

Vincent Schade

The inclusion of aviation in the European Emission Trading Scheme

Analyzing the scope of impact
on the aviation industry



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III List of Abbreviations

AAU/s	Assigned Amount Unit/s
A-CDM	Airport Collaborative Decision Making
art.	Article
ATC	Air Traffic Control
ATK/s	Available Ton Kilometer/s
ATM	Air Traffic Management
CDM	Clean Development Mechanism
CER/s	Certified Emission Reduction/s
CO ₂	Carbon dioxide
EC	European Commission
EEA	European Economic Area
EEX	European Energy Exchange
ERU/s	Emission Reduction Unit/s
ETS/s	Emission Trading Scheme/s
EU	European Union
EUA/s	European Emission Allowance/s
EU-ETS	European Union Emission Trading Scheme
GHG/s	Greenhouse gas/es
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IET	International Emission Trading
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol

LCC/s	Low-cost carrier/s
NAP/s	National Allocation Plan/s
NWC/s	Network carrier/s
par.	Paragraph
R&D	Research and development
RTK/s	Revenue Ton Kilometer/s
SESAR	Single European Sky ATM Research
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

1.1 Background

Climate change has been a major concern in climate policy and has therefore regularly been on politicians agenda for a long time. For this reason, several scientific studies in climate research were conducted to detect main causes of this disturbing environmental development. It was determined that anthropogenic (i.e., human-induced) greenhouse gases (GHGs), such as nitrous oxide (N₂O), methane (CH₄), and carbon dioxide (CO₂), have been major contributors of global warming.¹ In particular, atmospheric CO₂ concentration, which is caused by the combustion of carbon based fuels, has been declared as one of the major drivers of the greenhouse effect. Beyond that, records show a significant increase of atmospheric CO₂ concentration compared to pre-industrial levels.² In order to address these climate change challenges and mitigate global warming, international environmental treaties, such as the United Nations Framework Convention on Climate Change (UNFCCC) and later the Kyoto Protocol (KP), were established to enforce limitations on GHG emissions.³ As a result, the overall GHG emissions within the European Union (EU) were decreased by 5.5% between 1993 and 2003.⁴ Moreover, additional actions were taken through the creation of the European Union Emission Trading Scheme (EU-ETS) in 2003. This cap-and-trade scheme operates through the allocation and trade of emission allowances to reduce GHG emissions in a cost effective manner. Its original scope required only selected industries, such as energy, iron, and oil, to comply with the emission trading scheme (ETS).⁵ Aviation, as an industry whose CO₂ emissions have risen in the EU by 95% since 1990, accounts nowadays for about 3.3% of the EU's total CO₂ emissions. However, it had never been subject to the KP nor included in the EU-ETS.⁶ In 2008, the European Commission (EC) proposed the inclusion of aviation in the EU-ETS as a response to the continuous air traffic growth which caused a constant increase of CO₂ emissions from aviation. As a result, Directive

¹ See Grubb (2003), p. 147.

² See Intergovernmental Panel on Climate Change (2007); Kiehl and Trenberth (1997).

³ See United Nations (1992); United Nations (1997).

⁴ See Wit et al. (2005), p. 1.

⁵ See European Commission (2003), Annex I.

⁶ See European Environment Agency (2012), pp. 293-294.

2008/101/EC (henceforth Aviation Directive), an amendment of the original EU-ETS legislation, was ratified and came into force in January 2012. Since then, all flights departing from and arriving at an airport located in the European Economic Area (EEA) have been subject to the EU-ETS.⁷ Figure 1 illustrates the long-term evolution of global air traffic between 1980 and 2007, including major events leading to some temporary variations of activity:

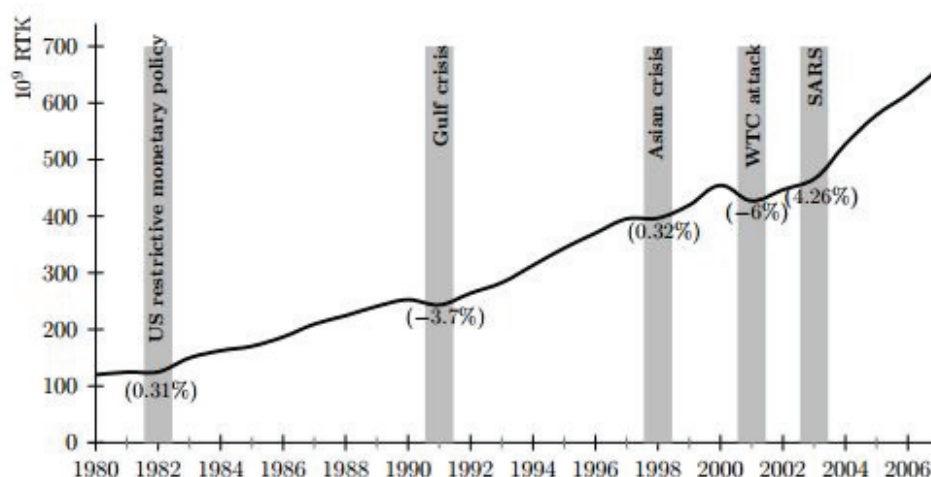


Figure 1: Evolution of world air traffic (1980-2007) expressed in RTK (billions)⁸

A significant volume of literature already exists concerning the inclusion of aviation in the EU-ETS. Most of the research laid its focus on specific industry levels such as the individual airline, the aviation industry in general or macroeconomic aspects. In this context, these studies tried to anticipate market reactions triggered by the EU-ETS by analyzing specific issues such as the financial impact on airlines, changes in competitive behavior or implications for the overall industry development.⁹ As a consequence, the existing studies took only a limited market view and made assumptions about expected developments in specific fields of the aviation industry. However, at the time of writing this thesis, conclusions about the scope of impact could hardly be drawn from existing impact assessments because of the wide range of issues that exceeded the scope of most impact studies. Hence, a broader research approach is needed which takes

⁷ See European Commission (2008), preamble, par. 16; The EEA consists of the EU, Iceland, Liechtenstein, and Norway.

⁸ See Chèze et al. (2011), p. 5.

⁹ See Anger (2010); Lowe et al. (2007); Scheelhaase and Grimme (2007).

different analytical perspectives to describe the scope of impact of the EU-ETS and depict potential effects for the aviation industry.

1.2 Objective and limitations

The main objective of this thesis is to describe the scope of impact of the EU-ETS on aviation and to develop a detailed understanding of the effects for the aviation industry through its inclusion in the EU-ETS.

Facilitated by the following remarks, including a comprehensive impact analysis, this thesis will also help to understand:

- the potential chances and risks for airlines through the recent incorporation in the EU-ETS,
- the expected market development of the aviation industry in the future due to the imposition of an ETS for GHG emissions,
- the international legal framework for climate change and emission trading, and
- the distinct industry characteristics, including interrelations and dependencies between the legislation and the aviation industry.

Due to the complexity of the research topic, the presented analysis in this thesis is conducted under scope limitations. The focus of the analysis is to examine the impact of the EU-ETS on passenger airlines, excluding cargo airlines and other market participants such as airport operators, ground handlers or other service providers.¹⁰ Also, adjacent industries such as tourism and the oil industry are not subjects of the analysis.

1.3 Structure

This master thesis is structured into six main sections. After the introduction, section two provides the reader with an overview of the legal framework for climate policy in order to describe the legal scope of major climate policy treaties and explain how the EU-ETS is embedded in this legal environment. At first, international and national law is conceptualized by distinguishing between different environmental treaties. Later remarks refer to

¹⁰ In this thesis, the terms “aviation industry” and “airline industry” are used interchangeably.

major climate change treaties such as the UNFCCC and the KP. Eventually, a detailed description of the EU-ETS, including its objectives, scope, and mechanisms, is given. Based on the preceding part, section three delves further into the EU-ETS by focusing on the aviation industry and its incorporation in the EU-ETS. In the beginning, a brief overview of key characteristics of the aviation industry is provided to achieve a sufficient understanding of the market players, the competitive situation, and major industry trends. Subsequently, the section elaborates on environmental policies in international aviation ending with a detailed description of the Aviation Directive including its objectives, design parameters, and latest amendments. Section four encompasses a comprehensive analysis of EU-ETS describing the scope of impact for the aviation industry. Different industry parameters that are potentially impacted through the inclusion in the EU-ETS are identified. Moreover, expected effects for the industry are highlighted and potential market reactions of airlines are discussed to provide support for future predictions on industry developments. In order to achieve an overall understanding of the scope of impact, the impact assessment takes three distinct analysis perspectives. The individual perspective focuses on the impact of the EU-ETS on airline profitability. Subsequently, the intra-industry perspective takes a broader view on the impact on competition between market players. Eventually, the collective industry perspective focuses on potential changes in market performance and development, and thereby examines effects for the overall aviation industry. Thereafter, section five outlines main results from the impact analysis, including main drivers of impact for aviation. Later, management implications for airlines to cope with the EU-ETS regulatory are discussed. Finally, section six concludes this thesis by recapitulating the key aspects of the research topic and providing a future outlook for potential developments regarding the EU-ETS and the aviation industry.