

THE ECONOMIC AND EMISSIONS IMPACTS TO CHINA AND THE EU OF INCLUDING THE INTERNATIONAL CIVIL AVIATION INDUSTRY INTO THE EU ETS

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(1) Overview

The EU has pioneered greenhouse gas (GHG) emissions reduction with the establishment of an emissions trading scheme (ETS). Going even further, beginning in 2012, each airline was to hold a number of permits proportionate to the GHG emissions of its fleet, following an initial, partially free distribution among the carriers (2008/101/EC, known as the EU Aviation Directive). For fairness in competition, all flights departing from, and arriving at EU airports would be included in the trading scheme, including international (non-EU) airlines. This approach raised a series of huge reactions because a number of countries, for instance, the US, China and many developing countries, do not have mandatory emission reductions obligations under the Kyoto Protocol. Therefore, nearly thirty non-EU countries adopted a joint declaration describing the EU Aviation Directive as “discriminatory” and a violation of international law, and while the European Court of Justice has ruled in favour of its legality, there still is ongoing debate around whether the EU Aviation Directive is in compliance with principles or rules from following: WTO, Kyoto Protocol, international customary law, Chicago Convention, and the Open Skies Agreement between US and EU. (Tunteng, 2012) Pressure from these countries resulted in the suspension of the inclusion of aviation in the EU ETS from October 2012 for one year to allow for the possibility of the development of a Market Based Mechanism (MBM) as an alternative route for reducing aviation emissions.

In the face of this uncertainty surrounding the economic mechanism for emissions reductions in aviation, this paper will explore the economic and emissions impacts to selected economic areas, EU and China, of including the aviation industry into the EU-ETS. Although China is not listed in the Annex I of the Kyoto Protocol, there is a large possibility that it will commit the mandatory mitigation obligation due to its dramatically increasing GHG emissions. According to the estimation of the Energy Information Agency (EIA), the GHG emissions in China will increase to 8133 Mt in 2025, accounting for 21% of global emissions. Therefore, it is significant to study the impacts of including Chinese airlines into the EU ETS to see whether there is a positive effect in China’s emissions mitigation.

(2) Methods

We examine impacts to both regions in terms of, firstly, a reduction in GDP as a result of smaller airline profits. If the international (non-EU) aviation industry is not included in the ETS, this will favour Chinese airlines for flights between both regions and cause an increase in their profit margins. The methodology will establish a linear regression model to examine the nature and form of the relationship between both region’s GDP and their aviation revenue from 2001 to 2012. We then estimate both EU’s and Chinese aviation revenue changes from 2012 to 2020 due to the inclusion of international aviation into the EU Aviation Directive. We then investigate how these changes could influence EU and Chinese GDP growth.

In addition, we estimate the effect of the additional cost of emissions permits on travel behaviour between the EU and China and the impact of this on emissions in the future. We use the Tier-1 methodology, based on aggregated fuel consumption for flights between the EU and China to be multiplied with average emission factors. For cost impact calculations all studies assume that the cost of CO₂ allowances is passed on to consumers causing an increase in airfares. During these calculations, we evaluated a number of parameters which could influence emissions changes, such as price elasticity of demand, revenue tone kilometres, fuel efficiency, and allowances price. (Xu, Liao, & Ma, 2013) The structure of the model is shown below:

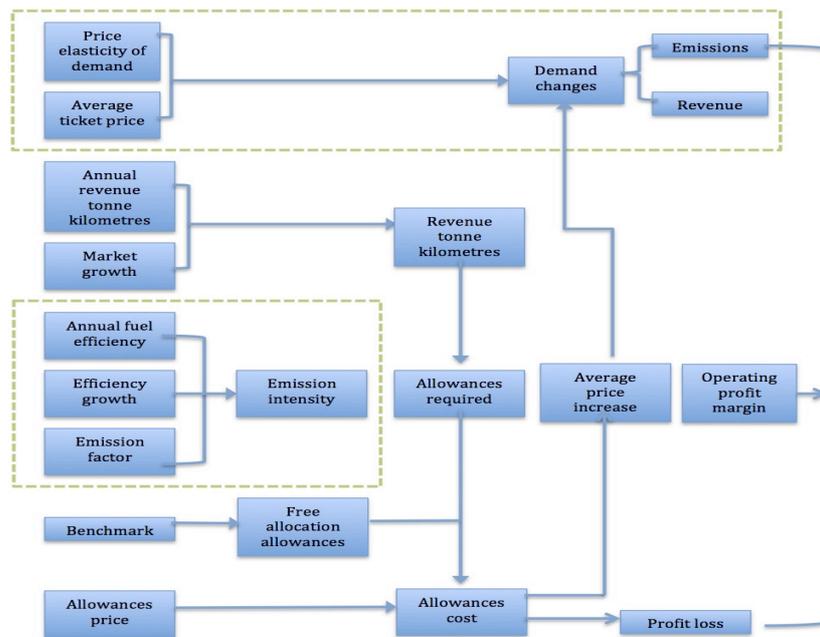


Figure 1 Simulation Model of Impacts

(3) Results

The models are currently being tested, but preliminary results show the negative impact on airline companies of joining the EU ETS. By participating the trading scheme, carriers will increase the operating cost due to purchasing carbon permits, which leads to the average ticket price ascends; thereby the demand of flying goes down and the operating profit decreases. This leads to a reduction in national GDP. However, it does have a positive effect for emissions mitigation.

(4) Conclusions

By modelling the effects of the EU ETS on aviation emissions mitigation and the influence to EU's and Chinese GDP, we can gain insights into how to improve the scheme's operation and attract other countries to participate. If we can create a win-win mechanism, achieving both environmental and non-environmental goals, this scheme will become more desirable to developing countries and will be more likely to be adopted as a multilateral measure.

References

- Tunteng, V. M. (2012, May). Legal analysis on the inclusion of civil aviation in the European Union Emissions Trading System. Centre for International Sustainable Development Law.
- Xu, X., Liao, X., & Ma, X. (2013, January). research on the Impacts of European Union Aviation Carbon Trading on China's Aviation Passenger Transport. *Acta Scientiarum Natrualium Universitatis Pekinesis* .