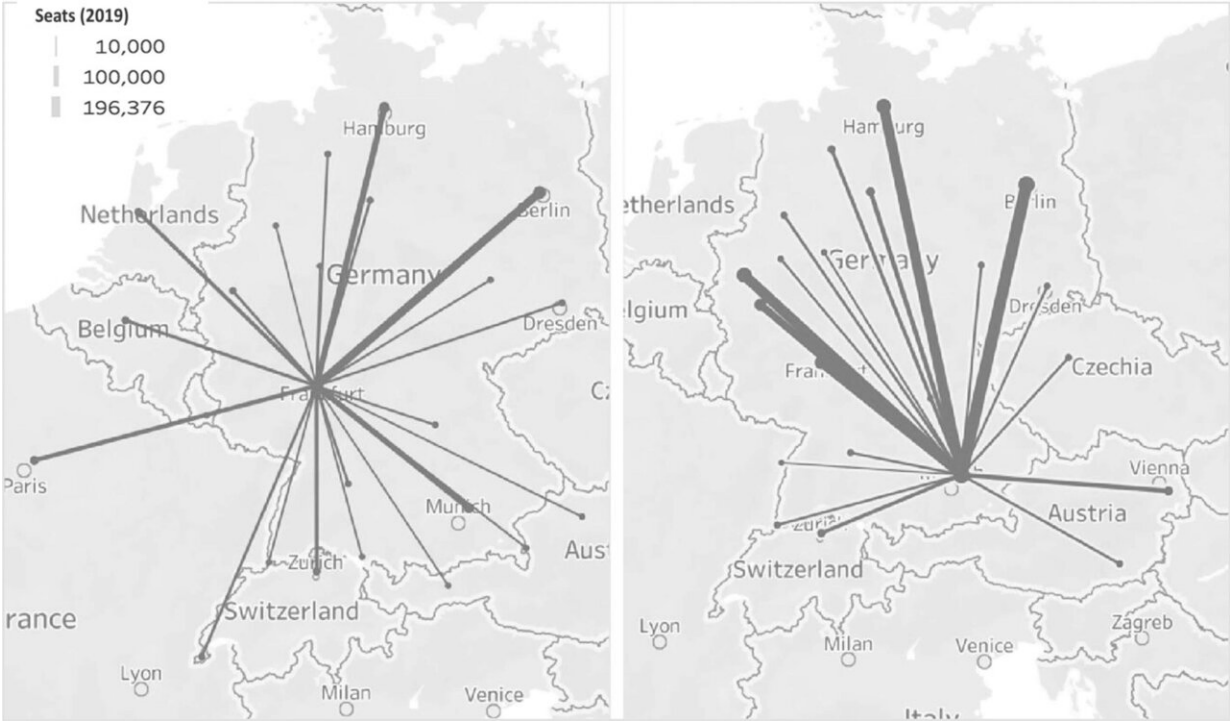


What effect will replacing short-haul flights have on carbon dioxide emissions and international connectivity?

February 13 2023, by Agustín López



Sample Air Routes from Frankfurt (left) and Munich (right) Source: OAG Traffic/Schedules Analyser. Credit: *Case Studies on Transport Policy* (2022). DOI: 10.1016/j.cstp.2022.09.001

Last December, France obtained approval from the European Commission to prohibit short-haul flights with alternatives by rail taking

less than 2.5 hours, in a measure aimed at reducing CO₂ emissions and combating climate change.

A new study by the Universitat Oberta de Catalunya (UOC) focusing on the case of Germany has quantified the potential impact of replacing these journeys in terms of both emissions and international connectivity, and highlighted the risks of these policies if they are applied on a widespread basis. The results, which have been published in the journal *Case Studies on Transport Policy*, also show the moderate impact on reducing emissions, and warn of the implications for investments in high-speed infrastructure and increased travel time.

"Our study estimates a potential reduction in CO₂ emissions of between 2.7% and 22%, depending on how strict the threshold for the replacement of flights is. However, we must be very realistic about the expectations that these measures may create because after all, aviation is responsible for only 3% of the planet's total emissions. So this would be simply be one measure among many that need to be taken to address the problem of climate change," explained Pere Suau-Sanchez, a member of the Faculty of Economics and Business at the UOC and the principal investigator of the SUMAT research group, who led the research.

In addition, the researcher also pointed out that it is a policy that should be implemented "selectively", i.e. it should be analyzed on a case-by-case basis. "Making general policies banning short-haul flights applying the same thresholds to all airports may create problems for international connectivity in the country, especially in the more peripheral regions, and could even force passengers to make longer journeys that end up polluting more," he argued.

The impact of replacements on long-haul travel

In order to determine which flights are likely to be replaced, the

researchers analyzed 87 routes across Germany, collecting data on passenger bookings, airline schedules and train schedules to calculate alternatives to short-haul air travel. The research also took passengers' complete itineraries into account when assessing the impact of potential cancelations on long-haul journeys, as many travelers who use short-haul routes do so as a means to make an onward long-haul connection.

"An average of 17% of bookings to Asia-Pacific destinations and around 24% and 25% for the Latin American and North American markets, respectively, depend on this type of feeder [flight](#)," said the researchers in the study.

This is a very innovative approach, as no previous study on the subject had explicitly considered this connectivity and its impact on travelers in transit.

Significant increases in journey times

Based on these parameters, the researchers defined four scenarios with different minimum levels of passengers with onward connections to [international flights](#) as a requirement to allow short-haul flights to be operated. For example, a threshold of 10% would mean that only routes that can demonstrate that 10% or more of their seat capacity is used for connections with long-haul flights would be allowed to operate. They also calculated what would happen by setting the threshold at 35%, 60% and 80% of passengers.

The results show that, depending on the scenario, between 53,000 and 272,000 short-haul flights per year would be banned in Germany, reducing CO₂-related emissions by between 2.7% and 22%. However, the researchers point out that if these flights are replaced by train journeys, passengers would face "significant increases in journey times, which could be very inconvenient for both business and leisure

travelers."

The measures would also lead to rail network users increasing by between 4% and 13% compared to the figures for 2019, depending on the scenario. In this context, the researchers said that any process involving replacing flights with railway journeys would require a substantial improvement in the speeds, capacities and multimodal integration of the high-speed rail network.

"These infrastructure investments would also mean an increase in CO₂ emissions, which should be taken into account when considering the measures," said Pere Suau-Sanchez.

The green advantage of Spain's high-speed train network

These results are similar to those obtained by the same researcher on a selection of routes from Barcelona, which placed the potential CO₂ savings at 2%. However, the specific characteristics of the country's airport network and railway links must be taken into account when extrapolating this research to other European countries.

"For example, the Barcelona-Madrid route is easier to replace, because it has many potential users and there is an attractive range of alternatives in terms of frequency, prices, etc., but on other journeys with fewer users, replacing the rail option would not be so attractive," explained the researcher.

One of the advantages of Spain's high-speed train network—the longest in Europe at 3,487 kilometers—is that the energy involved is always certified green, i.e. it does not emit CO₂. "In other countries such as Germany, France and Great Britain, they also use semi-fast trains that

run on diesel, so that is a variable that must also be taken into account when calculating emissions savings," said the researcher.

The risk of boomerang effects

One of the challenges in this type of measure is to make sure that they do not have unforeseen effects that have negative consequences for the economy and for the fight against [climate change](#).

For example, the UOC researcher emphasized the need to take into account the risk that companies will take advantage of the gaps left by the canceled short-haul flights to create new long-haul flights, which have higher levels of polluting emissions in absolute terms, or of passengers moving to other countries where they are not prohibited, leading to a transfer of emissions.

For this reason, Pere Suau-Sanchez believes that "a Europe-wide approach is necessary, as well as in aspects such as the integration of booking systems and the creation of an attractive intra-European range of trains."

Focusing on long distance

Apart from short-haul flights, the UOC researcher believes that the focus in the coming years will have to be on finding solutions to long-haul journeys, which account for two thirds of CO₂ emissions in the air transport sector.

"While other sectors are moving towards less polluting technologies, technological solutions linked to sustainable aviation fuels are still a long way from having an impact on the scale that is needed. For this reason, the relative importance of air transport in emissions will increase, and

there will also be increased pressure from public policies and the public to reduce this impact, with measures such as taxes and other initiatives to reduce flights," concluded the researcher.

More information: Vreni Reiter et al, The substitution of short-haul flights with rail services in German air travel markets: A quantitative analysis, *Case Studies on Transport Policy* (2022). [DOI: 10.1016/j.cstp.2022.09.001](https://doi.org/10.1016/j.cstp.2022.09.001)

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