



Emissions trading in aviation

Moderate burdens for the time being, perceptible competition effects

November 9, 2011

- From 2012, aviation will be part of the European Union's emissions trading system (EU ETS). Airlines will then have to prove that they have allowances for carbon dioxide (CO₂) emissions covering all flights taking off or landing in the EU. For the time being, a major share of the allowances will be distributed for free, while the remainder will be auctioned.
- Fundamentally, emissions trading is an appropriate instrument to limit and/or reduce carbon emissions in aviation. However, the international orientation of the sector means that if the EU goes it alone on this issue the result will be competitive distortions to the detriment of European carriers. There is strong resistance to the plans outside the EU. Furthermore, emissions trading incurs high transaction costs.
- The financial burden on the airlines will depend on the extent to which the additional costs can be transferred to customers. Due to the fierce competition in the sector, airlines will probably have to bear part of the costs themselves. True, the additional burden is likely to be moderate at first, but it affects a sector that for structural reasons only generates low margins.
- In the near future, traffic flows will be diverted only little because of the integration of the aviation sector in emissions trading. Nevertheless, non-European airlines and airports stand to benefit in intercontinental traffic. The growth of the sector will be curbed.

Aviation becomes part of emissions trading

In October 2008, the European Council – as the last of the three European institutions involved in the decision – resolved that air transport would be integrated into the European emissions trading system. According to this decision, airlines whose flights take off or land in the EU (as well as in Iceland, Liechtenstein or Norway) as of 2012 will have to prove that they have allowances covering their respective CO₂ emissions (exceptions are made for small aircraft and military flights, among others). Emissions trading is an instrument to limit greenhouse gas emissions that is explicitly mentioned in the Kyoto Protocol. The EU launched its emissions trading system (EU ETS) in 2005. It is the first multinational system of its kind.

Externalities of air transport attracting greater political attention

Airlines have paid no tax on fuel so far, apart from a few exceptions; furthermore, no value-added tax has to be paid on international flights. As an argument in favour of this tax exemption, the industry states that the government finances the required infrastructure from take-off and landing fees; for this reason it says no additional tax is necessary. Considering infrastructure financing alone, this argument is understandable. In the last few years, however, criticism has increasingly been levelled at the standing practice that externalities of air transport (e.g. greenhouse gas emissions) are not, or not sufficiently, internalised. Environmental associations in particular decry the tax exemption on kerosene and regard it as a subsidy for the sector.

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Interplay between EU ETS and aviation tax

Germany's aviation tax law, the Luftverkehrsteuergesetz (LuftVStG), came into force at the beginning of 2011. The legislation regulates the introduction of a tax that kicks in when a passenger departs from a German airport. The German government hopes it will generate additional annual revenues of EUR 1 bn. The relevant law also addresses potential double burdens on the industry from its integration into emissions trading. Emissions trading is to take priority: the LuftVStG provides that the receipts generated via the EU ETS may be netted against the departure tax. Depending on the revenues generated from emissions trading, the German finance minister, in agreement with the environment minister and without the consent of the Bundesrat (the second chamber of parliament representing the federal states), may lower the tax rates charged. The reduction is calculated from the difference between the respective airline auction receipts from the previous year and the already mentioned fiscal target value of EUR 1 bn. If, for example, the emissions trading system raised EUR 0.5 bn, the departure tax could be reduced to such a degree that its intake declines by half. However, it remains to be seen whether the finance ministry will indeed make use of this right.

Current participants in the EU ETS

Up to now, the EU ETS has been in effect for stationary installations and covers the CO₂ emissions of about 11,000 plants in the EU (as well as in Iceland, Liechtenstein and Norway). Both electricity generation and the industrial sectors of iron and steel works, coking plant, refineries and steamcrackers, cement and lime production, the glass, ceramics and brick and tile industries, as well as paper and cellulose production all participate in the trading of CO₂ allowances. This covers slightly more than 50% of European CO₂ emissions. Up to now, the transport sector, private households and agriculture have not been a part of emissions trading.

The Kyoto Protocol does not provide for the inclusion of air transport in emissions trading because the CO₂ emissions cannot be attributed to individual countries. Instead, the sector is called upon in the Kyoto Protocol to decide appropriate measures to reduce CO₂ emissions by referring the matter to the International Civil Aviation Organization (ICAO). The ICAO recommended using market instruments and a global emissions trading system, but did not develop a concept which could be pushed through; voluntary self-restraint on the part of the ICAO members has prevailed so far. Air transport was not part of the system when the EU ETS was launched either. Thus, the upcoming integration of the sector into emissions trading is aimed at internalising the externalities. According to the German Aerospace Center (DLR), air transport is responsible for roughly 3% of international CO₂ emissions.¹ The sector's greenhouse gas emissions are climbing strongly around the globe.

Emissions trading in air transport: Practical implementation

From 2012, airlines will be issued allowances entitling the emission of a fixed volume of CO₂. If an airline produces less CO₂, it can sell its allowances in the market to airlines that have higher emission volumes than the permits at their disposal. This enables emissions to be economised where it is possible at the lowest cost – an important advantage over taxes. The integration of air transport into the EU ETS is regulated as follows: airlines may buy allowances from companies outside the aviation sector, but their sale is only possible within the sector ("semi-open" system). As the CO₂ mitigation costs in the energy business and industry should on average be lower than in aviation, the sector would probably emerge only as a buyer anyhow. What is more, companies may carry forward the allowances they do not use in a given period to subsequent years ("banking"). Furthermore, it is possible to buy a certain share of allowances from project-related climate protection mechanisms (Clean Development Mechanism and Joint Implementation) and credit them to one's own reduction target.

The allocation of emission rights is to proceed as follows: the distribution of allowances to the airlines for the 2012 to 2020 period will be based on the ratio between average CO₂ emissions of the years 2004 to 2006 and the air transport services performed in 2010. Some 82% of the allowances will be given to the airlines for free. 15% will be auctioned within the sector, while 3% will be reserved for new or strongly growing airlines. As the sector's CO₂ emissions have probably risen by roughly 15% in Europe up to and including 2011, airlines will have to buy the necessary additional allowances in the market; this will boost the actual share to be auctioned to nearly 30%. The basis for the allocation of allowances to the airlines was announced at the end of September 2011, with the total number of allowances to be issued being divided by the total number of tonne-kilometres flown.² Each airline will thus be allocated permits in accordance with air transport services performed. Allocation on the basis of a benchmark is to reward an early increase in the efficiency level of individual airlines. The auction receipts go to the country of origin of the respective airline; for airlines from non-EU countries, the receipts are credited to the

¹ Debate continues over whether the aerospace industry's contribution to global warming is greater than its pure share of CO₂ emissions, as contrails have amplifying effects.

² In this context, passengers will be recorded with an average body weight.

Administering member state

Every non-European airline which has to participate in the EU ETS is put under the wing of an administering member state that helps introduce it to emissions trading and later monitors its compliance. The emissions trading receipts from non-EU airlines flow to the respective administering member states.

Chicago Convention and Open Skies

The Chicago Convention (1944) fundamentally recognises that every state has complete and exclusive sovereignty over the airspace above its territory. So far, the Convention has been signed by 190 countries.

The Open Skies Agreement between the EU member countries and the US has regulated the mutual opening of their airspace since 2008, granting them equal rights in a market-based framework. The aim is to boost competition on transatlantic routes. Among other things, the Open Skies Agreement provides that every European airline may fly to any US airport (naturally, this also holds vice versa for US carriers and airports in the EU).

member state responsible for their administration (see box). The funds thus generated are to be used to combat climate change.

CO₂ is to be reduced by 5% from 2013

The average emissions of the years 2004 to 2006 totalled roughly 220 million tonnes of CO₂ for all flights taking off or landing in Europe. For 2012, 3% fewer allowances will be issued than for the average of the period mentioned. For the period from 2013 to 2020 a one-off reduction by 5% of the basis value is planned. In any case, these will be supplemented by the allowances for emissions resulting from the growth of the sector since the basis period and from the future growth. In 2014, the system and the allocation mechanism are to be reviewed. The airlines must have proved possession of all the allowances required for the emissions caused annually by April 30 of the following year. If a carrier cannot present enough allowances for its emissions by then, it faces a penalty of up to EUR 100 for each tonne of CO₂ that is not covered.

Resistance to European plans to go it alone

Several US airlines filed suit with the European Court of Justice against the inclusion of air transport in EU emissions trading. They doubt that this is compatible with international agreements such as the Chicago Convention or the Open Skies Agreement (between the US and the EU). In the framework of the EU ETS, flights taking off in the US have to present allowances also for emissions produced in US airspace or over the Atlantic if their final destination is in the EU. If, for example, a US airline flies from Los Angeles to Lisbon, emission permits are required for the entire flight. In late October 2011, the US House of Representatives passed a law that prohibits all US airlines from participating in the EU ETS. China and other countries are also threatening to retaliate with sanctions because of the EU's determination to go it alone. The Association of European Airlines (AEA) is against a European go-it-alone strategy, fearing it will get caught in the crossfire of a political conflict and be burdened by, for example, punitive taxes imposed by non-European countries. The international resistance to the EU plans is currently very strong. The EU has so far shown no sign of changing its plans, though.

However, countries such as South Africa, Australia or New Zealand that have already established or planned an emissions trading system for aviation are more neutral on its integration into the EU ETS. The EU rule says that no additional allowances have to be procured for flights from countries in which a similar system is applicable for airlines.³ The EU is currently negotiating with Switzerland over the possibility of linking the Swiss trading system with the EU system. The EU has an interest in integrating Switzerland into the EU ETS, since it would like to prevent the rerouting of air traffic to Switzerland.

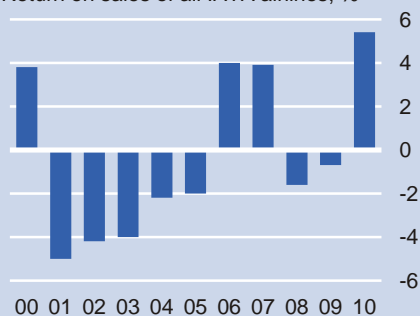
Passing on the costs is a challenge for airlines

According to our estimates, the actual costs being faced by the airlines – at a price of EUR 15 per CO₂ allowance – will total about EUR 1.1 bn for 2012. If these additional costs cannot be passed on in ticket prices, such a burden will increase the already pronounced margin pressure in the sector. This does not include the transaction costs incurred by the airlines via expenditures on monitoring and

³ For China, the introduction of emissions trading might be an option in the long run. Recently, there have been discussions about the launch of such a system for stationary plant. However, these plans have been very vague so far; besides, it is unclear whether air transport would also be included.

Only a few years in the black

Return on sales of all IATA airlines, %



Sources: IATA, ICAO

Single European Sky to benefit airlines

By introducing the “Single European Sky”, European policymakers could also make a noticeable contribution towards reducing the sector’s CO₂ emissions. Plans call for the partitioning of European airspace to be cut back from the 27 blocks at present to only nine functional blocks by 2012, the aim being to boost air traffic efficiency in general. Airspace harmonisation would make it possible to route flights more efficiently, conceivably leading to fuel savings of up to 12%. This would be a major advantage for carriers since allocation calculations for the allowances already granted were based on the routes of the old, heavily fragmented airspace blocks. Given a more efficient division of airspace the airlines could reduce emissions and they would not have to purchase as many additional allowances; this would pave the way for new growth options. However, the planning for the harmonisation of European airspace is far behind the EU’s schedule and will presumably not be fully completed until much later than 2012. The elimination of capacity bottlenecks at airports could lower the number of kilometres flown in holding patterns – and thus also CO₂ emissions.

reporting. Since 2001, the airlines constituting the International Air Transport Association (IATA) have only generated a cumulative profit in three years in the first place. Of course, the airlines will attempt to pass on the costs directly to their customers, which would lead to higher fares as a result – and ultimately also comply with the costs-by-cause principle.

The critical point will be to what extent the airlines will be able to pass on the costs of emissions trading to their customers. The allowances themselves obtain a value that is equal to the price of the emission rights in the EU ETS. By contrast, actual costs are incurred merely for the allowances bought by auction and for such emission rights that may additionally have to be purchased on account of the growth of their own traffic volume; however, most of the (value-bearing) allowances will be allocated free of charge. Depending on how costs are passed on, two scenarios are conceivable.

- First: The airlines cannot pass on the actual auction costs to their customers, or only partially, because of fierce competitive pressures. In this case they will have to bear the financial burdens at least partially themselves.
- Second: The airlines are successful in passing on the value of the allowances allocated for free either fully or partially in their ticket prices. The industry could then reap windfall profits.

In times of weak demand, when tickets have to be marketed in price-aggressive campaigns, the first scenario could come into play. It might be difficult to pass on the costs even on intercontinental flights if foreign competitors are required to show fewer allowances for routes linking non-European hubs (see below). When the economy is booming, the second scenario may have a higher probability. Ultimately, the policymakers probably opted to allocate a large share of allowances at no charge partly in order to keep the financial burdens on the industry within reason. In the medium to longer term the airlines will increasingly be compelled to purchase additional allowances via the EU ETS on account of the prospects of continually climbing traffic volumes. This automatically means that any potential windfall profits are likely to melt away in the course of time.

Only minor shift in traffic flows in the short term

Besides the direct financial burden a deciding factor for European airlines is how the integration of air transport into the EU ETS will influence the level of competitiveness vis-à-vis non-European carriers. After all, EU airline ticket prices will probably increase faster on intercontinental flights, depending on the routes, on account of emissions trading – ceteris paribus – than will those of foreign peers. One potential consequence could be a shifting of passenger flows from European hubs, such as London, Paris or Frankfurt, to non-European airports. At this time, three options need to be taken into consideration. First: Direct flights originating in or destined for Europe will be rerouted to airports outside the EU. Second: Flights using a European airport merely as a transfer point will be shifted to airports outside the EU. Third: Intercontinental flights taking off or landing in Europe will be rerouted in such a way that an enroute stop at an airport outside the EU will prove worthwhile because fewer allowances will need to be procured.



Significant competition effects for intercontinental flights

So just how probable are these three “rerouting options”?

- The first option does not seem probable, as there are only very few alternative airports available for passengers taking off or landing in the EU. A passenger destined for, say, Madrid has no worthwhile way of flying there via a non-EU airport. Only the Swiss airports would be suitable as an alternative for some final destinations in the border region. The capacities there are limited, though.
- The second rerouting option, transfer flights, will probably be used, i.e. where the European airport serves merely as an enroute stop for flights with two intercontinental legs (e.g. Miami-Paris-Mumbai). According to the European Commission such flights currently account for only about 1% of all passengers in the EU. So, in terms of the total market, the rerouting of these flights would have only a small impact. However, the large European hubs and the scheduled carriers based there would be hurt by a shift in such traffic because they have a higher share of flights with two intercontinental legs – in Frankfurt the reading is close to 5% of all passengers. Taking the given example (Miami-Paris-Mumbai), allowances would be needed for both legs. By contrast, for a Miami-Dubai-Mumbai flight, during which roughly the same amount of CO₂ would be emitted, there would not have to be any allowances on record.
- The third option will probably also gain relevance in reality. More allowances will have to be obtained for direct flights between Europe and the Far East than for flights with a stop in, for example, the Middle East (see box).

Competition with Gulf state hubs

The introduction of the EU ETS has a largely neutral impact on competition for intra-European flights and European airlines since all carriers are burdened equally. For intercontinental flights, however, this condition of competitive neutrality does not apply. On long-haul routes, flights with stops outside the EU incur less of a burden than nonstop flights. Lufthansa says a nonstop flight from Frankfurt to Beijing would have to obtain allowances for 193 tonnes of CO₂. A flight from Frankfurt to Beijing with a stop in Dubai would need allowances merely for the Frankfurt-Dubai leg, even though 265 tonnes of CO₂ would be emitted over the total distance (+37% versus the direct flight). Airlines using the hubs in Dubai and Abu Dhabi are thus less impacted than carriers offering nonstop flights from Europe.

From a competition standpoint, such shifts in traffic flows would not be a fundamental problem if they were possible for all airlines. What is a critical issue, though, is that European airlines often will not be able to offer such flights via non-European airports on their own owing to a lack of traffic rights. Thus, they will not – unlike non-European competitors – be able to mitigate or avoid the EU ETS for the given routes. Thus, there is evidence of a competitive distortion to the detriment of EU airlines, especially since the restrictions also hold for the boom in Asian airspace.

True, the absolute and relative price increases for intercontinental flights triggered by emissions trading are likely to be minor at first. And many customers – particularly in the price-inelastic business segment – will prefer to take a direct flight over a connection service and pay the premium. However, this does not change the fact that European airlines are at a disadvantage.

Fundamentally, the instrument is ecologically effective, ...

Considering the target of CO₂ reduction, emissions trading is an effective instrument with a high environmental incentive effect. It caps emissions of CO₂ for the entire EU ETS. Of course, the aviation sector may continue to grow either on the back of an increase in energy efficiency or on additional purchases of allowances via the EU ETS; these emissions will then be saved in other areas. The integration of air transport into the EU ETS will guarantee that CO₂ emissions are cut back in areas where the mitigation costs are lowest.

Options: New and more efficient airplanes and biofuel

Updating the fleet and thus deploying more efficient airplanes is one way for airlines to cut back emissions. The booming sales of the new Airbus 320neo (15% less CO₂ versus its predecessor) indicate that renewing the fleet is an economically viable option. However, given the long operating life and high costs of an aircraft, a revamp of the fleet may prove to be very costly and demanding in terms of time and money. In view of the global emissions of air transport, it has to be borne in mind that airplanes taken out of service by European carriers are sold, as a rule, to companies from other countries (e.g. in Africa).

One further way of achieving fuel savings is to reduce the weight of aircraft. Newly developed airplanes are increasingly seeing the use of plastics reinforced with carbon fibre as a substitute for metals. In existing fleets, the interior fittings harbour potential for weight reduction, e.g. via an exchange of seats.

Several airlines are counting on the use of biofuel to cut back CO₂ emissions. While the European Commission is generally open to the use of biofuel, its production is linked with other problems (fields cannot be used for food production). A complete conversion of global aviation to biofuel would require a crop production area twice as big as the territory of the Federal Republic of Germany. Therefore, hopes are being pinned on second and third-generation biofuels (e.g. algae) which may help to reconcile these conflicting targets.

... but also linked with major transaction costs

There is ultimately no question that for a global problem (climate change) a global emissions trading system would be the most effective solution. While the growth of the sector will be curbed within Europe by the integration of air transport into the EU ETS, the rapid expansion of the Asian market in particular will continue. This will continue to result in higher emissions in air traffic, so a European go-it-alone solution will have a small impact on the climate. Since a global system seems unlikely in the foreseeable future for political reasons, a pioneering thrust by the EU will have to be monitored for its competition effects on European airlines. Even if the financial burdens on the sector generally ought to be moderate for the time being, the weakening of the European carriers' competitiveness vis-à-vis non-European airlines on long-haul flights is a point of criticism; if there were shifts in traffic flows because of the EU ETS, its ecological efficiency would also suffer.

The integration of the aviation sector into the EU ETS is an incentive for other countries to follow suit with a similar system. For example, they could use the receipts from emissions trading themselves instead of leaving them to the EU. However, if other countries were to launch similar trading systems, the monitoring and coordination of the various systems would represent a major challenge. The current resistance to the regulation shows, though, that other countries would prefer to seek ways to circumvent the EU ETS. In the medium term, other countries could also conceivably introduce "alibi emissions trading systems" without a noticeable environmental incentive effect, so that their own airlines would not have to pay for allowances in the EU ETS framework.

One major disadvantage of the system is the high transaction costs incurred. But the alternative of a "kerosene tax" is not a politically viable solution. Moreover, here too, a European go-it-alone solution would pave the way to tax evasion on intercontinental flights and harbour disadvantages for European carriers and airports.

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