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## Assessing the equity impact of the European Union Emission Trading Scheme on an African airline



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### ABSTRACT

The European Union Emission Trading Scheme (EU ETS) included aviation activity in 2012, with free emissions allowances being allocated to each airline. The EU ETS is a market-based measure, which the European Union has introduced for aiming at reducing emissions and meeting the targets specified under the Kyoto Protocol. One of the largest issues is equity. The first multinational emission trading scheme resulted in many regulatory issues and objections by a number of countries and airlines concerning its legality under the Chicago Convention. In addition, under the Kyoto Protocol, ratified countries have different responsibilities and roles based on whether they are Annex I or non-Annex I countries. Hence, this paper attempted to investigate the equity issues by measuring the impact of the EU ETS on an African airline compared to airlines in an Annex I country. The results of case study indicate that there are some differences in terms of equity between Annex I and non-Annex I carriers and their passengers. The instrument is proven to be cost-effective; however, the economic rationality arguments seem to be weak with respect to the volatility in individual behaviour and the vulnerability of non-Annex I carriers which is caused by competition with Annex-I carriers. A transparent distribution of revenue from the EU ETS could be one way of moderating the equity gap between carriers and passengers.

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### 1. Introduction

This paper aims to measure the equity effects of the aviation EU ETS on a non-Annex I country's airline by comparing it with airlines in Annex I countries, assuming that the EU ETS phase III was conducted in 2013 as planned. In addition, any opportunities to mitigate the equity issues caused by the ETS and implemented on a global scale will be discussed.

Aviation became part of the European Union Emission Trading Scheme (EU ETS) in 2012 (European Commission, 2006), with free emissions allowances being allocated to each airline. According to the European Commission (2011), it is anticipated that over 176 million tonnes of carbon dioxide (CO<sub>2</sub>) emissions are expected to be traded, and by 2020, the EU ETS will allocate €20 billion worth of free CO<sub>2</sub> at the current market price (around €7 per metric tonne). In other words, the EU ETS has valued CO<sub>2</sub> emissions generated by aviation at no less than €20 billion. A large amount of economic activity is expected, including other activity costs such as consultancy, management, transactions, and abatement. The

scheme poses many challenges for airlines because they are now required to internalise carbon costs (which used to be an external cost in their profit and loss statements).

The EU ETS is one of several market-based measures (MBMs) the European Union has introduced aimed at reducing emissions and meeting the targets specified under the Kyoto Protocol. As such, this is the first international ETS in the world. The first phase was carried out between January 2005 and December 2007; the second phase ran from January 2008 to December 2012; the third phase started in January 2013 and will end in December 2020. The ultimate aim of this scheme is to create an environment where a scarcity of allowances will eventually lead to an upward trend in prices (Bredin and Muckley, 2011; Paoletta and Taschini, 2008).

The first multinational emission trading scheme resulted in many regulatory issues and objections being raised by a number of countries and airlines concerning its legality under the Chicago Convention. In addition, under the Kyoto Protocol, ratified countries have different responsibilities and roles based on whether they are Annex I or non-Annex I countries, whereby the latter do not have to undertake quantitative emissions reduction targets. But equity issues among airlines and countries cannot be avoided, particularly with regard to global ETS mechanisms.

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Consequently, the EC took a ‘stop the clock’ action in November 2012, and issued a ‘stop the clock’ Decision (Decision no. 377/2013/EU) (European Commission, 2013) in April 2013 by promoting progress on global MBMs through International Civil Aviation Organisation (ICAO). The global MBM led by ICAO will be finalised in 2016 and implemented by 2020. In particular, the ICAO Resolution (ICAO, 2014) stated that the member of countries and groups implementing MBMs prior to the global MBMs should consider a de minimis exemption to exclude developing countries contributing less than one per cent of global aviation emissions. Although the EU voted against such the above resolution, Brussels announced the proposal to amend the 2003 ETS Directive (European Commission, 2014) in February 2014.

This resolution can be considered as a temporary measure for finding a way to break the deadlock regarding the MBMs for each country, group, policymaker, airline and user. Considerable issues and constraints for implementing the MBMs exist, with particular regard to establishing a fair and transparent mechanism.

The equity effect of the EU ETS on passengers is therefore evaluated through a case study which uses a bottom-up approach, where differences in consumer welfare are investigated by implementing the EU ETS on various carriers. In order to compare Annex I carriers and non-Annex I carriers, a case study of London Heathrow and Johannesburg routes is conducted by comparing the UK carriers British Airways (BA) and Virgin Atlantic (VS) and South African Airlines (SA).

The rest of this paper is organised as follows. Section 2 consists of a review of the previous studies to identify the issues and the key areas of the EU ETS. The methodologies, models, and data used are explained in Section 3. The results of case study are presented in Section 3; and Section 4 concludes with a discussion.

## 2. Literature reviews

The impact of the EU ETS has been studied widely in terms of airlines' networks and reconfigurations (Albers et al., 2009; Derigs and Illing, 2013), the additional costs and effects on fares (Scheelhaase and Grimme, 2007; Scheelhaase et al., 2010; Morrell, 2007) and the impact on the airline industry and macroeconomic activity in Europe (Anger, 2010).

Derigs and Illing (2013) analysed the impact of the measure on air cargo airlines, with specific reference to how airlines can optimise their profits by adapting their network and schedules. CO<sub>2</sub> reduction was shown to have a zero or marginal impact on cost increases, and these may be limited by small changes in the schedule.

The extra costs are not considered large enough to prompt major route reconfiguration among European airlines (Albers et al., 2009). Morrell (2007) estimated that the excess cost per passenger would be USD 2.77–3.49 for easyJet, and USD 1.66–1.77 for British Airways (based on a price of USD 40 per tonne). Scheelhaase and Grimme (2007) estimated the cost to be between zero and €2.51 per passenger for Ryanair in 2012, and €0.04–0.39 per passenger for Lufthansa (based on a price of €20 per tonne). Unilateral GHG emission regulation would increase the home airlines' fares more than foreign airlines, thus adversely affecting their market share (Yuen and Zhang, 2011).

Albers et al. (2009) investigated the impact of the EU ETS on the European airline network and concluded that a rate of €20 per tonne was not high enough to initiate major route reconfiguration. The EU ETS rules planned for the first phase would not reduce CO<sub>2</sub> emissions at all (or at least only marginally). Cost increases for airlines were either negligible or limited to small changes in scheduling (Derigs and Illing, 2013). Many of the above-mentioned studies use European airlines to show the minor impact of the EU ETS on costs, networks, and emissions reductions. A US study by Malina et al. (2012) also found that the EU ETS has a relatively small impact on US airlines and aviation emissions. Controversially, under the current allocation rules, US carriers' profits may in fact increase due to windfall gains from free allowances.

Meanwhile, it is crucial for non-Annex countries to discover how to engage in and make use of the EU ETS, and the measure's future influence on aviation sectors in non-Annex countries also require further consideration (Zhang and Wei, 2010). For example, the decline of revenue from the Caribbean tourism market from Europe and North America would be negligible under the current proposal. However, a significant decrease in tourist arrivals is predicted under a more stringent scenario (for example, if the carbon price is USD 200 per tonne, the emission cap will be 90 per cent of the baseline [2004–06 average emissions] in 2012, and 80 per cent of the baseline during 2013–20). Overall, there are no significant impacts on emissions reduction or costs under the current EU ETS scheme. This scheme becomes effective only if aggressive measures are implemented (Derigs and Illing, 2013; Sgouridis et al., 2011; Vespermann and Wald, 2010). The small reduction in aviation emissions is due to high abatement costs in aviation compared to other sectors (Malina et al., 2012). The carbon pricing scheme would need to maintain high price levels: a price of USD 200 per metric tonne of CO<sub>2</sub> would be needed for a total reduction of 8 per cent of emissions compared to a zero price case (Sgouridis et al., 2011).

One of the largest issues is equity, which involves perceived differences of cost-benefit distribution among the groups participating in the policy (Agusdinata and Delaurentis, 2011). Agusdinata (2013) address the equity issue in terms of multi-actor policymaking. They discuss the solutions which require a different level of sacrifice from each actor and argue that the policymakers should consider the level of compensation each actor should pay. In other words, the equity issues reflect how much both the costs and benefits caused by the policy implementation are distributed among the groups. Each group has demographic, geographical, and historical differences which affect the different levels of the policy implementation required.

The EU ETS was established by involving both Annex I and non-Annex I countries. Indeed, non-Annex I countries have been concerned about the move by Annex I countries to a market-based mechanism (MBM) initiatives such as the EU ETS or levies in other regions. One example is the International Air Passenger Adaption Levy (IAPL) of 2008. The Maldives submitted a proposal for the IAPL to the United Nations Framework Convention on Climate Change (UN FCCC) Conference of Parties in 2008, on behalf of the Least Developed Countries (LDC). It proposed increasing the revenue for the Kyoto Protocol Adaptation Fund by charging a levy on air tickets. The purpose of this was to allow developing countries direct access, rather than reducing emissions. Many small developing island states are considered particularly vulnerable to the adverse impacts of climate change, and at the same time, highly dependent on tourism for economic development and as a major source of employment (Chambwera et al., 2012). The LDCs intended to redistribute the revenue from levies to their own countries or other non-Annex countries, whereas the EU ETS aims to keep it within Annex I countries. Pentelow and Scott (2011) estimated that Caribbean nations could gain revenues of approximately €2.0 to €2.15 billion per annum through the IAPL by 2020.

Each participant has each own opinion about the EU ETS which involves multi actors with different policies and backgrounds are involved. Hence, it is the important that the global MBM scheme for international aviation should take into account the equity issues caused by the scheme. This paper attempts to fill the gaps in the empirical literature related to this key area.

## 3. Model, approach and data used

Firstly, the additional costs the EU ETS passed on to passengers in 2012 were estimated based on the difference between total fuel

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