if this is possible.

Yes. Norway is quite big, per capita at least, for example on electric cars than Europe. Do you think that there will be a more special Norwegian phenomenon, or will it be more at a European level?

In the long run, there may be bigger aircraft as well. It's one way they think it's going. It is dependent on battery technology, the amount of performance per kilo you can do. But I think that there will be a pressure to reduce emissions and will this come in. But it's always hard to get started and we are a major airport operator with many airports. Great turnover, many passengers even though we are a small country. So, we can help to get started in collaboration if they are going to develop and. So that's what we hope – if we can be a little catalyst, then that's what we hope for. Then we'll see how much they really dare to bet. But that it is

possible is no longer in doubt. In addition, we have biofuel we are investing in. We are trying to get more production on it and, yes, and have cooperative agreements with industrial players and work all the time with it as well. Such initiatives are important to be able to continue to exist with the other conditions one has.

Just one very short concluding question. We had the flight passenger fee from 1978 to 2002. Then it was abolished. Do you think what exists today will exist for long or is this something which is going to be removed in the future?

No, I think it will exist for a while. When the Ministry of Finance has received some income, it is difficult to let it go again.

End of interview.

Jacob Pedersen

Head of Equity Research, Sydbank

Notes:

- Interview conducted via phone call on March 7, 2018.
- Language of interview was English, this is a direct transcription.
- J = Jacob Pedersen, K= Kayla Rupp, R= Rasmus Spanne

Transcript:

K: Okay, so first of all, just for the record could you please just state your official job title for us?

J: Head of Equity Research at Sydbank

K: Ok, great. And is it ok for us to refer to you by your name and your position in our final document?

J: Yeah, yeah it is.

K: Ok, great. So we are looking in our thesis at different ways of how the current air passenger tax could be enforced and part of our analysis is related to the greenhouse gas emissions of airplanes. To the best of your knowledge, does aviation contribute significantly to climate emissions compared to the transportation sector overall?

J: Yeah, it does, it does. It does massively if you look at the statistics on what it costs to transport a parcel for example by ship, by airplane, by land, airplanes are by far the worst in that regard when it comes to greenhouse gas emissions.

K: Aviation is taxed for environmental reasons. Give this, what is your opinion on taxing aviation given air travel's lesser degree of substitutability as a means of travel within Norway relative to for example Denmark, where you have a very well-functioning train system? In Norway, we don't really have the geography that allows for that.

J: You can say that it's much more difficult in Norway to not be traveling by airplane. So I think it's probably not as much an environmental tax in Norway because it's much more difficult for a lot of people not to pay this tax, just because the number of substitutes for flying is very limited in some parts of the country.

K: Right, ok. So now we're going to come to our main section of questions, those (the previous questions) were just for some background. So what immediately comes to your mind when we say air passenger tax?

J: Well, more cost and lower earnings among the airlines. Usually these taxes are not passed on to passengers because of the competitive environment. So instead of becoming a tax on the passengers it becomes a tax on the airline.

K: Ok, thank you. And how do you feel about how the current tax is working? What have you noticed about the current air passenger tax?

J: Yeah, it's 83 kroner or something per passenger. I think first of all that it's had almost the exact effect that I've just pointed to, that it has become more of a tax for the airlines than a tax on the passengers, because for competitive reasons. In a lot of destinations at least, this tax has not really increased prices that much. Of course, as I understand it, there are routes which are destinations which are exempt from the tax. I simply don't have the local knowledge of the Norwegian market to really say if that has the right effect, if it's been the right destinations that have been exempt from the tax. I haven't got that local knowledge, but what we can see from earnings numbers, what we can hear from airlines, a lot of this airline tax has been absorbed by the airlines and has not really increased ticket prices ___(incomprehensible).

R: We can read that you previously had an equivalent air passenger tax in Denmark. How did that overall work since they ended up abolishing it?

J: *Laughter*. I think that the Danish government found out that air traffic is actually quite important for Denmark, so it was not in the interest of the country to really tax airline passengers because it ended up being a tax on the airlines, and that will prohibit the airlines from really developing new routes and new destinations, and creating the network in and out of Denmark. So I think a the end of the day that that's why they really abolished it, because if you want the passenger tax to really change people's minds about traveling, and stop traveling by air, it's way too low. And I think any way, no matter how you twist and turn it, it will almost end up being the airlines paying this tax because the competitive environment means they will have to absorb it and the passengers will not really feel it.

K: Ok, so-

J: It's difficult, but also from a competitive point of view, if we're talking domestic Danish flights, you know we have the Danish rail being heavily subsidized by the government while on the other hand they're extra-taxing the airlines or the airlines passengers. So I think it's very difficult. At the end of the day I don't think that you can really impact people's wishes to travel by air by putting on a, now I say a minor tax of 100 kroner or so, I think it would be (need to be) a lot more to really impact people's wish to go by airplane.

R: Just looking into the future also, regarding when we're talking about Scandinavian taxes, Sweden is considering implementing a tax, although this one will be a distance-based one. Do you think that that will hurt Sweden's aviation sector and push especially people from Göteborg and Malmö, for example, over to Danish airports to travel, since it will become more expensive in Sweden?

J: Well, I don't think that it will hurt aviation. I'm confident that it will hurt aviation. *Laughter*. But it'll probably hurt the low cost carriers the most because if we take Ryanair for example, a passenger tax is felt more on a ticket for 200, 300 kroner than on a ticket for 700, 800, or maybe even 1000 kroner. So this would probably hurt the low-cost carriers the most when it comes to their expansion plans, but also we should remember that the likes of Ryanair and low cost carriers, well except Norwegian, have the earnings power to expand this. And some of the network carriers, they have a more difficult time doing that. So I think that was one part of the question, can you repeat the other part of the question?

R: Since Sweden is so close to Denmark, or part of it is close to Denmark, do you think that it will push Swedes over to Danish airports to travel from there, given that ticket prices may rise in Sweden as a consequence?

J: Yeah, it's a multitude of things I think. I don't think that Göteborg will really be impacted by this. I don't think that anymore wants to go by boat to go to Aalborg or, I don't know, it's a three (hour)…, it's quite a drive to get to Copenhagen. So I don't think that will be an issue for Göteborg. But for Malmö, definitely. I think it'll impact the airlines' wishes to start up new routes. It'll definitely do that. And also with a higher price, it'll probably make some passengers take the trip to Copenhagen. But it's difficult to say, you know, they have to pay to pass the Øresund Bridge, probably it's not that huge of an issue because the cost of passing the Øresund Bridge from Malmö to Copenhagen is higher than the tax.

K: Ok, so have you heard about the idea of only taxing empty seats on aircraft?

J: Only taxing…? Sorry, I didn't hear that.

K: Only taxing the empty seats on aircraft.

J: Empty seats?

R: Yes.

J: No, no I haven't really heard that. *Laughter***.** It's an efficiency tax, I don't think we've seen that in many other industries. Not like that at least. That will be a tax that plays right into the hands of the low cost carriers, so I'm not sure if that will be such a great idea if what you really want is a good network in and out of the country and not just the ___ (incomprehensible) flights that the network carriers are representing. But it's a way of inducing the airlines to get their planes so ___ (incomprehensible) good. But you know on the other hand if SAS, if the tax was big enough, so SAS will need to get a better cabin factor on their flights, they'll probably just, if they fly on the same destinations, 7 or 8 times a day then they'll probably just fly 5 or 6 times a day. I know at least here in Denmark that will really be a good solution if you really want a good network in and out of the country. So I can see some kind of logic behind that but also quite a bit of paradoxes.

K: Ok, so in the next part of the interview, we wanted to focus a bit closer on our research question, which is what is the effect of a theoretical empty seat tax on empty seats in the Norwegian airline industry? The purpose of our master thesis is to see how this alternative seat tax on empty seats will actually affect the industry. This is based on a lot of interest and an ongoing debate in Parliament today on how we can –

R: They're talking in Parliament on how we can change the tax as it is today. And also there has been some interest in, some people talking about, this specific idea. And also Bjørn Kjos actually had a quote one time: "put the tax on empty seats instead."

J: *Laughter*. Yeah, I imagine! He's not a network carrier, is he? He likes to fly when he likes to fly. SAS has to fly when the passengers want to fly. *Laughter*. That's very nice.

R: So you touched onto this subject on our next question, which would be how would this generally affect the airlines? You were talking about that Norwegian would most likely have a larger gain from this than SAS, but –

J: Yeah, the cabin factors in the companies, you know, low-cost airlines don't have high frequencies on their destinations whereas the network carriers, they have built a network on a lot of frequency and they're really fine masked (?) network, so network carriers generally have somewhat lower cabin factors than low-cost carriers. You know, if you choose to travel SAS, you do so because you want to be able to take the next flight home. In order to give this flexibility, especially to business passengers, you can't have as high cabin factors as some of the low cost carriers, so I think this would be a kind of tax that plays right into the hands of the low cost carriers. They have some benefits but I think in order to maintain a good network in and out of a country, and domestically in a country, I'm not so sure that the low-cost

carriers will be able to provide that. I think also, you know, SAS still exists even if the company does not have a very big intercontinental network - that is what really shields it from the low-cost carriers and has done for a lot of time… For the likes of British Airways…But still SAS manages to stay alive. How can the company stay alive? Well you know, Scandinavian cost is not very efficient, if you look at the competitor's costs, then all salaries are probably somewhat below SAS salaries for competitor's pilots and cabin crew walking in and out of the same gate. So why does SAS manage to stay alive? Well it does because it has a unique product. There's not a single low-cost airline that is able to provide that kind of network, that kind of frequency, that travel destination, around one-two-three hubs in the Nordic region. And I don't think that the politicians appreciate this enough if they impose a ___(audio breaks up here) seat tax.

R: Just quickly also, how do you think that this will affect other key stakeholders, for example airports and the businesses that rely on air travel? And also companies they work with like catering, handling agents? If it were to be introduced.

J: Well first of all if you look at travel agents, what will happen is that the tax itself will drive up costs among the airlines. So they would have to fill their planes even better, and that will probably drive down ticket prices a bit and it'll hurt airlines' income, I think, from what they think is the equilibrium of pricing today because prices will probably be lower to fill some of the blank seats. It'll make it lot more difficult for business travelers. If SAS fills more of their seats, there will be less flexibility on the single ticket and that will probably end up with – if SAS were to keep its business model as it is today, I think ticket prices would increase for the passengers wanting the flexibility. It's very difficult to say. I don't know how big the impact would be for airports, positive of course because it would mean fewer empty seats, so that would of course be a positive for the airports. The aircraft are already there, so you just have to fill them up better. It's not like I expect a lot of the aircraft to be grounded because of some empty seat tax.

K: And in your opinion how would this empty seat tax impact climate protection efforts in general?

J: You say environmental protection or…?

K: Yes.

J: Yeah, I think no matter how we twist or turn it, it will be a small positive, but it's only a incremental, it's on the margin, positive. If more passengers go on the airplanes it will be a bit more effective, but still you would get…I need to say this, if more passengers go on the airplane, they actually use a bit more jet fuel. It will only be incremental, but they will use a bit more. And it will get less tax for the government, so I would call it more of an efficiency tax because I don't really see what it does for the environment. I must say, if the airlines fill up their planes better, then they weigh more because there are more passengers, and that will

use more jet fuel. Of course it would make the company a bit more efficient but it will also bring down the tax income for the government. So you will have a bit more fuel burn and you will have no money paid in taxes, a bit more effective airline and probably for a network carrier probably not as impactful as it would have been earlier because you're playing into the hands of the low cost carriers. You will have diminished the position of the network carriers. So you'll probably make the network in and out of your country worse, you'll get more fuel burn, you'll get less tax so if that's a positive for the environment and the country then it's a go.

R: We touched on the pricing strategy earlier, you mentioned that some prices will go down to sort of try to fill up instead and some network carriers might actually increase prices to maintain flexibility. But what would you think the short and long term effects would be regarding route structure and fleet planning?

J: I think it's very difficult because Boeing and Airbus, they won't just make a new plane because Norway is introducing an empty seat tax. So there will still be the same aircraft types to choose from, but of course the airlines will need to be even more focused on their strategy. Would they want to sell more tickets at a lower price to fill the last seats on the plane, or would they actually have to increase seat price for some types of passengers in order for them to pay for the empty seats to have the flexibility that they want?

R: So you don't think –

J: I think long term if this tax is big enough, it'll eventually drive the network carriers out of business and leave the market to the low-cost carriers, with the benefits and setbacks that it will create for the market.

R: According to you, do you know approximately what percentage of the current taxes are passed on to the consumers?

K: Just a rough estimate.

J: Rough estimate, I would guess, and this is only a guess, between a third and half are probably passed on to consumers. I would guess that the rest is absorbed by the airlines. But you know, it's very difficult, there's not one rule of thumb, because it depends a lot on the competitive environment. If there's a steep competitive environment with a drag on demand and a lot of capacity coming into the market, it'll be almost 100% paid by the airlines. If we have an environment like the one we have today, with a lot of demand, good growth in the European region and the Scandinavian region, and we also have a situation where there is of course a lot of new airplanes coming into the fleet, but it's not like totally massive on a European scale, then they will probably be able to pass some of the tax on to the customers. But I don't think that it'll be big (a big portion of the tax). So I would say in normal

circumstances, probably around a third of taxes they'll be able to pass on to customers, and in a more benign environment, competitive-wise, it'll probably be around half.

R: But if an empty seat tax was to be introduced tomorrow, what would you say would be an efficient or effective price for such a tax to achieve an, for example, environmental purpose?

J: So, what kind of tax in kroner should they set on an empty seat?

K: In order for it to actually achieve its stated purpose of being an environmental tax.

J: I don't know. I won't take a guess on that. It's for the politicians to decide whether they want this to have an impact, or how they want this to have an impact. I don't have the calculation methodologies to really say anything quantitative in that regard, I'm sorry.

K: Do you think that it's better for an aviation tax, on either passengers or empty seats, to be distance-based, as it is in a lot of other countries? Or should it be a flat fee like it is now in Norway?

J: If you want to create a passenger tax, it makes sense to create this tax based on the distance. On the fuel burn. So it's like if you fly a long way then you'll have to pay more in tax but you should also remember that the fuel burn per kilometer is far less on the intercontinental flights than it is on the short-haul flights. Also I think that it's kind of a (that there should be) regulation and taxation on the type of aircraft, how fuel-efficient it is, because you pay the same tax when you step into a 25 year old aircraft as when you step into a fuel efficient, sort of a new, aircraft. I think it would not be very fair either. So I would say some kind of difference dependent on aircraft, dependent on flight weight. But I think it's difficult because you know, what's been done so far, I don't think that it's really had any impact. Of course it's had an impact on the government's budget, because you get some taxes. But it hasn't had the effect of really regulating passengers and making them fly less frequently.

K: Do you think that, realistically, there will ever be a tax big enough to actually deter people from flying when they don't have to?

J: Nope. I don't think so. It would be a surprise for me and of course it would be a huge setback for the industry, because it's like asking if you think that they will make fuel so costly that we won't drive our cars anymore. I think that it's very difficult now because flying on an airplane and seeing the world has become so normal that it would be very difficult to withhold this type of freedom from consumers by heavily taxing the airlines or the passengers.

R: You actually touched upon the next question in the previous one. Given the development of increasingly more fuel- and emissions efficient aircraft such as SAS' A340 contra Norwegian's Dreamliners and Neo's Airbus contra the older G20s other airlines are flying, could the tax be differentiated to reward airlines for flying more efficient aircraft? And would that have a positive effect?

J: Yeah, I think that would definitely should be one item in this calculation. But it's really difficult because when an airline buys an airplane, it will probably have an idea to have this airplane for 20 years or so. You know, a lot of aircraft are flying 25, 30 years and maybe even more. So it's extremely costly to make big changes in your fleet and it's also something that is only done over a long period of time. It's taken SAS fifteen years and a bit more even to streamline its fleet of airplanes. So it'll be a tax with some definite losers and some definite winners, and the losers will have a very difficult and time-consuming and very, very costly transition period in order for them to be on the winning team when it comes to taxation of the type of aircraft.

K: So in your opinion, do you think that airlines would be more receptive towards this tax if the proceeds were earmarked specifically towards aviation-related climate mitigation efforts?

J: I think that would definitely make it more digestible for the industry. But I think no matter how you twist and turn it, these types of taxes…I think the airlines feel that they are very specific on it only having a negative effect on them, and almost only on them. That is what we've seen historically.

R: Do you think airlines would eventually find a way to put, as you mentioned earlier, one-third to one-half of such an empty seat tax onto the consumers? Or would this be a tax more carried by the airline itself?

J: I think it'll be very difficult. I don't think there really is a way to pass on more, because the industry is just so competitive and you know when we search for an airline ticket, prices are almost all that we look at. So it is a really competitive industry with somewhat over capacity almost all of the time. It'd be extremely difficult to pass this on entirely to the consumers.

R: So even though most of the airlines fly with cabin factors above 50%, this would still be more damaging than taxing the number of people on board a plane?

J: Well, I don't know if it will be more damaging, but it would definitely hit different companies in different ways. As I said, a passenger tax would not have the same…you know, if the effect of an empty seat tax is that Norwegian will lower their prices, and SAS in order to maintain their business model will increase their prices, then of course it'll be more difficult for SAS to compete and for SAS to make money than it would for Norwegian. So I think that

we are creating some very different incentives for dealing with this tax that could lead to a lot of disruption of some of the carriers in the industry, whereas the passenger tax would create some disruption, even disruption, no matter what. No matter what type of carrier you are.

R: We only have a couple of minutes left, so now you get to play the part of the Finance Minister, and just play around with some thoughts. Our closing question is: given the need for a tax on aviation, how would you design an optimal aviation tax which would be most effective, both from the government and also airlines' point of view?

J: Yeah, well, I think it's difficult. I don't have a very good answer for that but I think that the empty seat tax would create some very different scenarios for different business models. I'm not sure that's what they really want. I think it's so difficult, because if they really want people to fly less, then they should increase the tax massively. But that will of course hurt the industry profoundly. If you only want money in your government's pocket, then it's a fine way they've done it so far. But they should've also borne in mind that the larger part of this burden is being carried by the airlines, and not by the passengers. I think it is extremely difficult to tax something that is so widespread and widely used as airplane traveling. I don't really have the good answer. Of course I think if you want to tax something efficiently, you have to tax on the amount of jet fuel used, you have to tax on…that would be length, that would be the type of aircraft, but that would be extremely bureaucratic. And very difficult, I would think. That would also be a positive for the environment, probably, but not a positive for the industry. It would be very difficult to deal with.

R: So the best thing that might be doable is that the government should just find a way to get the tax money from the consumer directly instead of having to go through an airline, which then makes airlines take a burden, in an ideal world?

J: Yeah, I think so but that's also difficult. Here in Denmark, when we talk about airline tax, it's also like we're taxing the rich now, we're taxing the guys that are out on business flights ten, fifteen times a year. So just putting an environmental tax on all consumers, I don't really think that is the way to go. Here in Denmark, we can't build a bridge and not have a fee for passing on it because it has to be the users that are paying for this (*laughter)*. Also I think that it would be very difficult politically, now we have an environmental tax to bring down, at least to pay for the airlines and their carbon emissions. But it's not only the consumers flying on the airplanes that will pay it, it's all consumers. I think that will be very difficult to sell, for the politicians.

R: Well, that's it for our questions. I think we're also basically right on time.

J: Yeah, it's perfect.

K: Thank you again for taking your time….. (irrelevant after this point)

End of interview.

Terje Skram

Director of Strategy and Infrastructure, Widerøe

Notes:

- Interview conducted via Skype voice call on March 12, 2018.
- Language of interview was Norwegian.
    - Interview first transcribed directly in Norwegian and later translated to English for analysis. Both done by Rasmus.
- R = Rasmus Spanne, K = Kayla Rupp, T = Terje Skram
- During the interview, an internal Widerøe presentation was shown to the interviewers (not publicly available). It is referred to as "personal communication" when used in the final document.

Transcript:

R: We can start with a few very quick initial questions. The first question is whether you can state your official job title just for the part of the recording.

T: Yes, I am the director in charge of strategy and infrastructure at Widerøe.

R: We can quickly mention, make an introduction about us. My name is Rasmus and beside me, I have.

K: Kayla, hi.

T: Hi.

R: She is American. So if she has any follow-up questions then they will be asked in English if it's okay.

T: Yes

R: Otherwise everything is in Norwegian. Is it okay that we refer to you with name and job title in the thesis?

T: Yes that is all right. This task will be publicly available or would it be classified as confidential?

R: Basically it will be a publicly available thesis. That it is published and publicly available yes.

T: Okay.

R: Or did you have something you wanted to share that was, what should I say, confidential?

T: Yes, something. So, I have a small presentation that deals with the air passenger tax. That is, I can show you ten pictures, maybe I should do it initially, and do the formal interview afterwards?

R: That is fine.

T: Very short, we have around 420 daily departures. That is how we are a relatively big player in Norway. We serve both tender routes, which are the green routes here, as well as serving commercial routes that are the red ones. When it comes to the tender routes, which are the green, the air passenger tax does not apply since it is compensated for through government grants but all the red routes are subject to the air passenger tax. Then we have a fleet of large, relatively small aircraft, where the largest is at 78 seats, in the domestic market, Widerøe has 48 percent of the departures, so we are bigger than SAS, bigger than Norwegian and almost as big as those two together in terms of number of departures while compared to seat production we are around 22 percent and 15 percent of the passengers. What's a little interesting to see is that after the air passenger tax came in, think it was in June 2016, Widerøe has reduced the number of departures each year, but if we look at SAS and Norwegian, they have to a larger degree maintained production and that's also an expression for that the air passenger tax is hitting the commercial regional routes with small aircraft hard. Here we see our route results in 2015 before the air passenger tax came, here we see our route results after the air passenger tax came. So now, we are losing money on very many regional routes.

It is also a true that our regional routes are so expensive to fly. Not necessarily because Widerøe is an operator or that, there is little competence but it is structural conditions. There are 73 percent higher fuel prices in the districts. On small planes, you allocate the costs to fewer seats so you get higher costs per seat. Each landing runs costs and we have a structure with many landings in the districts. We have to station airplanes and crew outside bases and it pushes costs instead of SAS and Norwegian having most employees based in Oslo, so they fly to and from Oslo right. Technological development is falling behind on small aircraft where no new aircraft are being produced for our type of operations, at least in the smallest airports with 800-meter runways, so we cannot produce new aircraft to operate such routes.
Then we have thought that, purely politically, that the air passenger tax should compensate some of the structural challenges so that does not come on top, because it's out in the districts you really pay high prices, initially due to structural conditions. But on the contrary, so purely politically, they have made it harder to operate commercial routes in the districts through the air passenger tax but also because the other types of fees they have increased after. I will not show all of these but the example here is that our fees have increased by 71 percent compared to 2012, so the government has also changed some of the start fees and such things that make us pay Avinor higher fees than we did before.

Then comes this with the passenger tax also we got this CO2 tax. Yes and then we have the history behind all these increases and now we pay 181 million in air passenger taxes. I mentioned earlier that on small planes we pay quite high charges overall then, at least to Avinor we pay 30 percent higher fees compared to a 737-800 per passenger. The effect of this is that there is an increase in international traffic, in domestic traffic there is almost no growth and that's because on international flights is almost subsidized, thus one avoids VAT, no CO2 fee and this air passenger tax, it applies only one way , i.e. from Norway, not to Norway. For example, we pay 80 times as high air passenger tax on Bodø - Stokmarknes as Oslo - New York per kilometer. Here we have a little about the air passenger tax. There they take 83 kroner Oslo - New York, the fee applies only from Norway. On these small short regional

routes we have, the total is 168 kroner round trip because you pay both ways and because you will have VAT as well.

Other countries have seen that this is unreasonable. So for example in Sweden, it will be 60 kroner on the short stretches, 400 kroner on the long ones. Similarly, there is also a high price in others, in several other countries, while Norway, they have added a fee that is equal regardless. So our suggestion it is that short stretches up to 320 km go down to 30 kroner, medium stretches to 65 kroner, 180 kroner and 240 kroner. Here the government would retain its fiscal fees or revenues of about 1.9 billion as they have today. This is how it would look in practice for short regional routes would then be better off but also national routes (riksruter) like Oslo – Kirkenes which is a fairly long stretch will also be a little better of, and it will be a bit more expensive for holiday destinations in Spain and Greece and a fairly more expensive if you are on long routes.

So that is the way we think that the air passenger tax should be changed. Then you will have a stronger environmental profile. Unnecessary journeys on holiday and leisure where more and more will travel ever longer, it contributes to higher emissions while at the same time all foreign travel only pay one way. So you can actually divide these or you can multiply this price by two to get a comparison. That is how we look at the air passenger tax. So the way it works now, means continued downsizing of regional routes. We will consider further route cuts in the future. This is a little introduction about how we view this.

R: Exciting. You are on to part of what we also thought about asking. We can do that as we get to the points. First and foremost, we just want to ask if it is okay that we record the interview to use in the analysis of the thesis afterwards.

T: Yes, and then the audio recording starts now or is it already started?

R: It already has, it started when the interview started, or when we start here but if you do not wish that what we talked about should be published, we will of course not include it.

T: I think what I've said now can withstand the public's eye.

R: Yes okay. So then we have your views as you showed just on that PowerPoint and that we might include in the analysis and discussion. We can start with our first question which is: Norwegian commercial aviation contributes to climate emissions. Therefore, aviation is amongst others taxed for environmental reasons. But in view of this information, what is your opinion about taxation of Norwegian aviation given fewer available substitutes for air travel as a means of transportation in Norway compared to, for example, mainland Europe?

T: Yes, you are on to that the importance of aviation in Norway is very strong because, yes, the substitutions are so and so (Norwegian saying). So if you are going from Finnmark to have a meeting in Oslo then suddenly there was no aviation then you would use Hurtigruten, car, or something else and it would take a few days. So aviation is of fundamental importance, and it also shown in the travel rate per capita in Norway, which is higher than in Europe because it is important.

In terms of emissions, there is triple taxation in Norway. In a way, the air passenger tax does have an environmental facility. At least that was what they said initially. Since then, they have moderated this to a fiscal tax but it was also intended to curb air traffic and have an environmental impact. But in Norway, we pay a CO2 tax and so we are already taxed in relation to the emissions we have. In addition, we have EU emission allowances, i.e. ETS that also taxes emissions and ETS should really be enough because that is the model the EU has joined which will lead emissions reductions of up to 40 percent. There aviation is a volunteer member. There we pay the fees. So we have a special Norwegian CO2 fee, we also have an air passenger tax and the fundamental here is that the Norwegian CO2 tax and air passenger tax, it has no environmental impact. We can reduce emissions here in Norway, but it only means that EU airlines can have higher emissions.

R: Because there are so many different fees in Norway. Would Widerøe say that Norwegian aviation is over taxed compared to what might be appropriate for maintaining a good offer/supply?

T: Yes, at least when it comes to the regional routes, the short stretches, then this air passenger tax hits hard. These are shorter routes per kilometer, so this charge is killing. I do not have a solid opinion about the framework conditions for SAS and Norwegian, but I only note that with the regional routes, a large proportion is not profitable and must be downsized. And we also know from before that ticket prices are highest in the districts. So it has become more expensive and poorer supply of routes. But I do not know if this was the intended purpose of introducing the air passenger tax was to affect the districts in particular.

R: In the next question we are just going to ask what descriptive words are the first you think about when we say air passenger tax?

T: Not thought out/not considered well (lite gjennomtenkt). Remember that the fee came a late night in the budget negotiations and they lacked any money into the treasury. The airline fee was introduced without any kind of analysis or study.

Just look at Sweden, they have spent one year studying and obtaining consultation and looking at socioeconomic findings and having a conscious approach. Here it was just a flat fee that was rolled out like lightning from clear skies. This is the sugar fee number two.

R: We have touched upon the next question and in that presentation you had how you think the current air passenger tax is working and regarding that, the summary was that it is making an impact and especially the regional routes are the hardest hit if it were so to understand?

T: Yes or, in other words, the districts in the form of primarily short routes and with small aircraft where the framework conditions to begin with were very difficult because it has been aggravated by the fact that Avinor has increased its starting fees significantly since 2012 and 2015. In addition, the market is a little more difficult out in the districts due to oil-related traffic that is now at a much lower level. So we started to struggle heavily before the air passenger tax came in June 2016, and it is the thing that tipped the scale that has led to a sharp increase in prices and the offer has deteriorated. We also note that on the main route network, i.e. where SAS and Norwegian are flying with large aircraft and longer stretches, the offer has not been reduced significantly, and it has not become much more expensive to travel.

R: That builds a little upon the next question we had that if you have noticed any consequences after the current fee was introduced. There I think, yes, we have received answers. It has increased, worsened profitability and as you said poorer framework conditions and reduced offerings that are main...

T: Yes, we cut our production by 3.4 percent in 2016. We cut our production by another 3.6 percent in 2017 and the first half of 2018, we have cut production by 4.2 percent. So it is a result of this new passenger fee while at the same time there have been challenging market conditions related to oil-related traffic.

R: Have you heard of the idea of just taxing empty seats on board instead?

T: Known with one of them, or, Norwegian has suggested a model where one to a larger degree favors airplanes that are full. It will only hit the districts to an even greater extent, because there are a lot of stops and you travel from major centers to the districts, let's say you start off early in Bodø at five o'clock in the morning to Lofoten and you pick up passengers going to Bodø which will connect or continue to Oslo.

And it is clear at five o'clock in the morning you will not get any traffic out to Lofoten so we have a lot of flights that have fewer passengers. We also have a challenge as we have many stops, so unoccupied seats might appear along the way so in a completely natural structural way, the district routes will have a lower cabin factor than you have from Oslo to New York or whatever it should be.

At the same time, it is the case that in particular international routes, it is on international routes that there has been considerable growth in recent years and on international flights, there is no VAT nor CO2 tax while the same time fuel prices are low when you fill up at Oslo compared to the districts.

So naturally, you can stimulate demand on international routes to a much greater extent than we can manage on the district routes with the framework conditions they have. Thus, it will be difficult to get a good load factor out in the districts, and if you change the fees to even greater extent to hit these type of flights then we stray off the right path. It is not empty seats that have emissions. I think that what's causing emissions into the environment are departures, how far you fly and how big the planes are.

And if you then on international routes have the framework conditions that allow you to sell cheap seats you manage to fill up the planes better and when you fill up the planes, you add new departures. So the result is also as you can see, explosive development on international flights and more and more choose to vacation in another continents and fly longer and more and there will be more emissions and if you go to the United States there is also no CO2 fee or ETS deal . So you do not pay for emissions when you fly to the United States.

R: We have divided the interview into slightly different parts. In the next part of the interview, we will focus a little closer on our research question and what we are looking at is what the effect on the Norwegian aviation industry would be if a theoretical air passenger tax was put on empty seats. The idea is to look at how an alternative air passenger tax on empty seats will affect the Norwegian aviation industry, but we will also look at other proposals. We will be going back to that in a part two and that will amongst others build a lot upon what you talked a lot about initially. Our research

question is based on statements from the business community. You mentioned one of them earlier and other stakeholders, in addition, we are motivated by an ongoing debate in the parliamentary council on how to change the air passenger tax that we have today.

T: Yes, until the parliament, let us see, the parliament asks the government to consider changing today's air passenger tax so that it receives an environmental profile, for example differentiating by the length of flight. If you, you have to set up the thesis the way you want, but I think it would be a much more exciting approach to look at the consequences of one, not this with empty seats because there are no emissions with empty seats but rather differentiated according to the length of the flight because that's what releases emissions into the environment.

So a model could be that you have an air passenger tax based on the offered seat kilometers, that is, when you weigh the number of seats and length of the flight. Offered seat kilometers, it is actually the number of seats multiplied by the number of kilometers you fly. Then a short trip with a small airplane that pollutes little will then have a small share of the air passenger tax while a larger aircraft flying far with many seats will get a higher fee.

So when you first fly far with a lot of seats, you will nevertheless have the incentive to fill the seats as best as possible, i.e. fly with the lowest number unoccupied seats. So, any airline does not want to fly with empty seats. So you do not need a new fee to stimulate not to fly with empty seats. Thus, an empty seat is a loss of passenger income.Just an example then. If you fly Stokmarknes - Bodø, that is 149 kilometers in flight distance or if you have to travel by car then, petrol or diesel, then you will spend 35 minutes by air or 5 hours and 45 minutes by car. The CO2 emissions will then amount to about 72 kilos per passenger from flying and with a gasoline car, it will be over 500 kg per passenger. This builds on 60 percent of the seats on the aircraft being sold and also 60 percent occupancy of a five-passenger car meaning three passengers in a car.

So, in a way this is, it is also district-friendly or environmentally friendly to fly with small planes, and alternatively you could travel by boat that has lots of emissions or by car that can also have lots emissions because you have to travel around big mountains and around large, long fjords that make it a long stretch to drive. Remember environmental profile, so to put it into a little perspective as well. Very many talk about emissions from airplanes when talking about environment. It is a bit like the big ugly wolf. Do you know how big is the CO2 emissions are in proportion to Norwegian emissions in domestically? How big is the share from air transport? What do you think?

R: Well we read in a report from Avinor that, of Norway's total CO2 emissions, domestic traffic was 2.5 per cent.

T: Yes, it is good that you are up to date. That puts it a bit in perspective then. It is relatively limited what these emissions are and has had a positive trend in the last two years. Then there have been fewer, less emissions on domestic traffic and we are a member of the EU quota system so in total we will contribute to a 40 percent reduction by 2030.

R: Yes, because we can only, you are the third person we are talking with regarding this and we have been told earlier that a fee on empty seats would not be the cleverest that could have been introduced.

T: Remember now that a seat, either if somebody is sitting there or not, a seat has no emissions. It is a flight that has emissions and the farther you fly the more the emissions. That is how it is.

R: So if we understand correctly, such a fee would ruin say almost the entire regional traffic then?

T: Well, ruined and ruined. An alternative could be that the state then, more routes will become unprofitable and must be diluted or shut down and the state may then buy more routes through the tender scheme. But it would be a bad use of taxpayers' money then. You would need more subsidies to buy district routes.

R: However, if it had been applied (the tax) outside of the FOT (PSO) routes, possibly if there had been a minimum limitation for such a tax, say aircraft flying with 50 seats or less was exempted from such a fee in order to maintain the route structure in Norway. Would things have been a bit different or would it still be in the same category?

T: No that would be, it would not be as bad in any way. However, we have a lot, many routes also with 78 seats and some of the challenge, it is that we serve thin stretches, that is, low passenger volume and thus we have very many departures where we have two or three departures a day and if one fee would encourage you to have as few empty seats as possible, so we had to consider. Should one cut the production to some degree to achieve and average higher load factor. But if you go down from two departures to one departure then the offer becomes so bad that it does not work. So let's say Oslo - Bergen where SAS and Norwegian have, I do not know how many departures there are, there are probably 25-30 daily departures and if they are going to have a better load factor then they can remove a departure or two. Still, that is a good offer but once you get to the thin traffic streams with fewer departures, it will be difficult to make structural changes which gives you a higher load factor just because the number of departures becomes critically low if you thin out more.

R: Can one ask, how is your profit margin affected by changes in taxes and how much of today's air passenger tax do you get back in the ticket price?

T: On public service obligation network as I mentioned, it has not become more expensive for passengers because the government takes bills through increased grants. So it is the taxpayers that take care of that. On the commercial routes, if you do not do anything about the ticket prices then it will have an affect right on the bottom line. We tried to pass this on to customers so that already high prices became even higher and then we saw that there was a large drop/disappearance and the cabin factor, that's, and more empty seats. So we had to make new reviews. This market does simply not tolerate this. Then we chose to a larger degree to lower the ticket prices again, something that also affects the bottom line, so we cut production like we talked about earlier and then you enter a bad circle and we cut production and it leads to weaker demand, worse offers that again can make it even a bit more worse. So, no, it is a serious situation we are in now.

R: Because we heard, we talked to Avinor amongst others and he said that the airlines or their calculations showed that the airlines on average managed to take 0 to 50 percent, depending on, back on the air passenger tax. So that means that 0 to 100

percent potentially becomes, had to be covered by the airlines. Is this a situation you recognize?

T: Yes, we recognize ourselves in that it is difficult to pass it on to the passengers because, yes, a bit like I mentioned earlier.

R: Yes, then in the next section we would like to look into other alternative suggestions for possible, how a possible air passenger tax could be. The first question was what your opinion about a tax on seats based on distance traveled as in other countries. There you really gave a pretty nice and detailed explanation or suggestions on how it could be designed without compromising government revenue.

T: Yes.

R: We can move on to the next. It is no secret that the development of ever more fuel and emissions-efficient aircraft has sharply increased. Could a flight tax have been used, can a flight tax also be differentiated to reward airlines to use more efficient and environmentally friendly aircraft? You have these E2's on the way now, among other things, which consumes much less than other competing aircraft do.

T: I think that regarding fuel consumption the airlines initially have strong incentive to renew the fleet because the fuel price in itself is so high and make up so much of the airlines' costs that it in itself provides an incentive to renew the aircraft fleet. Secondly, airlines have an incentive to renew the fleet because new aircraft have lower technical maintenance costs. On top of that, there is the CO2 fee we already have and this ETS fee we also have, so there are already well-functioning environmental taxes in place. At least ETS is well functioning. The CO2 tax does not work at all because it only affects domestic flights and if we reduce our domestic emissions, other European companies can emit more in Europe because of quota calculation, greater emission allowances that will then become available to others. So, this air passenger tax will also have an angle towards fuel, or renewal of fleet or such things, where we already have incentives in place, I think. Regardless, of the short field network (kortbanenettet, small community airports with 800 meter runways part of the PSO routes), we may want to buy new aircraft, but no one are selling them.

R: That is true. They are the only ones you got for the time being the Dash 100 series (Aircraft from bombardier).

T: Yes.

R: Regarding the Dash 8-100 aircraft, Avinor has recently mentioned that they will make an effort to invest in electric aircraft. What does Widerøe think about that?

T: We are very positive about that. We believe that on short distances, it will be possible in the future to fly electrically, either completely electric or a hybrid solution based on the technological development currently in progress with a number of aircraft manufacturers. So the airline producers themselves say that they think they can have solutions in place or new technology in place by the year 2030, and then it may take a little time to be installed and approved and such things. But it is the ultimate and best solution in the long run. And then suddenly there will be zero emissions while at the same time the environmental footprint on the ground would be very small. You can imagine adding new rail lines it would take a lot of

space and lots of noise along the rail lines while electric aircraft have low noise levels, no emissions and only a short runway at each end.

R: So all in all, summarized then. If a tax based on distance had been introduced tomorrow, then would Norwegian aviation have been better or worse than today, if you look at only domestic routes?

T: Definitely better than today. Also, just to illustrate it. So if you put 30 kroner on the shortest routes and 65 kroner on the rest of the domestic routes and elsewhere in Europe and increase a little on the longest routes in Europe and a little more on intercontinental flights then the state would retain its revenues. Norwegian aviation would be better off than today.

R: Do you have any opinion, or you know which numbers you are willing to go publically with. I expect you have done some calculations. But if the tax suggestion you submitted to us here had become the case tomorrow, how much would the profit or margins in Widerøe change?

T: Yes, we would still be weakened compared to what we had before the air passenger tax came and, as I mentioned for you, the framework conditions in relation to our type of operations are to begin with very difficult in 2015 and 2016. So still, this will be a significant disadvantage but I think that in relation to today's situation, it will be a big step in the right direction.

R: Exactly.

T: Just to add in. The model we propose here will also mean that foreign companies would take a larger proportion of the fiscal taxes into the Norwegian Treasury. The foreign companies are only flying to and from Norway and many of them are flying long routes so they will be carrying more of the fees instead of the fact that it is the Norwegian companies that are making the biggest contributions today.

R: It is a disadvantage as you say with increased taxes in the airlines. Research and development, however, require funding. Would the airlines be more receptive to the air passenger tax if their revenues were earmarked climate measures for example, instead of going right into the construction of, for example, a new highway or similar things?

T: Yes. It would then contribute to a greater extent to that air traffic in the longer term could be strengthened in relation to the environmental impact so it could be positive. For example, it could be used to prepare infrastructure in relation to electric aircraft as well. Yes, we see that it might be appropriate. But aviation already has proposals that the CO2 tax we currently have on emissions today should be environmentally oriented within aviation so that this charge could be used to subsidize biofuels that are initially very expensive and you will get a better development and more will use biofuels if the CO2 tax can then be used to subsidize biofuels given that one now finds a sustainable solution to biofuels.

We are a little aware of that. If not, it is not possible to do that properly, it is not with two lines under the answer (Norwegian saying) that biofuel is necessarily an environmentally friendly solution to CO2. But yes, aviation will probably be positive that the airline fee will be more oriented towards technology development and adds to reducing the environmental

impact of Norwegian aviation in the longer term. Whether it is realistic regarding the fact that the fiscal fee came to finance the state budget, it...

R: Yes, we really have just one a bit open, closing question. You will be allowed to play finance councils, or finance minister. Given the need for a tax on aviation. You will not be able to avoid it. How would you have designed an optimal aviation tax in Norway?

T: Yes, it is a bit like I have been through. I would distance base the air passenger tax on a par like many other countries have done. This will mean that those who fly the longest, the largest aircraft and the most passengers will pay more than they do today and it would mean that small aircraft on short distance flights in the districts that have low emissions in terms of alternative transport would come better out and make sure that one avoids the scheme in which the districts today carry a disproportionate share of the air passenger tax.

R: We had, as I said, think it was from 1978 to 2002, an air passenger tax in Norway were for a major part of the time period that it was only international routes that had an air passenger tax. Could it have been realistic to do in Norway? We touched upon this earlier that we live in a country full of mountains. Would it have been possible to get a tax only on foreign routes instead?

T: One thing is that it might be appropriate because the international routes already have extremely good framework conditions because they don't pay a CO2 fee and that they do not pay VAT and that they only pay half the air passenger tax compared to the domestic routes so that could be a suitable option. Another thing is if it is possible to achieve. The latter significantly because of EU rules, which means that there must be objective terms, that is, you may have a fee based on distance but that you are excluding an area within the EU, I'm a little uncertain about whether it is doable.

R: No, but I do not think we have that many questions left to ask. We can ask if you want a copy of the thesis when we finish in June?

T: Yes, I would like that very much.

R: I talked to someone a little earlier that you would like to look at it and if you could use it for your own purposes. If it potentially could be of interest in the long run, then we can, take a discussion when we get that far. But at least we will send that copy to you when it is finished, and then you can see what you think about it.

T: Yes. If you wish, please feel free to send us a draft before it is done and we will give you some input. It is up to you whether you want to include the input or not.

R: We shall consider and think about it and we have your email address. Is it you we should send it to then?

T: Yes.

R: But we say thank you for your time and useful input and all the PowerPoint presentations. It gave a lot of things to build the thesis on regarding the analysis and

discussions. Especially this with concrete figures on how the current situation has developed. It was very interesting to get an insight into.
T: Good. Just tell me if there is anything more that you want from us or if we can contribute in any way, then we would like to spend some time helping you.

R: Did you have a question Kayla or?

K: Hi. I was just wondering. How was this model developed, that you found the different distances can give the same income to the state? Was it some special program that was used or?

T: I understand. We have simulated this model our self based on traffic figures from Avinor, and so we have simulated how many are traveling far and short and arrived at these numbers. It will safeguard government revenue in a good way.

K: Okay

T: We have also made an alternative model based on the offered seat kilometers.

R: It was the one you talked about where there was the number of seats divided by distance.

T: Yes. Here we have simulated a little how it will look like if you instead look at the offered seat kilometers. I do not know if you are, if they are affiliated with seat kilometers as I mentioned earlier then.

R: ASK and RASK and CASK and like that.

T: Yes. ASK, available seat kilometer. So here we have just used a database and looked at how many offered seat kilometers the different companies have also we have split this between domestic and international routes. Then we have looked at how the fees can affect the different distances if you charge a fee of, it is that many cents per offered seat kilometer. So then one covers actual plane size and flight length and then they have different fees per passenger here.

R: Yes right. I see Bergen - Las Palmas with Norwegian, for example, it would end up at a 140 per person for example and, yes, do not know if you have any specific domestic routes to show. You talked a bit about but.

T: Well domestically, on the longest routes, we operate Bergen - Tromsø, there would some increase, but most of the routes today will not be 80 kroner plus VAT.

R: Would that, yes for a fee per pax (passenger) it is included VAT?

T: No, this is without VAT.

R: Okay.

T: Also assuming 70 percent load factor, you also see here what this fee will be. Then you come down to say Hammerfest - Tromsø then it would be reduced to 18 kroner. This could be

a model, alternative model that has an environmental effect and that makes the one who, the passenger who is flying far pays more than the one who flies short. Not quite unreasonable if you ask me.

R: Right. Thank you very much for this.

T: Yes.

R: As we said, should we have some more questions and we will contact you. We have your contact information.

So just get in touch and we would like to contribute. I wish you luck too, I look forward to either a draft report or a final report.

End of interview.

Hans Jørgen Elnæs

Founder and Owner, WinAir AS

Notes:

- Interview conducted via Skype voice call on March 12, 2018.
- Language of interview was Norwegian.
    - Transcription done by Kayla, direct translation of Norwegian to English.
- R = Rasmus Spanne, H = Hans Jørgen Elnæs

Transcript:

R: Our first question, just for the official record, is what is your job title?

H: I am the founder and owner of WinAir AS, which is a company that analyzes and advises the aviation industry.

R: We can introduce ourselves…(skipped transcribing this part) … Norwegian commercial aviation contributes to climate emissions. Therefore, Norwegian aviation is taxed for environmental reasons, among others. With this information in mind, what is your opinion on taxing of Norwegian aviation given fewer available substitutes for airplane travel as a mode of transportation in Norway, relative to, for example, continental Europe?

H: Norwegians are the people who travel the most in Europe, and have the most flight trips per year. And aviation is critical for the logistics of business development and industry in Norway. The taxes levied on aviation by the authorities – you have some with are specifically domestic, like the CO2 tax etc. The flight passenger tax which came out in 2016 was originally meant as an environmental tax to reduce travel volume. This limited the further growth of aviation in Norway, both domestically and internationally. Even though other countries in Europe have comparable taxes, the markets are different. There are larger markets (than Norway's) with a larger ability to take a price that defends this and the market is willing to pay a higher price including these fees. It is more limited in this respect in Norway. That's also one of the reasons for Ryanair closing the airport Rygge. Closing that base located there.

R: Which descriptive words are the first you think of when I say "flight passenger tax"?

H: *Laughter.* What are you really thinking of here, Rasmus?

R: We wanted to collect reactions of people, because people have different perspectives on the subject. I don't know if you have any associations to the question.

H: I have to say that I am very central in the fight against the flight passenger tax, because I worked at Ryanair's main office in Dublin (was the Sales & Marketing Manager for Nordic countries & Baltic states at Ryanair). The day that I got the information on the flight passenger tax in 2015, I was at a party…it was a bad day.

R: So there was not much champagne that day?

H: There was no champagne at the Ryanair office in Dublin. That I can promise you. It was the complete opposite, to tell the truth.

R: How do you feel that the current tax (flight passenger tax) is working?

H: The problem with this type of tax, Rasmus, is that…what is the actual instrument here? Is it so that we can have lower emissions on a global basis? When a plane flies in England, in Norway, in Germany, or in the Middle East, the location is not important, the emissions will happen regardless. So it doesn't actually have an effect except to put a restriction on airlines' opportunities to offer more routes and favorable prices for Norwegians. As a starting point, definitely that. It doesn't mean that airlines and I are against that one should be charged for the carbon footprint one leaves. But there are a variety of international conventions like the European Trading Scheme that, in a way, take care of this here. And then Norway comes with a special tax which will take care of Norwegian circumstances. This is very unfortunate.

R: Of course you know that this went especially hard for Rygge. But have you noticed any other consequences in addition to this after the current flight passenger tax was introduced?

H: Many consequences, Rasmus. I will answer in three parts, starting in Norway, going on to Europe, and then I will take up intercontinental traffic. Is that alright?

R: Yes.

H: In Norway, multiple companies have reduced traffic volume and overall flight numbers, and shut down routes which we can call secondary routes because this tax means that prices became too high, so people travel less.

R: When you say secondary routes, do you mean that-

H: Yes, secondary routes, primarily. If we look at the share of taxes of the overall price of a ticket price in Norway, it was high before the flight passenger tax came, but now it's even higher. And additionally, there is VAT (moms) which the airlines can recover but passengers must pay for that in the total price. So that brings about a reduced supply (of flight options). Airlines don't have the ability to handle this in their own internal accounting (put this better?) so it becomes passed on to their customers in one form or another, in the system here. When you look at, what the problem is…to increase flight frequency on secondary routes, as typified by Vestland, Ålesund, Kristiansund, Molde, Haugesund, and Kristiansand too, maybe some destinations in northen Norway also. There are restrictions on that. Especially for Widerøe, which has many small, short-distance routes, they were very unfortunate with this tax, this became a very large part of their ticket prices.

When you look at Europe, Norway is far to the north. This makes low-price companies primarily must account for a much longer time to fly up to Oslo, Kristiansand, Vestland, and other places relative to, for example, just Copenhagen. In addition to these special taxes on top, they have to take this into account and to a large degree, appraise investing in other markets that are closer to central Europe, where market size can be larger, and risk is lesser than flying up to Norway. Many people have the desire to travel to Norway for tourism, etc. but the uncertainty and competition means that one abstains from Norway (the Norwegian

market) to a larger degree. It seems also that new routes come primarily to Copenhagen, secondarily to Stockholm, and then to other places in Denmark, very few to Norway.

Looking at long distance routes, the picture is perhaps even more complicated because all airlines are fighting for the same passengers, as a starting point. If one wants to fly to the US, the Middle East, Australia, or other places, the market is limited. And this puts pressure on prices and makes us more, should I say…if we have more fiscal taxes and other complicated things which are put forward, which makes it, can I say, un-observable into the future, this puts limits on where airlines will then wish to fly. Now, they end up in markets where there are larger catchment areas, larger markets generally, like in Sweden, Denmark, and farther south in Europe.
The Chinese have started many new routes in 2018, and there will come to be many new routes in Europe in 2018, including Copenhagen and Stockholm - but not a single route to Norway despite the fact that Norway is becoming more popular in China, because there they sell Norway as a tourist destination to business partners. Not a single Chinese flight coming to Norway on regular route traffic. There are a lot of similar things going on here.

It is important to understand that the Norwegian market is a very small and spread out market. Eighty percent of the market is in the Østlandet region and the rest, the remaining twenty percent, is spread along the Oppland coast and further north. And that is something that the facilitators must think about and facilitate so that the airlines are given better framing conditions with more predictability than what they have today. There is therefore a large restriction on interest in the flight.

R: You touched upon this already, but some people, including Norway's finance minister, have said that the flight passenger tax is primarily a fiscal tax, even though it is heavily marketed as an environmental tax. What are your thoughts on this?

H: Actually, they aren't allowed to call it an environmental tax. They had a meeting with Siv Jensen in December 2015 regarding the flight passenger tax and…it is Parliament who ultimately decides, independent of what FRP and Siv Jensen think. They could not have called this tax an environmental tax but as a starting point, it is what they set out to achieve. They wanted to regulate Norwegian people's travel by plane to reduce overall annual emissions, which is available in the public record (regjerings handlingsplan)…a 30-40% reduction in NOX emissions in 2030, wasn't it that number?

R: Yes, that can be correct –

H: Not exclusively for the aviation industry, but on a general basis I understand that the transport sector shall make up 40% of this reduction. This means flight and ground transportation.

R: Have you heard of the idea of taxing empty seats on board a flight instead of occupied seats?

H: Yes, I have heard of it.

R: The rest of our inquiry will be sort of split in two. In the next part, we will focus closer upon the main research question, which is to see the effect of a theoretical empty seat tax on the aviation industry. The purpose is to see how an alternative flight seat tax

on empty seats will influence the aviation industry, but we will also touch upon other alternatives afterwards. This builds upon statements from the business world and other interests. I don't know what you are thinking immediately after having heard this?

H: As I understand it, this has been discussed in the industry and politically in Norway, about how one can, in a way, find the correct tools. So the question is should we reward the airlines who fill their planes and punish the airlines that do not fill up their planes? There are two relevant principles in commercial aviation. I'll take you shortly through this. I'll start with low price airlines. They have a doctrine that can be defined as "yield passive, load factor active". This means that it's not the price of a sold flight ticket that creates, as a starting point, the bottom line - that is flights which are maximally filled up. This means that they will operate with a load factor between 90-96% on average for low price airlines in Europe. Then you have the opposite, which is "yield active, load factor passive," a phrase which has referred to network airlines for a long time. SAS has been in the leading driver's seat here, average load factor, or cabin factor, for SAS lies under 70%. And in the past two months, January and February (2018), the load factor has been around 66-67%.

For comparison, the 280 airlines who are a part of the International Aviation Association IATA in 2017 had an average load factor of 81.4%. SAS and this kind of company will be a big loser in this type of system, because SAS has such high costs that they can't sell their tickets too cheaply. They try to maximize their unit incomes, which is primarily accomplished though their lucrative, good agreements with the business community, Eurobonus loyalty program, and such things. They are far, far behind with filling up their seats and they have been for many, many years. Do you have any comments on this?

R: No, we have talked a bit with others but that was the first I have heard the expression "yield passive/active" etc.

H: Yeah, there are two models: the low price model, which is income passive, cabin factor active. And the network companies have income active, cabin factor passive. The first is that when filling up the flight, you can then perhaps get passengers to buy many additional services, for example when you have a very low flight price. And today it is…as low price airlines see it, and what I work with, I have worked with these things in Dublin (at Ryanair), it is price which drives the market today. The volume of passengers which come abroad a flight are not business people on business trips. There are fewer leisure markets. They who are the larger wave in aviation today are independent of whatever place in the world or country you are in. That's where the larger markets are growing. They are dependent on you going out and traveling, your colleagues going out and traveling, so you look at the price, right, when you're going to London or Oslo or wherever? However, if you have a company card, you travel to the meeting regardless of what it costs. That's what SAS makes a living off of, while the other low price airlines fill up their planes, and get partial incomes, what we call ancillary, from additional services like booking a seat, taking baggage on board, buying food on board, and booking a hotel. So low price airlines are a good complement… if they get a bonus because they come to Norway with full flights, we might think about it. But it wouldn't be especially good for airlines like SAS.

R: No. Next question was… is how will this tax generally affect airlines? It is pretty clear that it will favor some airlines above others. If there were to be an exception made for example for FOT routes, would this have any negative effects on domestic travel? In the districts?

H: It's hard to… FOT routes are a bit of a special tool independent of what special exceptions are made. FOT routes, I don't know how familiar you are with this, Rasmus, but FOT routes are not especially known for having low flight prices. Completely the opposite. There are many restrictions on what an airline can do with their FOT routes because they are collaborations between the airline and interlining, that type of thing. I believe that… if you go a bit back, the flight passenger tax domestically, it will perhaps come to be revised in next year's budget, where they will differentiate between levels, maybe different levels of flight routes. Shorter routes will have lower level than regular domestic routes, which will be on a medium level. On FOT routes…it is difficult to exclude individual segments here, to say that these will not pay but those will pay, either to pay a lower amount or just to be removed. That is another model, which we will maybe come back to.

R: How do you think that a tax on empty seats will affect environmental efforts that they talk so much about? Would it have an effect, or -?

H: If you had a tax on empty seats, the first thing that would happen is that routes on which medium sized flights are used, like the Boeing 737 and Airbus 320, which are typically what SAS and Norwegian uses domestically… then on these secondary routes with too low cabin factors, these planes would be switched out with smaller machines (Bombardier CRJ 100), like the ones that SAS rents in. SAS rents in 30% of its capacity from other suppliers who always have smaller planes. It would soon affect route quality and etc., routes would eventually be scaled down, if this tax were to be implemented. Alternatively, you throw out low prices. This is a very bad idea and a stupid solution, to tax seats.

R: You were talking about price strategy, that either tickets would be "dumped" or that airlines would have to take really high prices to compensate. Flight route planning could be translated onto smaller planes. Route structure could see a cut in frequency.

H: There will be a worse supply, because there are many routes in Norway which are secondary routes…which maybe won't have full planes. And airlines don't have the cash to be taxed for such…in this way, no. So this is unfortunate. I know that you will come with suggestions for alternative ways to tax and assess fees, right?

R: Yes, we are coming to that soon. I just wondered first if you had any idea of how much of the current flight passenger tax are airlines able to recover back from customers? Or is it directly taken from their bottom lines?

H: There have been many opinions on this. It is a bit dependent on what kind of company it is, but for a company like Norwegian, I think they recover back this cost by adjusting prices, at a cautious tempo. They recover in this cost.

R: So you are saying that today, airlines are able to recover the majority of this cost back through ticket sales?

H: I think that there is a fair opportunity because I think that SAS declared that it would cost them 700 million kroners from their bottom line. I don't think that they've actually seen this happen. They have been able to adjust this without it being noticed, but for low price airlines the story plays out differently because the tax represents such a large part of an average ticket price. This ended up like what you said, at Rygge, where the average price became too high to

move the market from traveling via Gardermoen. Some had decided to travel in the first place because the price of a ticket was so low…this means that, if one will operate, one has to take on some of the cost themselves. Ryanair didn't have the opportunity to pass this cost on to the customer in the ticket, so it had to search for other markets in able to have the opportunity to realize a better return on its invested capital.

R: I was just in London myself, on a cheap ticket from Norwegian. There weren't many kroners leftover for Norwegian of the total price I paid after taxes and fees were taken out. It's a tough environment.

H: Yes, a very tough environment. You can see that for some companies which are very well-capitalized, like Ryanair, Easyjet, Wizzair, Eurowings… they sit in a better position than Norwegian does now. Norwegian is a very good company but they haven't yet gotten good control over…they haven't been able to build up the same capital base. This means that when they fight with their competitors, and in addition this type of fee trickles down in their system, like we have in Norway, England also has expensive fees, unfortunately, so it becomes small margins. And that is not so good.

R: We can quickly end this section of the interview with a little bit of a fun question. There is a lot of discussion around the fact that this kind of tax must have an additional environmental impact. What do you think is approximately an effective price on empty seats would be in order for it to achieve this stated environmental purpose?

H: I think that you come to get the environmental effect that one thinks one will get. If this kind of concept where you are charged for empty seats is introduced, airlines will flee from Norway, unfortunately. These flights will fly just as much, but in other places, with just the same emissions, the same air, just not in Norway. It doesn't matter for these emissions, whether they happen in Stavanger or in Oslo, it all goes in the big global system. So it doesn't have any meaning. There are other mechanisms that can be done here. Do you want me to discuss this or will we come back to it later?

R: I was thinking about the next part of the interview. Maybe one of the more realistic suggestions that is being debated now is…what is your opinion on a flight tax on seats based on flown distance, like in other countries?

H: You can say that my opinion on flight taxes is that I don't think they are the correct approach. Especially in marginal markets like Norway, where we are not so many people and it is as a starting point already expensive to fly. And it is geographically complicated and it is expensive in the winter, which makes operating to Norway very cost intensive. But if you look at it more neutrally, is it right that you pay more relative to the footprint that you leave on a flight from Oslo to New York, which has a bigger footprint than a flight from Oslo to London. So you have to account for that, but I say that it is better with differentiated taxes that cover the actual emissions, in a way. This involves a formula for taxes which is alike for all.

R: Given the development of continually more fuel- and emissions-efficient flights, you have 320 Neo, etc. can a tax be differentiated to reward an airline for increasing their will to make investments in these newer flights which emit less?

H: This is a good idea. I have discussed this with politicians. Companies which have lower…flights with jet motors or turbines which have lower emissions getting a reward for

this. I believe that when this tax and potential instruments were being discussed some years ago…there were individual airlines in the Scandinavian region, don't need to mention the names, that had a proportionately older aircraft fleet. They would be under very hard tension with this type of tax, while other companies which had ordered many new planes and had a very modern fleet, they would have had it good in this situation. The fact today is that many airlines have planes which are less than 6 years old, with more modern technology and lower emissions. These new planes which are coming out have even fewer emissions. They use less fuel, relatively. I think this is a very reasonable idea, that those who have less emissions must come out of it better than those who have higher emissions. This can chase away the companies and planes which have older turbines, and must use a lot of fuel, which means that they emit more CO2.

R: On the subject of fuel- and emissions-efficient planes, Avinor has taken a pretty offensive politic aimed at electric planes. Do you think that this is something to wager on or do you look at it as a kind of flash in the pan?

H: Avinor is wagering on two things, there are two tracks they're going on. One is, as you said, electric planes, and the other is biofuel. This means the use of more…blending in of more biofuel in the fuel that planes use. I'll discuss electric planes first. It is a long process of certifying new types of flight machines. It is one of the most complex certifications that exists. It will take time before this type of plane is approved for commercial use in civil aviation. On private flights, you can use your own choice of plane, this is here already. In Norway we have other challenges as well. For a start, these planes are pretty small already, they are under 20 seats. And you know in Norway, there is a lot of bad weather and challenging geographical, topographical special conditions. This affects, for example, flights on Widerøe's shorter flights with light aircraft and limited range and all of that. It is perhaps not the place where they should start. I think that electric flights and other electric modes of transportation will come in the next 20 years with turbulent changes. We live in a relatively tough, operatively-challenging environment and there is not room for solutions that aren't tailored for this. It will be a good amount of time before these electric planes will come. Avinor has said that by 2040, all domestic routes will be electric. That is in 20 years' time, and a lot will happen between now and then.

R: Just as a quick summary, I have a few more questions. You have the tax today, and there is discussion about tax based on distance flown. Would airlines in Norway have it better or worse if a distance based tax were to be introduced tomorrow?

H: What you are talking about now is…the authorities will take in 200 million kroner in flight passenger tax. And it is clear that for longer flights that go to Asia, the USA, the Middle East, from Norway, the total ticket price is considerably higher than in Europe. A tax will have a smaller effect in the total picture of price, do you understand what I'm saying? It is dependent on how high this tax will be, right? It is a bit of a complex picture. But we are sticking to taxes and not other Avinor things. I support a higher tax on longer routes, but I will also say that, like we talked about, for companies that have cleanest emissions and things, they should get a bonus. Because for example, that could trigger that (the incentive could trigger investments in lower emissions). You can also have a bonus if they manage to fill up their flights as much as possible - if there is, for example, an average cabin load factor of 85% or higher, so they could also get a bonus in relation to what they have paid. This would give airlines an incentive, not just a tax, if they are able to tailor their operations in such ways, to fly with the most full seats possible. Flights will fly anyways, right? It doesn't matter if there

are 180 or 250 passengers on board, there won't be different emissions from a flight from Oslo to Bangkok because of that. And…(reference to a picture)…you are very taken up with empty seats on flights, but flights will fly anyways.

R: I didn't get any pictures, unfortunately.

H: No, I am saying that you can see the dilemma here. That flights will fly if they have filled up 80% or if they have filled up 50%. Even if you have fewer passengers on board and a bit lower weight, the flight only uses marginally less fuel and has only marginally lower emissions. To punish half-empty flights, that's a very analog way of thinking. When you look entirely at, as you say…based on distance or if companies fill up planes. If companies feel that, in Norway if they actively try to have the newest planes, Qatar, and Turkish, and SAS, and Ryanair, so they must have ____ (audio breaks up here). If they can come off as very environmentally friendly, if one can use that phrase, in relation to other airlines, then they will be rewarded by Norwegian authorities. They would have a chance to get a bonus, a rebate, on what we see in 2018. This is something that companies would like better.

R: You also talked, in the messages we sent back and forth, about how there is a large possibility of changes coming. Unfortunately, the thesis must be delivered by June 15, and the new national budget won't come before the 15 of May. So there will be a bit of difficulty with including this, in regards to time. But do you have any opinions on what they will put forth, having spoken to politicians before about this?

H: Now, there are budget discussions every day. So there might be some leakage that you can pick up on. Maybe something interesting will come up that you can use. But what I think is that they are looking at a distance-based solution. And maybe two levels in Norway, where you will have maybe one level for the typical short flights and another level for all other flight routes domestically. Then you will have a level for flights to Europe, and another for intercontinental flights. This is an identical copy of the Swedish model, which starts on the first of April (2018). What won't change is that there will be 2 billion kroner in the state's account yearly from this.

R: We are coming to the end, so there is one more question. If you were allowed to act as the Finance Minister, given that the authorities have decided that there must be a tax on aviation, whether it be on emissions, on seats, everything is allowed as long as it is a tax, how would you design the optimal tax, given your background?

H: As a starting point, if I were the Finance Minister, I would split it a bit in two, Rasmus. I would have talked with my colleagues and looked at how we could expand the European Trading Scheme and the Corsia model to see how, on the whole, how could we affect the environment in a positive way with aviation. There is an optimal way to do this, because airlines do not want to pay for their carbon footprint, they are not interested in very many local instructions. As Finance Minister, from a Norwegian point of view, independent of EØS, Europe, and others, I would want Parliament to understand that aviation is crucial, that it creates jobs and gives a better economy in Norway, so we must take that into account when deciding what to do. If they aren't interested in understanding that, many will want to impose taxes like the ones we've talked about today, with distance-based being two levels in Norway and Europe and a long-distance component. I would make it very clear that we want to attract planes and airlines to Norway that have the newest, most environmentally friendly planes and lowest emissions type of motors. I would give a bonus to those which manage to deliver that

and punish those that use older planes with older turbines and emit more. I wouldn't be so happy to see, in Norwegian aviation, either when overflying or when landing at an airport operated by Avinor…so I would have gone more strongly out against it there, it would be a system split in two. Then one must find a cutover regarding this.

R: That's all we have to ask about…

End of interview.

Torbjørn Lothe

Administrative Director, NHO Luftfart (the Federation of Norwegian Aviation Industries)

Notes:

- Interview conducted via phone call on March 13, 2018.
- Language of interview was Norwegian.
    - Transcription done by Kayla, direct translation of Norwegian to English.
- R = Rasmus Spanne, T = Torbjørn Lothe

Transcript:

R: Good morning and thanks for wanting to talk to us…First of all, can you state your official job title?

T: Administrative director in NHO Luftfart (the Federation of Norwegian Aviation Industries).

R: Norwegian commercial aviation contributes to climate emissions. Therefore aviation is taxed for, among other reasons, environmental reasons. With this in mind, what is your opinion on taxation of Norwegian aviation given fewer substitutes available for flights as a mode of transportation in Norway, relative to for example, continental Europe?

T: It's a very open and complicated question. Because as a starting point, aviation from the year 2012 came into the EU's quota system. So aviation, like the energy sector, process industry, some other industries, became a part of the system which is regulated by the quota ceiling and buying of quotas at a market price. There have been some technical misfortunes connected to how aviation is being taken into the quota system. But essentially what this involves, that aviation is a part of the quota system, is that collective emissions from aviation and the other sectors must be reduced by circa 43% in relation to 2005 by 2030. Regardless of how this is accomplished, the total emissions of quota-bound areas must fall by 43% by 2030. If individual sectors aren't able to reduce their emissions, they must purchase quotas from other sectors to achieve an equivalent emissions reduction. So one achieves the emissions targets for these sectors that were set into place all over Europe, and one achieves them in a very cost-effective way, these reductions are achieved at the lowest cost possible. In a way, they are platforms…that aviation in Norway and in the rest of Europe is part of an international European quota system.

This means, in principle, that special regulations on the top of the quota system will undermine the quota system's effectiveness. You can surely read more about this in the Grønn skattekommisjon, among others…the report that was made by the Norwegian Environment Agency and other authorities about 3-4 years ago, called Klimakur2020. With this degree of special regulation on top of a quota system, it means that locally, one can perhaps reduce some activity, but the sum of the available quota is unchanged.

I will try to illustrate this in a populist way… you have a concern about people drinking too much at the office Christmas party. So you say "okay, we will pass out 1000 drink tickets and we will sell these at a good price for everyone at the company to use at the party." And at the next Christmas, there will be 50 less drink tickets, and 50 less at the next one. Maybe one of the managers wants to be a bit more clever than the others and he says that there should be a tax on the drink tickets, so that we drink even less. They will probably drink less in that office, but the problem is that if the drink tickets which aren't used remain available for the other employees, and there will be the same "emissions," the same drinking. Just the same. This is how it is with the quota system as well. If you want to drink more, it is smart to buy drink tickets from those who have the least need to use them. This is the most cost effective way.

What is smart about the quota system, Jens Stoltenberg has tried to explain this and get the political environment in on this…many say that a quota system doesn't work, this is totally wrong. The quota system works very well. (audio breaks up)…so the quota price is low. And the quota price affects incentives for technological adjustments. So if the quota price is low, incentives for new technological aren't as strong as they would have been otherwise. But the goal is achieved, and this is why the quota system works. It is the fundamental plan in relation to the aviation sector.

Strictly speaking, the Norwegian authorities should have said that "yes, we are in the quota system for aviation, so we shouldn't do anything else there. There isn't a need for any special regulation on top, there isn't a need for the CO2 tax, there isn't a need for the flight passenger tax, there isn't a need for any other taxes for the environment's sake." In a way, it's counterproductive. You can read more about this in the Klimamelding which was put forth in the summer and is being handled by Parliament now. In this document, the government is very clear that we must differentiate between quota-bound and non-quota-bound sectors. Then you meet your former self, look yourself in the mirror because…it is apparent that emissions are what is important. Despite that, practical politics collides with principles. For example, we have a CO2 tax on aviation. On my side, I work very hard for aviation in Norway under the EU's quota system, also before 2012. I work in relation with the government on this and what happened, we argued that the CO2 tax should be removed. Or alternatively that the CO2 must be adjusted downwards to approximately the equivalent proceeds as one would expect of the effects of the quota system to give. This was exactly what the government did, it was Erik Solheim who was the climate and environment minister at the time, he accepted this. At the time, I don't exactly remember the number, the CO2 tax was 60-70 øre per liter. And it was adjusted downwards to around 40 øre per liter. Later, the politicians in Norway forgot this. The CO2 tax now, in the budget for 2018, has increased to 1,28 kroner , it has almost tripled from 2012. In my eyes, this is purely symbolic politics. Fuel in Norway becomes a bit more expensive and in principle, this means that activity goes down in relation to what it would have been otherwise. The quotas that we don't end up using in Norway, they go to other actors down in Europe for, in principle, a bit of a lower price and the collective emissions under the quota ceiling are exactly the same. So it has absolutely no effect on the collective emissions of Europe. It has a minor effect on the collective emissions of Norway, but it is purely symbolic, and this is what the politicians are chasing when they argue that we should fly less, than it isn't sustainable, that we can travel by train instead, etc.

So there is a problem with a CO2 tax on top of a quota system, and then we get the infamous flight passenger tax of 80 kroner in 2016. Now, it has increased to 83 kroner and

then VAT is added, so in practice it is over 90 kroner. But politicians have been ambiguous on this, because they say there is a good environmental motivation behind this kind of tax, but those who actually understand know that it is a fiscal tax, it is not an environmental tax. In principle, this has exactly the same…it doesn't have any environmental benefits or climate benefits, but of course gives money in the state's treasury for the authorities. So there is not a double, but a triple measure in use, and on top of it all, Parliament has decided that from 2019, a so-called "omsetningskrav" will be introduced on biofuel, at 1%. And there is no functioning market for biofuel today, and price differences between biofuel and fossil fuel are very high. There is a 10-15 kroner difference (per liter). This means more costs, dependent on all the fuel that is filled. This is only applicable domestically…this will be about 60-120 million kroners per year, just with this 1% omsetningskrav. This is in principle a kind of environmental regulation, special regulation, that comes on top of the quota system.

So the short answer is that this kind of extra taxation on, national taxation in Norway…it has little to do with real environmental meaning collectively in Europe. It has a bit of local importance in Norway, but has no meaning when viewed as a part of the quota system's scope. So I recommend you to check out especially the Grønn skattekommisjon's statements on this, and also Klimakur 2020, and also the latest Klimamelding is clear on this principle even though they skip over the issue of special taxes on top and that the consequences of this are not positive.

R: We will look into that more. Just a few questions we are using for comparative purposes. What descriptive words are the first you think of when I say flight passenger tax?

T: Symbolic politics, in relation to the environmental motivation. Also there's a feeling that it's a "5 to 12:00" (last minute/rushed) decision, something that came in the last round of budget discussions. Very little examination of the consequences.

R: You touched on this in the start, but just generally to sum it up, how do you feel that the current flight passenger tax is working? And what possible consequences has NHO Luftfart noticed from it?

T: It is a difficult question. I can send over our recommendations made to the tax directorate. You can look at it, it's long…What airlines say themselves is that they have to a large degree have observed many costs on their own bottom lines in the short term, especially on the so-called "stamrutene", the larger commercial routes. On a portion on the regional routes, like those Widerøe chiefly operates, there has been a clear downscaling of production. Widerøe has reduced quite a lot on a lot of shorter regional routes that see little flight traffic and weak profitability. On many of the stamruter, there have been less such adjustments, but the airlines say that profitability in the system has been substantially weakened. When you look at traffic numbers, they don't seem to bad. Traffic numbers domestically have had weak growth, but it is because the Norwegian economy in the last few years has begun to recover, in a way this compensates for the cost increases that have actually been involved. And a relatively careful portion of these taxes have been introduced into the market in the form of price increases. Some downward adjustments in production.

If you look at Avinor's statistics on flight movements, you see that total flight movements have decreased in the last year. But traffic volume has gone a bit up. This is because the airlines, on average, set in a bit larger plane types. They have had an adaptation towards the new 320 (?), which are the larger versions of these planes. The average plane size has increased, while the total number of flight movements, taken as a whole, has gone down. Also the price mechanism has been used to fill up these larger plane units which fly, combined with a certain economic growth in Norway, which has compensated for some of the cost disadvantages with this flight passenger tax. It is about 2 billion kroner, of which roughly 1,1-1,2 billion is linked to the domestic activity in Norway. There are taxes both ways. Also, the tax is equal for short and long routes, which means that the shorter routes have a relatively higher burden domestically in Norway. If you fly from Bødø to Stokmarknes or Tromsø to Hammerfest, it is the same tax as between Oslo and Tromsø or Oslo and Kirkenes. What I'm uncertain about…there is very tough competition on the domestic network, which in a way has contributed to a dampening effect on price side, and only just on the supply side, in relation to what the tax proceeds and costs had pledged. The question is, the money, the tax does not evaporate on the domestic network in Norway, have the costs gone up by 1,1-1,2 billion kroner? …Which comes on top of a lot of other cost increases which are quite large – CO2 tax has increased a lot, it now has proceeds of 500 million per year, with 1,28 kroner, it has almost tripled in 5-6 years. Also the VAT has risen substantially by 2% every year between 2016 and 2018...in total, about 500 million kroner increase from 2015 to 2018. It went up from 8% to 12% and this goes directly in to ticket prices. The business community gets an exception from VAT, but private individuals do not, there is a certain effect on cost levels and price levels. So the sum of the flight passenger tax, the CO2 tax, and VAT have substantially increased the cost level on the domestic network, and relatively more on domestic routes than on international routes that aren't subject to VAT, that don't have the CO2 tax, and have a relatively lower flight passenger tax.

R: In the next part of the interview… as I wrote to you, the objective of our thesis is to analyze how an alternative flight seat tax will affect the Norwegian aviation industry. The main research objective is to see what effect a theoretical flight seat tax on empty seats instead of passengers will affect the industry. We will come back and at other ways of doing this afterwards, as said in the first section, but what are your immediate thoughts on the empty seat tax?

T: Yeah, it has been discussed before. One has also had the previous shift in terms of, among other things, the so-called airport charge to Avinor, which has sometimes been placed on seats, sometimes on passengers. It has been an argument actually in many contexts, to a larger degree, to tax empty seats, or one can tax all seats, or place a tax on the actual number of passengers, or one can connect the tax to the number of empty seats. Technically, there are many ways one can do this. The intention is that airlines should be stimulated to high use of their capacity utilization of the material and the empty seats that pollute, in a way. The starting point here is that aviation is the transportation mode which has the highest capacity usage of all – personal cars have on average 1,3-1,4 passengers per car on long trips, trains have a capacity usage of perhaps 30%, but flights use 70-80% of their capacity, dependent on the market. So as a starting point, aviation already has a higher capacity usage.

The disadvantage of taxing empty seats is that the marginal flight routes will be taxed the hardest. On smaller flights and on flights with multiple connections, it is harder to achieve

higher capacity usage. So Widerøe, which operates with maybe 60% capacity usage, will have a relatively tougher tax burden. Those that come better out of this are the low price airlines, which have policies to make their prices low in order to achieve high capacity usage. Ryanair operates with almost 100%, Norwegian operates also with a higher capacity usage than SAS, for example, which is more in the business segment and has a higher price per passenger but a lower capacity usage. There is a difference between classic business airlines and low price airlines, and it gives a disadvantage to regional operators who has smaller flights and more complicated route patterns.

R: Do you think it would have a different effect if exceptions were made for FOT routes? If the tax was only placed on the "thinner" stamruter?

T: There is already an exception made for FOT routes. The government compensates for a certain increase via economic support (tilskudder). Widerøe receives this, but Widerøe has a lot of regional commercial flight routes. For example, Hammerfest, Stokmarknes, etc. They have an area. They are heavily taxed in relation to the shorter distances etc. and they have a relatively high burden because of the short distances they fly.

R: How will a tax on empty seats generally affect other interests, for example airports, consumer choice generally, business in general, and operations that are linked to the operations of airlines, like catering and handling?

T: I don't think…the point is that the state wants to have the same revenues regardless. If they want 2 billion kroner, it means that empty seats will have to be taxed extremely high. It would surely be a very high number, a thousand or something, because as a starting point they will want to have the same revenues. I can't see that it is so practical. Another model is to tax all the seats, then you will have a lower rate. Or taxing actual passengers, which is simpler. I can't see that there is a very big difference, because the state will get this money anyways. And it is difficult for operators, especially Widerøe, to make a system that will increase their capacity usage significantly compared to what they have today. Even if we give this incentive for better capacity usage, we don't give an incentive for less climate gas emissions, just an incentive for a mode of transportation having higher capacity usage. The incentives aren't so big that I can see them making a big difference. In addition, the rates will be extremely high if they are only applicable to empty seats. It would be hard to make it work.

R: In your opinion, would this kind of idea have any special effect on climate protection efforts in Norway? Or would it have a quite small effect?

T: It wouldn't have any effect were the quota system as before. It wouldn't have any meaning, it would be more symbolic. It would maybe have a marginal effect on capacity usage, you would have a few less seats than you would have had otherwise. How large this effect would be, that could be discussed, but I think it wouldn't be serious, just because companies already have strong incentives to use their available capacity. And if they managed to use even more, the rate would have to go up even more in order for the state to get the same revenues as before. So regardless of how you twist and turn it, you will get hit by a boomerang in the face, the state will take what it wants to take anyways.

R: So would this kind of idea have any short- or long-term effects when it comes to price strategy, route structure, or fleet planning, maybe it would be more profitable with smaller planes?

T: By taxing empty seats?

R: Yes.

T: No, I don't think it would have a very big effect. It would be very difficult to accomplish, practically speaking. It would be a bit more theoretical.

R: Do you have any concrete numbers for the percentage of taxes that airlines manage to pass on to consumers? Or is it variable from company to company?

T: I don't have a number, you'd have to get in contact with the companies. But I see that a number of these actors…when it applies to SAS and Norwegian especially, they have had problems with passing a large percentage of the flight passenger tax into their ticket price. And when they have done it, it's been very little. More precisely, I don't know.

R: We talked to someone in Avinor who said that your numbers (from NHO Luftfart) were between circa 0-50%, that airlines manage to take in. Now we are going into the second portion of the interview, which has a more practical approximation to today. What are your thoughts on an aviation tax on passengers based on distance flown, as in other countries?

T: You are thinking of the Swedish and German model?

R: Yes.

T: One may have different views about it. It is a bit dependent on what kind of pressure one wants to take care of. For a company like Widerøe for example, which generally flies short distances, it would be an advantage that the tax is differentiated on distance. For example, distances of less than 300 kilometers would have a low rate, distances from 300-500 kilometers would have a bit of a higher rate, and so on with 3 or 4 levels. This would mean that longer trips, intercontinental trips, would have the highest rate. If you want to have a reduced rate on the shorter trips which don't have the largest volume, you must also have a higher rate on longer trips to compensate for the loss of income. I am assuming here that the collected tax would not change total tax revenues. At the same time, a company like Norwegian which operates many longer and intercontinental routes would likely face a higher rate, and the market would in a way be strangled. The question would be how airlines would adjust their operations, by changing their route structure - for example passengers to the USA would travel via Copenhagen or Amsterdam or other hubs to get out into the world and avoid the Norwegian tax system, reducing the effect of the Norwegian tax system. It is dependent on how this would be concretely structured. If it is profitable, or you get lower taxes with these kinds of adjustments.

Out of a consideration of fairness, there are some who believe that this kind of tax is rational, that a short trip in Northern Norway is not taxed as much as a longer trip from Oslo to Bangkok or Oslo to New York…that there is an element of reasonableness for longer trips to have a higher tax than shorter trips. That is understandable. There are some

who argue that this is reasonable in the environmental and climate sense. Especially for those flights which go outside of the EEA, which don't fall within the quota system. On the traffic which goes outside of the EEA, this kind of tax will actually have climate effect. This is partially correct, but in ICAO, which is a UN organization, they have agreed to implement a global quota system by 2020. So from the point in time from which the quota system comes into effect, which is in practice 2021, this argument will also fall away, that a tax on distance flown outside of the EEA will also have an environmental effect.

So we are left with the question of fairness, and the question of whether to have a more reasonable, lower tax on shorter routes to stimulate the market…to get more traffic in the local area which will not be over-taxed by such a high proportion for shorter routes. But what people are going to think of this is up for debate. Widerøe would suggest this kind of model, but Norwegian for example would be less receptive to it. A good deal of tax revenues would be moved from national actors in Norway to the international market, and relatively more foreign actors. As such, you push a little more of the bill over to international companies instead of Norwegian companies.

R: Today, we are seeing the next generation of flight motors in regards to emissions, Airbus family's new Neo series, Boeing Bombardier C-series, …etc. Given the development of continually more fuel- and emissions-effective aircraft, can an aviation tax be differentiated to reward airlines which use more effective and environmentally friendly aircraft?

T: Yes, this ties back into the discussion on…in principle, these instruments are (already) provisioned because there is already a quota system connected to emissions and fuel usage. So the need for the quota decreases the more energy effective aircraft become. You already have a differentiation along the lines of energy efficiency because both the quota system and especially the national CO2 tax are connected to use of fuel. So when you purchase a new aircraft, you not only get lower fuel costs, but also lower costs for the external effects of emissions. The industry already have strong incentives to use the most modern and energy effective material, as a starting point. Fuel prices make up roughly 20-25% of operating expenses for airlines. This is why Norwegian and others are very taken up with using the best materials, so that they can minimize their operating expenses to the maximum extent possible. It is almost the same thing twice over for most, if you are going to differentiate additionally in other areas.

There has been a discussion on if, for example, the airport tax should be differentiated based on emissions. But the airport tax is meant to cover costs for completely different things, like the runway system, terminal building, air facilities, air traffic control towers, etc. It is in a way incorrect if the taxes are differentiated after other conditions than those they should actually cover (bad wording on my part). So we are left with the flight passenger tax, and logic dictates that we could organize this in a bit of a more environmental direction. This is where a differentiation for distance could come in.

R: Could the flight passenger tax itself be differentiated to account for emissions, for example, or would this be a bit too much discrimination?

T: In this case, the flight passenger tax would become an environmental tax, a climate tax. It could of course be this way, but the point is that this could not be used internationally. It would come into conflict with some international agreements and conventions. Therefore,

authorities have created a departure tax from Norwegian airports, thereby avoiding formal problems with international agreements to which Norway is party. This has been done in Sweden, Germany, and the United Kingdom, because you cannot tax fuel on international flights because it conflicts with aviation agreements like the Chicago Convention and other rules of the game we have for how international companies can be taxed. These are old rules of the game from war time. The motivation was that a country can't tax an airline from another country, an African country for example, when a Western airline comes, they can't tax the fuel that they had used and get money in the state account in this way. Maybe by taxing fuel in this way and reshaping the flight passenger tax as a climate tax, many politicians would ideally want.

R: On the subject of greener aviation, Avinor has declared that they are betting heavily on electric flights, amongst other things. How does NHO feel about this?

T: It is positive that… Avinor's contribution to both information and mapping of technology status also uses some resources which are made available on the Norwegian side so that we can take this new technology into account when the time is right. But I don't think that, from the Norwegian side, we don't have any illusions that we will be the solution-makers for this type of technology. Very much of this development happens internationally, in other countries than Norway, in North America and Central Europe. There will definitely be a big development and especially regional flight routes in Norway could benefit from implementing adaptations for charging when this time comes, but for now its more of a buzzword. It is great that Avinor is engaging itself but the underlying here is how the global industry sees opportunities for taking this kind of technology into use. It must be deemed good enough, this is a decisive factor. And this goes back to the global, international measures we have like the quota system today, which gives an incentive and involves that quota costs in the long term will increase and strengthen incentives for emissions from quota-bound sectors go down 43% by 2030. This will strengthen the need for new technology. The quota system is in a way a tool for adjustment towards new technology. In such a long time perspective, to 2040 or 2050, new technologies must see the light of day in order to realize more carbon effective or carbon neutral aviation.

R: You talk about the money here going maybe towards a communal fund for technological development. NHO has its NOx fund which supports climate initiatives. Would airlines be more receptive towards the flight passenger tax if the incomes collected would all end up in a similar fund?

T: We have discussed this at length and we believe that in principle, the CO2 tax and flight passenger tax are wrong and don't stimulate climate emissions reductions, collectively seen. So we have said that if the government will have these taxes anyways, they should use them for something rational. We have argued for the establishment of a CO2 fund where, to start, the proceeds from the CO2 tax could be used. But it could also be the proceeds from the flight passenger tax put into such a fund. The money would be used to finance subsidies or support for, to start, additional costs linked to production of biofuel in Norway. Eventually, it could become a subsidy fund to stimulate the use of new technology, very well electric planes or electric infrastructure. This would make it possible to roll out new technology and get more innovation in terms of local solutions in Norway than you would have gotten otherwise without the usage of subsidies. We work together on this with other actors in the business community to create a CO2 fund, of which aviation can be a part.

R: Just to quickly sum up all that we have been talking about, if you had a distance-based or a much more aggressive differentiation of emissions, would aviation be better or worse today? The state would get the same revenues anyways, so as long as they get the revenues…

T: The state's motivation is to gather money from the flight passenger tax, it is not an environmental tax or a climate tax, formally seen. The CO2 tax is surely the same. I don't think it would make a big difference. The state is focused on keeping up its incomes, so that if it were formed in a slightly different way, with different types of markets or actors, revenues collectively seen will be the same in the medium to long term.

R: If NHO had the opportunity to be the finance minister, how would you design an optimal aviation tax, given the need for a tax?

T: I wouldn't design a tax on aviation at all. It involves a taxation which is socioeconomically probable to be incorrect, because it is not connected to any costs of doing business. Aviation pays for all of its infrastructure, all of the costs linked to its operations including the external costs connected to the environment. There are also noise taxes at night and that sort of thing. And we are a part of the quota system, which covers costs linked to emissions. It is completely wrong to add a flight tax on top. This creates a worse and more expensive supply than you would get otherwise, which involves a socioeconomic loss (link to micro theory on DWL, can use a simple illustration here). In principle, I think that this is wrong and that the state does not need the money, given that we go in the plus with the oil incomes. So we don't have a pressing need for this type of taxation. It is wrong that this kind of tax is on top of the other costs we incur. One must also think about different modes of transportation being priced differently – train, private car, plane, etc. Something that also gives a socioeconomic loss and an incorrect use of resources is that different modes of transport are priced differently. The railroad receives subsidies and economic support, free infrastructure, they don't pay for anything, like aviation does. You get a socioeconomic loss and wrongful use of resources with this type of random taxation. This is my opinion, that it is wrong to have this kind of tax. You can read about this in the document (høringsbrev) that I will send over, that in principle this is completely wrong.

R: The concluding question is in regards to the national budget which is coming on May 15. If you were to look into a crystal ball, would you think that there will be a drastic change in the flight passenger tax or would it be essentially unchanged?

T: There is currently something up for consideration by Parliament, that the flight passenger tax should be modified. The government and the Finance Department are probably sitting and working with this now. It can come in this year's budget or it can come in the 2019 budget. It remains to be seen, but I wouldn't be surprised if it came up in the next budget.

R: That's all we had to talk about…

End of transcription.

Harald Thune-Larsen

Chief Research Economist, TØI (The Institute of Transport Economics)

Notes:

- Interview conducted via phone call on March 12, 2018.
- Language of interview was Norwegian.
    - Interview first transcribed directly in Norwegian and later translated to English for analysis. Both done by Rasmus.
- R = Rasmus Spanne, K = Kayla Rupp, T = Terje Skram
- During the interview, an internal Widerøe presentation was shown to the interviewers (not publicly available). It is referred to as "personal communication" when used in the final document.

Transcript:

R: In order to get some background information, could you state your official job title.

H: I am a research leader within social economy at TØI (Transport økonomisk institutt)

R: Is it okay that we refer to you with your name and job title in our thesis?

H: Yes, basically it is, but we will see, depends on what is said.

R: We just want to say thank you for taking the time to talk with us. We can take a quick introduction. My name is Rasmus and I am sitting here with.

K: Hi, Kayla.

H: Hello

R: She is American. The interview is Norwegian, but she understands Norwegian, so if she has follow-up questions, does she ask them in English if that is okay?

H: That is okay. However, I don't know what I can contribute with, but that's another matter.

R: We are looking at the Norwegian air passenger tax, so we have some questions related to that. We see you have done a lot of research on aviation earlier and written many reports, at least from a socio-economic perspective. Therefore, it would be interesting also get your views on our questions. Based on your job.

H: Yes.

R: Then we start with the first question. Norwegian commercial aviation contributes to climate emissions. Therefore, aviation is taxed for environmental reasons. In light of this information, what is your opinion about taxation of Norwegian aviation given fewer available substitutes for flights as a means of transportation in Norway compared to for example mainland Europe?

H: So the question is, in one way, what kinds of practical alternatives you see, is that what you are thinking about?

R: For example, in Norway, if you are going to get around in Norway in the shortest possible time, aviation is really the only alternative versus Europe where you have high-speed trains and so on. So therefore, aviation is an essential part, but it may be very heavily taxed, even if it is really one of, in many cases the only usable means of transport.

H: Well, I'm not entirely sure if aviation is so heavily taxed compared to other modes of transport. I am willing to believe that cars are taxed significantly higher in comparison to the cost related to it, at least with regards to long distance.

R: So seen from a socio-economic perspective, aviation is not so heavily taxed as everyone makes it seem?

H: No, not in relation to alternative car travel at least. Because, car travel is probably under taxed in the cities, but at the same time, I think that car travel is equally heavily taxed between the cities or on long distances. Therefore, I do not feel that aviation is so heavily taxed compared to the important transportation option.

R: Yes, but also, we are looking, and given the actual climate emissions, because there will be more, less emissions for example for a person traveling by plane versus driving.

H: Yes, it is also a bit like that, there is not that a big difference between the emissions from driving a car between Oslo and Bergen, and flying. It depends a little on how many people are in the car. If you are driving alone in the car, it's worse to drive a car. If you are driving with your family, then it is better to drive. In addition, airplanes are much worse than trains, just so it is clear.

R: How do you think that the current air passenger tax is working?

H: I perceive it as a pure taxation of airlines. Thus, in reality, this money is taken from the profits to the airlines, so that they get such a correspondingly smaller profit. In particular, it applies to the shorter routes where the air passenger tax hits hardest compared to the options, that more alternatives then arise. So I look at this as a, I do not think it has affected the ticket prices remarkably. I think primarily the airlines are feeling this on the bottom line.

R: In light of that, you would Transport Økonomisk Institutt (TØI) describe this as a kind of, yes, tax or fee that does not have effect? That this simply...

H: Now, I cannot speak on behalf of the transport economic institute. I can only speak on behalf of myself just so it is clear. No, I mean that it has an effect because it limits the incentive to start new routes, so it probably limits, there will be fewer profitable routes in Norway to put it like that. So, it is probably limiting the air traffic. I think so.

R: Yes, because we have seen quite recently that Widerøe went out and said that they would cut 44 of 400 weekly departures as a result of, not necessarily the air passenger tax in itself, but that the higher level of fees that has occurred.

H: No, I think it is because they have less profitability on the short routes and that, in part, it is partly due to that fee. But just to have mentioned it, it does not mention that much that they have previously increased the number of slightly longer routes though. For example, they have set up direct routes between Lofoten and Oslo and it is clear that they have lost some of the basis for these short routes.

R: Have you noticed any consequences after the current air passenger tax was introduced in Norwegian aviation?

H: Not as far as I can see, I do not see any particular effect of that charge at all, except potentially on the supply side. So, the supply side has been slightly reduced or has not increased as much as it might have done otherwise. But it is impossible to see any effect on traffic, i.e. on passenger traffic.

R: Some people include Norway's finance minister has said that it is basically just a fiscal tax although it is marketed as an environmental tax. What are your thoughts about that?

H: No, view this as a fiscal fee, pure taxation of a mode of transport. I think the environmental effect is trivial. The reason I think is primarily that one has found a place where you can increase the fees without there being, or kept saying, even more protests than there has been.

R: Have you heard of the idea of just taxing empty seats onboard aircraft?

H: I have heard about it yes. It seems a bit weird though. So you might want to tax the seats. But to tax empty seats, I think it will be a bit, it will be a very weird way to do it.

R: In the next part of the interview, we will focus more on what the main research question is: What will the effect of a theoretical air passenger tax put on empty seats in the Norwegian aviation industry be. The purpose of our master's thesis is to look at how an alternative air passenger tax put on empty seats will affect the Norwegian aviation industry as well as other possible alternative revisions of the current airline fee. We are building our thesis upon statements from industry and a number of stakeholders as well as an ongoing debate today about how to deal with airline fare. What thoughts do you do immediately after hearing this statement?

H: In terms of taxation of empty seats, that would mean that even more problems will arise, even less profitability on routes with low load factors. So I assume it will get quite, if you collect the same amount to put it like that, I'd think you'll get even greater effect in the form of cutting out routes that are unprofitable. Then you can wonder if it, and there would be an environmental, environmental impact. That is clear. However, at the same time, some thin routes may then disappear, to a great disadvantage for those who use them.

R: So how do you think such a tax would affect the airlines? Because you have Widerøe, that is one thing. They are flying a lot regional routes. For example, if there had been an exception for aircraft below a given size such as 50 seats to shield the regional routes. How would this potentially have turned out on larger routes and aircraft?

H: I think that this will hit the bottom line of the airlines even harder because they have, it will be terribly hard to do anything about the airfare with such a tax. So it will simply reduce

profitability and I think one will get a good deal of routes that would simply be closed down. I'm thinking what more to say.

R: No, that is an answer if I should say so. For some can argue that, we have found that the airlines on average only manage to cover zero to fifty percent of the current air passenger tax through higher prices and hence, if one has more than a certain load factor, it could for example become less expensive to fill an empty plane, to pay for empty seats versus occupied seats, which is and argument someone could use.

H: What's happening is that passengers give an income then in addition to the ticket and thus it's natural for them to adjust down, almost to lower the ticket price at the same time the costs either are there or increasing. If you want to get the same amount of tax revenue, you also have to pay twice as much. Because if you assume that the load factor is 2/3 in the first place, then about 80-90 kroner is not sufficient, but one would need to collect about 170 kroner. So it will, I think it's going to be relatively catastrophic to say it right. I think it could remind a little of the situation in 1999 when Color Air went bankrupt and Braathens was bought by SAS. In each case, it would go in that direction.

R: But what would you say would be a sufficiently effective price on an empty seat, possibly in order for it to achieve its, in order to achieve an effective environmental effect?

H: What did you say now?

R: What would you say would be a sufficiently effective price per empty seat, possibly in order for such a tax to be able to achieve an efficiency and environmental impact?

H: No, it is very difficult to say anything about. I would believe that, no, because I mean, as said, that today's fee has an effect and to get the same, exactly the same effect in total, we would have to double the amount. But at the same time, an air passenger tax on empty seats will work more efficiently than a tax on the passenger in terms of cutting out routes that are not profitable. Thus, one might think that you need to bring in less money then. Thus, you can operate with a lower revenue but maybe a similar amount per lot compared to what you now have in occupied seats.

R: We also want to look into other alternative suggestions as to how a possible air passenger tax may be formed. What is your opinion about an air passenger tax on passengers and empty seats based on distance as they have in other countries? In addition, as being introduced in Sweden now for example.

H: I do not know about the Swedish, what the Swedes have done but basically I think it's a lot better with a distance based fee, but I'm a bit unsure of what to do with travel made up of several flights. It is clear that if it turns out that it is much more expensive to fly directly from Oslo to China than to fly through another country, I don’t think it would be so smart.

R: That people would rather fly via Amsterdam than fly on a direct route.

H: Yes, that might be the effect and it is not, it is not desirable because it would lead to both poorer service and a poorer environment. So there is a limitation on that. But domestically, I cannot see the problem with this.

R: Given the evolution of ever more fuel and emissions-efficient aircraft, you have, among other things these new E2's from Embraer that Widerøe is getting, you have the MAX from Boeing, NEO from Airbus. Can an air passenger tax also be differentiated to reward airlines to speed up using more efficient and environmentally friendly aircraft?

H: Yes, you can imagine, but then I think one just as well should bet on the CO2 tax. I think that just as well, you can go on a straightforward basis and tax what one wants to avoid, climate emissions, greenhouse gas emissions. At the same time, I doubt how it turns out when you consider that aviation is part of this European quota system, as on the other hand, as the discussion about how effective it is because quota prices are so incredibly low and there are many quotas left over. But in principle, the emissions are taken care of by the quota system, so you can wonder how much it turns into in theory for if you do not think it's going to be practical, it's natural to think of the CO2 tax primarily.

R: For when, when you have this quota system through. If there is less pollution here, someone will still pollute more another place. Since Norway has committed itself to this and we are seeing on the horizon that ICAO is working on a worldwide solution, it would simply be more socio-economically profitable to scrap the air passenger tax in its whole and instead reap the increased benefit through increased economic activity of it being removed since the environmental issue has been taken into account?

H: Yes, with an environmental fee, I think so. Then you can as well drop this fee because it is somehow solved in other ways, but the problem that is, has a fiscal effect. Then to get the same proceeds, you have to do something different and then the question is where to get it from. I mean, personally, I really mean that Norway's main environmental problem with regard to climate is that there are no big challenges related to solving demands to reduce emissions in the rest of the economy where there is no quota system and what is achieved to a certain degree, with this flight fee, it is possible that the government may move a little traffic car travel, so it actually seems to work opposite as intended. I do not think there is any big effect then but that can be some effect.

R: Do you have any calculations on how a removal of the air passenger tax would have impacted the economy as a whole if you include potential gains then?

H: No, we have no such calculations. I thought I had calculated that there would be an effect when the air passenger tax arrived, but I have not managed to see any such effect, and that is because, as I said, the airlines simply failed to pass the tax on to the passengers. And that Norwegian and SAS and Widerøe are earning less, that we are beginning to see the effect of now. So you read in the newspaper about Norwegian all the time and how bad it goes. But they have a very large route program and it's not just in Norway they operate.

R: But would, if a tax based on distance would have been introduced tomorrow, do you think Norwegian aviation would have been better or worse than today as a whole?

H: I think it would become better because then you would have a fee that works in relation to the income, i.e. the ticket prices.

R: Given the need for a tax on aviation. How would you have designed an optimal aviation tax?

H: I would at least look more at where the money comes in i.e. the revenue, the ticket income, tried to relate it more to that and then I would have tried to relate more to what one would like to have as climate emissions and so on. So would have been a balance between those two factors. Ideally, one should, to the extent that one has taken out, say the environment, to the extent that one has taxed as much as the environmental impact implies, one should try to tax where price elasticity is the lowest or where it the reduction on demand is minimized, so it will in principle be on business travel then. But how to get theory into practice is hard to say. But it depends a bit on distance and CO2 emissions and things like that. I would relate it more to that.

R: Do you think the airlines would be more receptive to paying a form of air passenger tax if the revenues were earmarked aviation-related climate measures?

H: Yes, I certainly think so. They are for this quota because they are in the quota system so they are not completely; they are not against everything to put it that way. I do not really see what kind of measures that would though.

R: Some have mentioned this with, the creation of a general where all revenue goes in, for example, that will support this with biofuel production. Avinor is very busy with, or has at least launched strong surveys with regard to future electric aircraft and such infrastructure. How do you think this with biofuels and potential electric aircraft in the long run by 2030 could affect an industry or aviation industry?

H: Yes, these are two questions where one is on biofuel and there I can see no other problem than that it would be bound to how much biofuels one can get in an environmentally friendly way and the other is that it is as of today, very expensive compared to normal fuel. And it is clear that you come across that you could use this tax to subsidize that fuel after a while. In the case of electric aircraft it is clear that one is now starting to get, there is a sufficient electrification at least technologically. Thus, there are not so many electric vehicles on the market really other than Norway. But taking place there are, lots going on technologically now. So I have a certain belief that there may be some aviation with electric aircraft on short stretches in the future and it will be very good environmentally though. But I think we are limited to relatively short stretches and relatively light aircraft or small aircraft then.

R: Do you think it will have something. So, there is talk about lots of costs if you look at, at least on that side. Would it have any, can the costs be defended against the gain you could possibly get from reduced emissions or is it a little more symbolic?

H: I have to say that I find it hard to believe, even with electric cars it is difficult to find a profitability. So that it is going to be profitable with electric aircraft from an environmental perspective, I find it difficult to believe. And at least it will probably take a little longer time than up to year 2030.

R: So the key would rather be to focus potentially more on improvements to the current plane with regards to weight and engines and consumption in general that way?

H: Yes for a while ahead, I think so. It is also clear that biofuel is one, things happen and it is clear that it may be that in the future it may prove to be a way to go. But per today it seems a bit expensive and a bit difficult to get enough in a good way, so avoid. I do not know what

needs to happen in practice to serve the whole aviation sector, but I feel it will become a competition. On the other hand, it may be that it is just aviation that is going to use biofuel and to imagine that land transportation could switch over to electricity to a much greater extent, so that biofuels can be reserved for aviation to a much greater extent.

R: That it can simply be a good option.

H: Yes, that is maybe the most nearby option.

R: Beyond that, I do not think we have so many more questions. We got good answers on most of the things we wondered about . May we ask if you want a copy of our assignment when we arrive when we finish it in June?

H: Yes, I'd love to have that.

End of interview.

Espen Andersen

Associate Professor of Strategy, BI (Norwegian Business School)

Notes:

- Interview conducted via Skype March 13, 2018.
- Language of interview was Norwegian.
    - Transcription done by Kayla, direct transcription from English.
- E = Espen Andersen, R = Rasmus Spanne, K = Kayla Rupp

Transcript:

R: Given that there's a lot less substitutability when it comes to ways of traveling in Norway, with getting there in a reasonable amount of time...compared to example Denmark and France, where they have a lot of bullet trains and so on, what is your opinion on taxing aviation for environmental reasons, or taxing in general?

E: Well, I think you absolutely should tax air travel for environmental reasons, because it is a major pollutant, or polluter. I think that taxation, the way it's done now, which is primarily for…I'm not sure there is any sort of environmental taxation at all in the Norwegian airline industry as it is now. There is a passenger tax which applies per trip, per passenger, with some reduction for multi-leg trips. But that is a fiscal tax in the sense that its sole purpose is to get money into the government's coffers. So I think the environmental effect is incidental and probably not very big.

Tax…as for the way the Norwegian airline system is financed, there is an implied tax actually in the tax free system. There is one airport in Norway that makes money, which is Gardermoen. Avinor will tell you that there are 5 or 6 airports that make money, but that's not true, chiefly because all the investments are taken centrally, so if you farm out the investments, there is only Gardermoen that really makes money. And that's used to subsidize the 46 or so other airports. But that's a redistributive tax between the… and its essentially subsidizing travel to the more remote areas of Norway.

So, yes I think absolutely we should increase the taxes on air travel in Norway. And they should be environmental, and I think the best way to do that would be to tax fuel. It's so easy to do and it encourages the airlines even more – they're already really big on trying to have modern airplanes to cut down on fuel cost, but that would encourage that even more. So I think that the taxation that we have now for environmental purposes, that's not what it's set up to do, it may have that effect to a small degree. But Norwegians are the most frequently traveling people in Europe, except for Iceland and Malta which are island nations. And Norwegians are rich, so we travel a lot.

K: What immediately comes to your mind when we say "the flight passenger tax?"

E: It was a political compromise because they needed to raise another billion. And, I don't know, some minor party said "why don't we have a passenger tax?" And the conservatives, who essentially were against it, had to implement it. And as they said during the debate back then, it's a fiscal tax to plug a hole in the budget. I think I've answered the question.

R: How do you feel that the current tax is working?

E: I think I've answered that too. It does not reduce travel that much. It may have had an effect on making Ryanair pull out of Rygge, but I think they would have done that anyway. It has had an effect on profitability on Norwegian and SAS, because they haven't taken it out in increasing prices. For Norwegian, in particular, it has been quite a drain on their profitability.

R: We have talked to some people and they said that the estimate for how much they would be able to recoup in increased ticket prices was form 0-50% only. So it's taken a lot off the earning margins. Have you heard about the idea of only taxing empty seats on aircraft?

E: No.

R: There have been some media reports about Bjørn Kjos saying that he would prefer it, and also some environmental organizations who also wanted a tax to be put on empty seats. In the next part of the interview, we will focus more closely on our research area, which relates to different taxation schemes for Norwegian aviation. For example, we are exploring the effect of a theoretical seat tax placed on empty seats and how this will affect Norwegian aviation. We are basing this on peoples' media statements, and towards the end we will look at other ways in which you could redo the current tax. What immediately comes to your mind after hearing this statement?

E: It's an interesting thought. In terms of the Norwegian…I mean, what it does is it raises the importance of load factors, filling the plane full. It will be a boon for people like Ryanair, or Norwegian. Mostly Ryanair and Wizzair, I think, because they are very good at having high load factors. It would be a problem for SAS, which is much more of a network airline. A network airline needs to maintain a certain capacity in their whole network, their whole infrastructure, in order to provide necessary flexibility. So it would be a harder thing for SAS than for Norwegian.

In terms of environment, it may cut down on frequency a bit. It would certainly make airlines cancel more flights. It might also encourage airlines to…let's say there's 100 kroner tax on an empty seat. That means that…I don't know what the current passenger tax is now. If you get rid of the passenger tax as it is now, there would be certain taxes per passenger for the airport. But it might be in the airlines' interest to subsidize that. So maybe you would get more spurious travel, people standing around waiting to get a free trip somewhere, just because they don't want to pay the airline tax. I doubt if that1s going to be a big factor though. It would hit SAS harder than Norwegian, and no wonder that Bjørn Kjos likes that.

K: What do you think if the FOT routes were to be exempt? The state subsidized flight routes to the smaller cities and smaller airports.

E: Well, yeah, I think you probably have to do that, because it would be the government paying out money on one hand and taking back with another. There would have to be some sort of compensation scheme for that.

R: How do you think this would have had an effect on other key stakeholders in the society? For example, airports, businesses that rely on air travel, and also companies who deliver services to airlines, such as handling agents, catering, and such?

E: I have no idea what would happen. Norwegian air travel has been increasing every year, and it probably will increase, if not by internal travel within Norway, by increased tourism, particularly from Asia. There are new airplanes that allow more direct flights between various airports in Norway, and for instance, the US, and after a while in Asia. So I think the businesses you're talking about are primarily driven by traffic volume, and that, I think, is not driven by taxes. It depends on how much you tax, of course, but I'm not sure. It may have an effect for businesses in the sense that it would be…you might get more marginal flights canceled if you depend less on the flight system. But the way things are set up in a lot of cases, you have to return the airplane, because it's going to start flying the next day. There are situations where you may just want to pay the tax in order to not disrupt the setup. So I doubt if that's going to have much of an effect.

R: What do you think the effects would be… you mentioned price strategy very briefly, do you think it would have a big impact on price strategy? And also would the future fleet planning go into more smaller planes like C-series, Embraeir, instead of the larger Boeings and Airbuses.

E: Again, I'm not sure. In the long term, it may have an effect. But a tax like that sounds like an experiment, so I think people would sort of wait for a while to see what they do. Because you can't order a 100 million kroner plane, sorry a hundred million dollar plane, on some sort of tax experiment. If you look at the structure of the airplane fleet, you're getting more and cheaper planes that can fly far. There is some innovation in the lower aspect, that you get short-haul planes which are much more fuel efficient. And there's a void in the market for reliable passenger planes that could land on the relatively short airport runways that Norway has. That's a peculiar problem for Norway, that Widerøe is facing because their fleet is very old and there really aren't planes that can function in that role. It's just not being produced anywhere. So something will happen with the fleet structure, but I don't think that a tax like that would have much of an effect on them. One thing about the tax is that it would probably feel more just. People probably say that's a better way of taxing, because it encourages the airlines to fill up the planes. But I doubt if you ___ (incomprehensible, audio at 15:40).

R: The next question you answered earlier, but just to sum up, taxes primarily affect airlines margins because they aren't able to get them back because of increased competition and lower ticket prices. If an empty seat tax were to be implemented tomorrow, would the aviation industry be worse off or better off than it is today?

E: It would be a boon for the people that are good at filling their planes high, load factor would become a much more important factor. And I think, if you're just comparing Norwegian to SAS, which are the two big carriers in Norway, it would be better for Norwegian because they have almost a, as far as I remember, a ten percent higher load factor than SAS. And SAS' load factor is widely imbalanced. There are some flights that have relatively few seats taken. So it would affect SAS more than Norwegian. Load factor becomes more important, that's the main thing. The trouble for the airlines in general is that the airline industry is interesting in the sense that everybody makes money except the airlines. And the reason for that is that they have a very un-differentiable product and high fixed costs. And so there are lots of schemes to do that. What you tend to see in a situation like that is lots of experimentation at the pricing side. You try to come up with all kinds of prices. And you would probably see some innovations in pricing, if you go to an empty seat tax, primarily

encouraging people to fill up planes in order for them not to pay it. You would probably see an even more, even higher differentiation between cheap seats and regular seats.

R: Yeah, I've heard the saying that the way to become a millionaire in aviation is to start out as a billionaire.

E: Yeah, if you want to create a small fortune in airlines, just start out with a big one.

K: What portion of aviation taxes can be passed on to consumers? For an airline like SAS versus Norwegian?

E: Relatively few. Like I said, the competition is heartless. It's kind of interesting, because if you talk to people who do marketing and are concerned with things like company reputation and things like that, they're forever saying "oh this airlines has a much better reputation than others." But the airline that has by far the worst reputation is Ryanair. Incidentally, they're also the biggest and most profitable airline in Europe. So when it comes to deciding whether you're going to fly or not, the first thing you look at is who flies there, and the second thing you look at is price, and anything else is just incidental. As long as you're not paying for it yourself, which is why they have all the airplanes frequent flyer clubs and so on.

R: For an empty seat tax to have an efficiency, to have an effect as an environmental tax, what do you think a sufficient or effective price would be in order to achieve that? For planes to fly as fully as possible?

E: I don't know. I would suggest you talk to Frode Steen at NHH, who is more of a calculator of these types of things than I am. I think, I don't know, a natural thing might be to take today's passenger tax and switch it to an empty seat tax, for instance. But it would be…it wouldn't necessarily be a complicated tax to administer, but you would have to make some sort of compensation for very low frequency routes that you want to maintain. And it might actually turn a few routes that are currently on a commercial basis and have them become routes that you have to support.

K: Do you think that there would ever be a tax high enough to actually deter people from traveling for non-necessary reasons? That would actually work in reality?

E: Not as long as Norwegians are so stinking rich as we are.

R: In the next part, we will look closer at some other taxation alternatives. The first one has been implemented in several other countries today. Would it be better for an aviation tax on passengers to be distance-based instead of a flat fee, such as today?

K: Like the Swedish model, for example.

E: From an environmental standpoint , yes. The thing is, we're getting into very minute details. I think it's more interesting to say, could you double it? Maybe that would make people travel less. If you wanted to get really finicky on it, an airplane consumes much more fuel going up and down. If you did it purely distance based, you would essentially encourage more short hops. That's why I think taxing the fuel would be the way to go, because that will encourage airlines to save fuel as much as possible, and it's a much more direct tax on what it is that actually pollutes. So I think that a model like that, it's a distortion in another way, I'm

not sure that the added complexity is beneficial. I don't think it makes that much of a difference.

R: You said earlier that it would encourage airlines to introduce more efficient aircraft regarding fuel burn and emissions. Could a passenger tax also be differentiated to increase that incentive? If you have a newer aircraft, you'd pay less even though you use less fuel.

E: Perhaps. But we're talking about very small percentages here. If you look at emissions in airlines, there is a certain effect of new technology. And the airlines are actually fairly well-incentivized to go to new technology anyway, not just because the new airplanes are more fuel efficient but they are much simpler to maintain. You're getting into modern technology, which is much more modular-based, you can switch out modules when they change. Things are digital rather than electronic and so on. There's also a change in the business models for the people that deliver, for instance, engines and other things more towards service. So your costs are reduced quite a lot by getting new airplanes. The problem for most mainly legacy carriers is that they don't have the money to finance them. But they don't get anything for their old planes. So I think the incentive is already there. Further subsidizing a transitional fleet…I mean, there's a waiting list for these new planes anyway. So I don't think that…I'm sortof, I kind of like more simple taxation schemes, which is why I like taxing the fuel, because it's un-arguable. One, the fuel causes so much pollution. And you could switch and say maybe you should tax CO2 or NOx or things like that, but it's harder to measure and it becomes more theoretical.

K: On that subject, do you think that airlines would be receptive towards this tax, towards any tax, if all of the revenues that were collected went to a specific fund that was earmarked for aviation-related climate efforts, instead of in the general fund as it is today?

E: Maybe, I'm not sure what that could be.

R: You have already NHO's NOX fund, where the proceeds from the NOX tax goes into a fund used by the airlines to fund further research into more friendly biofuel, for instance.

E: That's subsidizing a switch to biofuel, which is currently 0.2% percent or something, so almost nothing. I don't think that's enough. Again, you introduce so much complexity by doing that, you know? You've got to have people deciding on what to do on these things and so on and so forth. Nah, I think it should go into government coffers. If this research is interesting, we should set up a results-based incentive for the effect approach, and then make an appropriate investment decision.

R: We've read more and more lately about especially Avinor having a greater interest in electrical planes, especially in the more regional routes of Norway. Do you that that's just a symbolic thing, or would electrical planes really have an effect?

E: As far as I know, there is no electrical plane now that can take any commercially interesting number of passengers. This is at this point. It's going to take at least 30 years to get into commercial use. It is much, much harder to get an electrical plane to become commercially viable than it is to get an electrical car to become commercially viable. And

outside of Norway, you don't see any country that has had a big effect, and we've had electric cars for a long time, since roughly 1985. So, I saw that announcement from Avinor about electrical airplanes, and I was interviewed by the newspaper, and my answer was basically there must have been some sort of technical development they've seen that I haven't. Because, nope, I don't think that's going to happen. You may have drones, for one or two people, but I doubt in the short term, maybe the next 20-25 years, I doubt that's going to have any effect whatsoever.

K: With the next budget coming up on May 15th, what do you predict is going to happen in regards to the current flight passenger tax?

E: I think it's going to stay, because taxes once proposed have a tendency to stay, unless there's a huge outcry against them. I don't know, the politicians are fairly pragmatic when it comes to the airline industry. I don't think we're going to see any big changes.

R: But if the air passenger tax theoretically were to be abolished, do you think that the total positive effects on society in the form of increased profitability, maybe more travel, would outweigh the revenue lost by abolishing it?

E: I seem to remember that the revenue calculated is approximately one billion (NOK). I don't think it makes a difference whatsoever. It does not have a big effect on travel, on how much people travel. And one billion for a country as rich as Norway doesn't matter one way or another. The whole thing is very symbolic and very inconsequential. To get an effect, you would have to tax airline fuel, and you would have to tax it hard, and you would have to tax it across nations.

R: Do you think we've heard about _____(audio breaks up)

E: If the EU got together and imposed an airline fuel tax…I'm sort of wondering why countries don't do it all over, where is the Middle East? It's eminently rational. I don't think it's politically impossible to do.

R: There's already a quota emissions trading scheme in place within the EEA. Does this have any effects on curbing the number of flights as you see it, or is it too weak in its design and price to have an effect.

E: The quotas are fairly cheap. I don't think it makes much difference. People might get a better conscience, they can say they are purchasing quotas, but it doesn't cost much. In order for taxes or schemes like that to have an effect, they have to be economically consequential. At present, they are not.

R: Just to summarize, you think that the tax should be put on fuel and not on passenger seats.

E: It strikes me as the simplest and easiest solution. Although politically, I don't know, I appear frequently on the radio and TV to talk about airlines. And I sometimes wonder why, because airlines are not such a big industry. But a lot of us fly, and it's something that's popular to write about. A lot of people want to start airline companies, not because it's such a huge idea from an investment viewpoint, because it's not, but because it's kind of glamorous to own an airline and a lot of people just want to fly.

Politically, it's very unpopular to do anything that restricts people's freedom to fly. You saw that when the conservative government came in, almost 8 years ago, and Siv Jensen became the finance minister, one of the first things she did was increase the alcohol quota with 2 bottles of wine. And that was…A) it was popular among her voters and B) it was a very convenient way to increase the subsidies from Gardermoen to the other airports without it being visible. Not visible in the state budget, because it's all taken care of within Avinor, so it's a very popular thing. If you look at it from a rational viewpoint, it is completely insane, the whole tax free thing. At Gardermoen, you have the biggest shopping center in Norway, and it's open from 6 in the morning until 2 at night, whenever there's an airplane. And you're almost forced to walk through it. And if you continue, about half the people who fly to Gardermoen, fly to Gardermoen. The rest fly off. And if they come from abroad, they carry very heavy goods until the planes, burning even more fuel. And it's a subsidization of people who are rich, because they can afford to travel. So the whole tax free thing is just insane and should be stopped. But that would force the government to come up with 85 billion kroner in order to subsidize all those airports out there, and it would make visible just how expensive they are, because they are really expensive. But from my colleague's point of view, it's just ____(another speaker comes in, difficult to hear.)…tax fuel and get rid of the tax free system, because it's just insane.

End of interview.

Appendix 3: Discontinued Passenger Taxes in Other Countries

As there are countries currently enforcing different aviation taxes on departing passengers, we also find examples of countries that previously has had some form of air passenger tax only to abolish it later on. These countries include Denmark, The Netherlands and Ireland (SOU 2016:83, 2016). In addition to these countries, there were also plans on introducing a flight tax in Portugal, although the government chose not to proceed with the plans. In the following, we will briefly look closer at these cases.

The discontinued passenger charge in Denmark was introduced in 1991 and was meant to replace the so-called Charter Fee (Jørgensen et al., 2005). To begin with, this tax only applied for international flights and was set to 65 DKK. This however changed when the EU commission in 1996 informed Denmark that the tax was in violation of treaty provisions regarding the freedom of movement for people and services due to the charge only affecting international flights. The tax was therefore changed in 1998 to include both domestic and international departures and the tax was set to 75 DKK (SOU 2016:83, 2016).

After the change in 1998, some additional minor changes besides those mentioned above were made to the tax due to the effect on important domestic routes with low traffic volumes. This also applied to routes to Greenland and the Faeroe Islands, which are regarded as domestic Danish flights. The tax revenue from the tax increased steadily from 55 million DKK in 1991 to 504 million DKK in 2005 with the highest peak occurring in 2001. In 2004, 16 percent of the tax revenue came from domestic routes while 84 percent came from international routes (Jørgensen et al., 2005). In 2005, the Danish government decided to gradually discontinue the passenger charge. This was achieved by cutting the tax in half from 75 DKK to 37,5 DKK per passenger in 2006 before completely removing the tax from 01.01.2007 (Skatteministeriet, 2014). This was done to improve conditions at and the competiveness of Danish airports as well as combating the negative effects it had on the Danish economy. It is also claimed that the tax caused passengers to travel to airports located in Sweden instead (SOU 2016:83, 2016). After the tax was discontinued in 2007, the Danish government suggested during the summer of 2011 to reinstate the tax of 75 DKK. Despite the suggestion, the plans were never carried out (SOU 2016:83, 2016).

The Netherlands is also a country that introduced an air passenger tax only to abolish it later on. The air passenger tax was introduced by the Dutch government from 1 July 2008 under the 2008 national tax plan (Gordijn & Kolkman, 2011). The air passenger tax affected passengers that departed from Dutch airports but the tax did not apply to transfer passengers or to freight shipments. The air passenger tax was split into two different rates depending on the distance of travel. If the destination was located within an EU member country or a maximum distance of 2 500 kilometers from the Netherlands the tax rate was 11,25 euros and for other flights the tax rate was 45 euros. The expected tax revenues were 350 million euros.

The air passenger tax was regarded as one of the instruments to be used in making the tax system greener. One of the stated objectives was to transfer part of the taxes levied on labor and profit on to taxing environmental pollution. An air passenger tax was seen as a suitable instrument by the Cabinet with regards to taxing environmental pollution as air travel obviously contributed to pollution. Before the tax was implemented, it was estimated that the tax would cause the number of passengers travelling from Amsterdam Schiphol Airport to drop by around 8-10 percent. At the time, this was considered to be acceptable numbers as this would only be a short-term drop, and that the numbers would quickly pick up again due to increasing growth at the time and therefore preventing an actual decrease in passenger numbers. The worst-case scenario, a temporary delay in growth would occur.

As a result of the tax, passenger numbers began to fall immediately, especially at Amsterdam Schiphol Airport while the level of transfer passengers remained the same. Conservative estimates of the effects stemming from the air passenger tax are nearly two million fewer passengers departing from Amsterdam Schiphol Airport during the period. It must however be said that some of the effects experienced also came as a result of the global economic crisis and other trends and developments. Passengers in the Netherlands started using international airports such as Düsseldorf, Weeze and Brussels instead. Although this was a trend that began before the tax was implemented, the implementation of the tax accelerated this trend with Weeze airport seeing a 50 percent increase in Dutch passengers during the period of which the air passenger tax existed. KLM, the national airline of the Netherlands said in early October that they had 230 000 fewer passengers since the introduction of the air passenger tax. This number was in late November increased to 400 000 fewer passengers because of the tax.

After the travel and tourism industry released disappointing economic performance data, SEO Economic Research was commissioned to study the impact that the air passenger tax had made. The impact on airlines losing business, airports, tour operators and the tourism industry were losses of approximately 1.2 to 1.3 billion euros. The tax also failed to generate the expected tax revenue stated in the Coalition Agreement. The Cabinet then responded to the protests and negative effects of the air passenger tax by abolishing it in two steps as a measure in fighting the economic crisis. The first step involved setting the air passenger tax down to zero (€0) as of 1 July 2009. The second step was to completely abolish the air passenger tax as of 1 January 2010, a step that was made to offer the sector certainty in difficult times. A precondition for this was that Schiphol was to improve its competitive position through a number of measures. Another factor taken into account was aviation's entry into the EU CO2 emissions trade system as of 2012 (Gordijn & Kolkman, 2011).

Ireland previously enforced a tax called the Air Travel Tax. This was a departure tax put on all passengers departing from Irish airports since 30 March 2009 (Veldhuis & Zuidberg, 2009). However, flights operated on aircraft with a capacity of less than 20 passengers and flights operating from airports with less than 50 000 departing passengers the previous calendar year, were exempt from the Air Travel Tax (Revenue - Irish Tax and Customs, 2017).

Originally, to begin with, the tax was split between two different rates. If the flight was longer than 300 kilometers from Dublin airport, the rate per passenger was 10 euros and if the flight was within 300 kilometers of Dublin airport, the rate was 2 euros (Veldhuis & Zuidberg, 2009). If no reduction in demand for air travel occurred, then the projected tax revenues from the air travel tax in 2009 would amount to 130 million euros. Based on a report commissioned by the airlines Aer Lingus, Ryanair and Cityjet in 2009, airlines have not been able to pass the air travel tax on to passengers through higher airfares. Instead, the airlines reacted with a combination of absorbing the tax by lowering fares and redeploying capacity outside of Ireland. Therefore, the actual revenue loss across all sectors as a result of the air passenger tax is higher than previously expected due to the impact of higher prices alone, which is estimated at between 428 million euros and 482 million euros compared to the tax revenue of only 116 million euros.

In 2011, the air passenger tax saw a change in the design. The rate changed from being distanced based to a flat tax of 3 euros per passenger regardless of distance flown (SOU 2016:83, 2016). This was due to the EU commission remarking that the previous rates being distanced based,

was in conflict with the treaty provisions of free movement of services. On 1 April 2014, the air travel tax was abolished. This was due to the excessive consequences the tax had on the Irish economy (SOU 2016:83, 2016).

Portugal is a country which proposed to introduce a tax on departing passengers in 2014. It was supposed to be introduced as part of a green tax reform where aviation would compensate for their climate impact. In a slightly changed proposal, the Portuguese government in 2014 proposed to tax passengers on domestic flights with 3 euros and passengers travelling on flights outside the EEA with 15 euros. Passengers travelling on international flights within the EEA would be exempt from the tax. The proposal was expected to be approved together with the budget in 2015, however the government decided not to include the proposed tax in the green tax reform after all. The reason for this was that aviation tax would be counterproductive and jeopardizing growth in an important sector for the Portuguese economy. It was also argued that the aviation would soon be covered by a global mechanism. Therefore, despite the proposed tax being able to generate an estimated 33 million euros in revenues, the proposed tax was dropped from the green reform because of the potential decreased interest in Portuguese airports (SOU 2016:83, 2016).

Appendix 4: Current Air Passenger Taxes in Other Countries

The following table (adapted from PwC, 2017 and (European Business Aviation Association, 2015) lists examples of the different countries and their passenger taxes that can be found in Europe. A detailed text explanation follows below the table.

Country	**Name**	**Rates**
Austria	Air Transport Levy	Short haul: €7, Medium haul: €15, Long haul: €35
Bosnia	Government Tax	$12 USD Flat Fee
Croatia	Civil Aviation Authority Tax	Domestic: €0,68, International: €1,37
France	Civil Aviation Tax Solidarity Tax	Within EU: €4,48, Outside EU: €8,06 EU Economy: €1,13 Non EU Economy: €4,51 EU Business class: €11,27 Non EU Business class: €45,07
Germany	Air Transport Tax	Within EU & EFTA: €7,47, Outside EU & EFTA but max 6000km : €23,32, Other countries: €41,99
Greece	Airport Development Charge	€12 Flat Fee
Italy	Council City Tax	From Rome: €7,50, Other cities: €6,50
Latvia	Passenger Service Charge	€3,10 Flat Fee
Luxembourg	Passenger Service Charge	€3,79 Flat Fee
Norway	Air Passenger Tax	83 NOK Flat Fee
United Kingdom	Air Passenger Duty	Less than 2000 miles: £13 Economy and £26 Business class. Above 2000 miles: £78 Economy and £156 Business class
Serbia	CAD passenger tax	€0,98 Flat fee

As in Norway, there are also other countries that have introduced air passenger taxes over the years. It is estimated that total passenger taxes in European aviation will raise 6 billion euros in tax revenues during 2017 (PwC, 2017). It is however worth noting that the size of the tax and way the different taxes work vary from country to country and therefore in some cases, making

a direct comparison more difficult. The following list is an example of the different countries and passenger taxes that can be found in Europe:

- Austria: Air Transport Levy
- Croatia: Civil Aviation Authority Tax
- France: Civil Aviation Tax, Solidarity Tax, Fiscal Tax (Corsica)
- Germany: Air Transport Tax
- Greece: Airport Development Charge
- Italy: Council City Tax
- Latvia: Passenger Service Charge
- Luxembourg – Passenger Service Charge
- Norway: Air Passenger Tax
- UK: Air Passenger Duty
- Bosnia: Government (European Business Aviation Association, 2015)
- Serbia: CAD passenger tax (European Business Aviation Association, 2015).

The air passenger taxes mentioned above are taxes that are paid to the federal government with the purpose of raising revenue instead of being collected with the intention of offsetting the cost of a service provided, as aligned to the IATA list of ticket and airport taxes and fees (PwC, 2017). Any aviation tax rates mentioned below are per passenger.

The taxes that are most similar to the Norwegian air passenger tax can be found in Bosnia, Serbia, Greece, Latvia and Luxembourg. The similarity is that all of these countries charge a flat fee for all passengers regardless of distance flown. The main differences are that the Bosnian tax is only levied on passengers travelling on international flights. The taxes in Serbia, Latvia and Luxembourg apply for all passengers. This also applies to the tax found in Greece, although some intra Greek routes are exempt from taxation. The rates for the different countries are as follows: Bosnia USD $12, Serbia €0,98, Greece €12, Latvia €3,10 and Luxembourg €3,79.

Germany, Austria and Croatia are countries that also have introduced air passenger taxes. The taxes in these countries however vary by distance flown. The Austrian tax differentiates between short haul (€7), medium haul (€15) and long haul (€35) where different countries and territories are placed in the different distance categories. The German Air Transport Tax differentiates between flying within the EU and EFTA (€7,47), countries not a member of the

EU but within 6 000km of Frankfurt (€23,32) and other countries (€41,99). The tax in Croatia does not depend on distance but has one rate for international flights (€1,37) and one for domestic flights and transfer passengers (€0,68). In Italy, carriers are subject to the council city tax. The rate of the tax depends on which airport the flight departs from. The rates differ depending if the passenger departs from an airport located in Rome (€7,50) or other airports (€6,50). For executive air charter flights, Italy also enforces a tax called the Italian Aero Taxi Tax where the rate to be paid is determined based on the distance flown.

France operates with two different taxes on aviation. The first one is called the Civil Aviation Tax and applies to all commercial flights departing from an airport situated in French territory. The rate of the tax depends on whether you are traveling within the EU (€4,48) or outside the EU (€8,06). On top of the Civil Aviation Tax, one is also subject to the Solidarity Tax which is tax devoted to aid programs. This tax also applies to all commercial flights departing from an airport situated in French territory. The Solidarity Tax also differentiates between class of travel in addition to distance, meaning that flying business class is taxed heavier than flying economy. The rates for the Solidarity Tax are €1,13 for EU and €4,51 for non-EU economy flights and €11,27 for EU and €45,07 for non-EU flights in business class respectively.

The United Kingdom has an aviation tax called the Air Passenger Duty. The Air Passenger Duty came into effect already in 1994. The government has also included business jets into the Air Passenger Duty. As with the French Solidarity Tax, this tax is also based on distance and class of travel. From 1 April 2018, the rates for flying will be as follows. If flying less than 2000 miles, the rate is £13 for economy and £26 for business class while if flying more than 2000 miles, the rate is £78 for economy class and £156 for business class (HM Revenue & Customs, 2018).

As mentioned previously, there are also new aviation taxes planned. Sweden is a country that is considering implementing an aviation tax in 2018 (Statens Offentliga Utredningar, 2016). This would also be a tax where the rate is based on distance traveled. For flights within the EU, the rate is to be 60 SEK, for flights outside the EU but closer than 6 000km the rate is 250 SEK and for flights longer than 6 000km the rate will be 400 SEK. This tax will enter into force on 1 April 2018 (Sveriges Riksdag, 2017). There has been lots of criticism pointed towards the coming tax where the International Air Transport Association is one of the critics. In a response to the Swedish government, they claim that the tax will cost 7500 jobs while severely damaging

Sweden's economic competitiveness abroad. They also claim that the tax will have a negligible impact on the climate and that Sweden already is a part of European Union Emissions Trading Scheme and that airlines already pay emission and noise charges at Swedish airports (IATA, 2017). There are also countries that previously enforced air passenger taxes to abolish them again. An overview of these countries and their respective abolished air passenger taxes, their effects and reasons for abolishment can be found in appendix 3.

Appendix 5: Cost Structure Overview

The aviation industry in general, can be characterized as both fiercely competitive and cost intensive. This appendix contains a small overview of how the airline industry generally categorize their operating costs. An airline's operating costs can be split into "total fuel cost" and "total non-fuel cost". Total fuel costs change over time and include taxes paid on fuel**.** An important aside here is that taxes are not levied on fuel used on international flights, per the fuel tax exemption developed at the 1944 Chicago Convention, an agreement which established core principles permitting international transport by air while at the same time creating the International Civil Aviation Organization, ICAO for short (International Civil Aviation Organization - ICAO, 2018). Total fuel costs are more variable due to the volatility of fuel price, which is of course linked to the global oil price. They also have a downward-trending component due to improvements in overall fuel efficiency with time. Total non-fuel costs are relatively more stable, and include fixed charges, for example those per aircraft, per passenger, fees to airports, and et cetera.