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Aviation and the costs of the European Emission Trading Scheme: The case of Italy

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HIGHLIGHTS

- Aviation industry has been part of the European Union Emission Trading Scheme (EU-ETS) since 2012.
- Aviation companies complained about the additional costs linked to the EU-ETS.
- An economic model is proposed to calculate these costs, illustrating the case of Italy.
- Results show that the total direct costs of EU-ETS and their effects on airline companies and society are still limited.

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ABSTRACT

The attention of policy makers on aviation environmental impacts has increased meaningfully over the last years. In order to limit the CO_2 emissions in the transport sector, the EU has decided to include the aviation industry in the European Union Emission Trading Scheme (EU-ETS), from 1st January 2012 with the Directive 101/2008/EC.

The aim of this paper is to provide an estimation of the direct costs linked to EU-ETS that the aviation sector is standing, reporting the case of Italy. In details, this work proposes a calculation of the EU-ETS direct costs that Italian airline companies under the scheme, afforded over the period 2012–2014. Then, it presents a forecast of the EU-ETS direct costs for the years 2015–2016, referring to three scenarios related to different hypotheses on emission permit price (low, medium, high bounded scenarios), and on pass-through of these costs onto final passengers. Finally, the paper measures the effects of these costs in terms of change in airfares, revenues, and social costs. The calculations are obtained by following an economic model designed by the authors, which can also be extended to investigate other sectors covered by the EU-ETS.

1. Introduction

The attention of global policy makers on the aviation environmental impacts has increased meaningfully over the last years. In fact, the growth of the sector has induced significant drawbacks in terms of climate change, local air pollution, land contamination, and noise pollution (Köhler et al., 2013; Lee et al., 2010). The primarily source of these negative externalities is the emission of carbon dioxide (CO_2), directly computed as a proportion of burned fuel (Dessen et al., 2014).

In Europe, the aviation sector currently accounts for about 5 and 27 per cent of total and transport greenhouse gas (GHG) emissions respectively. In particular, CO_2 emissions are still growing at a rapid pace and have more than doubled over the last two decades, producing more than six times the emissions of the rail sector (Brack, 2013).

This expansion is primarily due to a substantial increase of the air transport demand, expected to rise by 3.7 per cent per annum in the next years (Rothengatter, 2010; Capoccitti et al., 2010) and driven by several factors. First of all, the gradual change in consumers' behaviours has determined a growth in both tourism and trade flows (Gössling et al., 2012). In addition, the liberalisation

Abbreviations: CO_2, carbon dioxide; GHG, greenhouse gases; EU, European Union; EU-ETS, European Union Emission Trading Scheme; EEA, European Economic Area; ICAO, International Civil Aviation Organisation; IACA, International Air Carrier Association; CITL, Community Independent Transaction Log; EC, European Commission; NAP, National Allocation Plan; EEAg, European Environmental Agency; AMC, Abatement Marginal Cost; TDC, Total Direct Cost; GSE, Gestore dei Servizi Elettrici

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policies started in the Eighties of the last century have encouraged the entrance of low-cost competitors, lowering airfares and making this type of transport accessible to a wider range of passengers (Fu et al., 2010).

In order to prevent and limit sector emissions and to meet the European environmental goals for 2020 and beyond, the European Union (EU) has broadened the number of industries belonging to the European Union Emissions Trading Scheme (EU-ETS), namely the first and largest international emissions trading scheme (Ellerman and Buchner, 2007; Meleo, 2010), including aviation from 1st January 2012 (Directive 101/2008/EC). In this way, air carriers have been asked to contribute to the reduction of GHG, implying additional costs (environmental costs) to manage.

The aim of this paper is to provide an estimation of the direct costs linked to EU-ETS stood by the aviation sector[1], and their market equilibrium effects.

In details, the Directive 101/2008/EC sets that all flights departing and arriving in an airport located within the European Economic Area (EEA)[2] must be covered by the EU-ETS, regardless of the airline nationality.[3] The Directive has raised two different reactions. At first the opposition of non-European airlines, aviation lobbies, and extra-European policy makers. They were concerned about the additional costs that the EU-ETS would have caused (mainly the purchase of emission permits, new green investments, and administrative costs), and the likely distortion of the competitive equilibrium (Mitra, 2012; Preston et al., 2012). In addition, they claimed that the EU had applied a charge to flights outside its borders without any previous agreement, apparently violating the Chicago Convention on International Civil Aviation[4] signed in 1944. The political and judicial debate that followed the Directive has leaded the European Commission (EC) to introduce the so-called "stop the clock" derogation of 2013 (Decision 2013/337/EU), followed by the Regulation 2014/421. These actions have suspended the Directive 2008/101/EC, waiting for an international agreement to set a single global market-based measure by 2020.[5]

The inclusion of the aviation sector within the scope of the EU-ETS has also raised concerns among many European airlines. In fact, the economic impact of the EU-ETS on competitiveness is still one of the main debating points among firms and policy makers (IACA-International Air Carrier Association, 2008; Scheelhaase et al., 2010; Kopsch, 2012; Meleo and Morelli, 2013). This has been especially true since the adoption of the Regulation 2014/421 as the EU airline carriers are required to obtain the highest number of allowances, given that their flights are primarily delivered in the EEA. In details, literature has found that the EU-ETS direct costs can affect the market equilibrium through a loss of market share (Faber and Brinke, 2011; Anger and Köhler, 2010), a change in entrance barriers (Barbot et al. 2014), or a reduction of profit margins (Delft, 2007; Frontier Economics, 2006; Malina et al., 2012; Girardet and Spinler, 2013). As a consequence, these effects could be amplified for those companies that could not offset the decrease in profits charging passengers (pass-through), or using any additional profits gained from extra-European flights.[6]

In the context of this scenario, this paper estimates the EU-ETS direct costs reporting the case of the Italian aviation sector. The focus on Italy is significant because of the different attraction factors that sustain the demand of flights to and within the country, such as the historical, cultural and natural heritages as well as the "Made in Italy" productions. Given the lack of similar studies on Italy, this analysis is interesting and it may represent a starting point to serve further studies and policymaking in Italy and Europe.

In details, this paper provides a calculation of the EU-ETS direct costs that Italian airline companies have faced over the period 2012–2015, based on the actual emissions verified by the European Commission, namely verified emissions[7] (see the Community Independent Transaction Log-CITL). Then, it presents a forecast of the EU-ETS direct costs for 2016, referring to three scenarios, more or less conservative, related to different hypotheses on emission permit price (low, medium, high bounded scenarios). Moreover, particular attention is drawn to the pass-through of these costs onto final passengers. Finally, the paper measures the effects of these costs in terms of changes in flight fares, revenues, and social costs.

The rest of the paper is organised as follows. In Section 2, it is outlined the methodology used in the analysis, providing an estimation procedure and, for years in which emissions are still to verified, a forecasting model. Section 3 presents the data used to analyse the Italian case. To better represent the selected case, some hypotheses and simplifying assumptions are introduced. Section 4 proposes an application of the constructed theoretical framework analysing the Italian aviation sector case. Finally, some policy considerations conclude the work.

2. Methods

2.1. The economic model

The EU-ETS is designed in order to reach the environmental goal of reducing CO_2 at the least possible cost option (cost effectiveness). It means that firms can buy permits from the carbon market and/or realise investments in new or sunrise technologies depending on the comparison between allowances price and marginal abatement cost.[8] In both cases, firms incur in so-called environmental costs or compliance costs that could negatively affect their competitiveness.

In order to measure the effect of those compliance costs on firm performance, an important factor has to be considered, namely the ability of firms to pass those additional costs onto final consumers

[1] The EU-ETS indirect costs originated by the electricity sector pass-through are not considered in this paper.

[2] The European Economic Area includes the 28 EU Member States, Iceland, Liechtenstein, and Norway.

[3] As for industrial plants, following a "top-down" mechanism (Meleo, 2014), the European Commission (EC) is responsible to set an emission cap for the aviation sector that is independent from the cap set for the other energy-intensive industries under EU-ETS. For 2012, the EC had to distribute a number of permits corresponding to 97 per cent of the aviation sector average historical emissions registered in the period 2004–2006 in Europe. In the following years (2013–2020), the cap has been reduced to 95 per cent of the same average historical emissions. As regards the method of allocation, in 2012 the total permits issued by the EU had to be auctioned by 15 per cent and distributed 85 per cent for free, while in 2013–2020, 82 per cent of the cap has to be allocated for free, 15 per cent by auctions, and 3 per cent collected in a special reserve for new entrants.

[4] The Convention prohibits the introduction of unilateral measures in the aviation field by the signatory countries.

[5] In details, Regulation 2014/421 indicates that: emissions from flights within the EEA are subjected to EU-ETS; the other flights are exempted for 2013; from 2014 EU-ETS will be enforced also for flights outside the EEA for the portion of the flights realised within the border of the EEA; flights that involve less developed countries are regulated with specific dispositions. After the 2013 Decision, almost 59 per cent of the original free allowances returned to the EC (Sandbag, 2013).

[6] Actually, the pass-through on final prices is a strategy that was announced and enforced by Ryanair that charged fare by 0.25 Euros per flight. Estimations indicated that Ryanair earned important windfall profits.

[7] Verified emissions represent the emissions communicated by firms to the European Single emission registry. These emissions are certified by accredited verifiers accordingly to the Monitoring and Reporting Regulation and to the Accreditation and Verification Regulation.

[8] The marginal abatement cost indicates the additional costs a firm has to manage when increasing one emission reduction. It is a convex curve; this implies that the more a firm has introduced actions to reduce pollution, the higher the MAC for additional actions will be (Meleo, 2014).