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Fewer Planes Means Less Trade

Diego Botero Garcia, Ariell Reshef & Camilo Umana-Dajud*

With the onset of the Covid-19 pandemic, international air traffic collapsed. For some European countries, air transport is the main mode of transport for their exports. Despite its higher cost, air transport is also a widely used mode of transport for products with a high value relative to their weight, such as precious stones, electronic components and pharmaceuticals. The same is true for intermediate products that are at the heart of global value chains. Yet, the more air links countries have with each other, the more they trade: the share of overall trade between two countries that have more than 103 air links between them is 9% higher than that of countries that share no direct air links; and for trade that is transported by air alone this figure rises to 15%. In the case of goods that are not shipped by air, the effect is also substantial (about 8%) because business travel supports trade. If travel restrictions continue, or if the air transport sector is included in international commitments to reduce greenhouse-gas emissions, air transport could remain disrupted and, with it, international trade.

The Covid-19 pandemic suddenly and severely disrupted air travel. Travel restrictions related to the health crisis, as well as a general reluctance to travel, caused the number of international flights to drop by 60% between January 2020 and August 2021.¹ Given the evolution of the pandemic and its many variants, it is unlikely that air travel will return to normal levels soon.² In addition, commitments to address climate change (even if they do not affect the international transport sector), *flygskam* (Swedish: flight shame), the emergence of new pandemics or the increase in oil prices are likely to affect the sector's activity beyond the effects of the pandemic itself.

With more than 35% of world merchandise trade by value moving by air, more than half of this in the holds of passenger aircraft and the rest by cargo aircraft, reducing the number of flights is likely to have an impact on international trade.³

In the US, for example, passenger flights fell by 60% in 2020, resulting in a 63% decline in the weight of cargo carried in the

holds of passenger aircraft. At the same time, the number of cargo flights decreased by only 11%, and the cargo they carried by only 9%. Passenger aircraft belly freight capacity, which accounted for 50% of air cargo in 2019, accounted for only 29% in 2020.⁴

This shock has also affected air transport prices, which have doubled since February 2020 for routes between Europe and North America and even quadrupled for routes to the Far East.⁵ This has a disproportionate effect on goods that were *ex ante* more likely to ship by air and to relatively distant destinations. Another, indirect factor whereby the reduction in flights could affect international trade is the decline in business travel, because salespeople or entrepreneurs who traveled abroad to establish or strengthen business ties, and engineers and technicians who traveled to solve problems, have been unable to do so. By eroding personal ties and opportunities for face-to-face interaction, this reduction in business travel is likely

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1. Domestic flights experienced a smaller, though substantial, reduction of 20%.

2. See *The Economist*, August 14, 2021, "Travel chaos will last well beyond summer" and *The Financial Times*, December 13, 2021, "Air freight costs soar to record high".

3. According to the International Air Transport Association, but also several logistics companies and consulting firms.

4. Source: US Department of Transportation. The same statistic for the UK is 60% (source: Steer Group, a logistics consultancy).

5. Source: Xeneta and TAC Freight, logistics information specialists.

to have increasing consequences over time. Nevertheless, the importance of this channel may be limited because these travelers have a strong motivation to fly even when few flights are available, but also because in the future online interactions may make many business trips unnecessary.

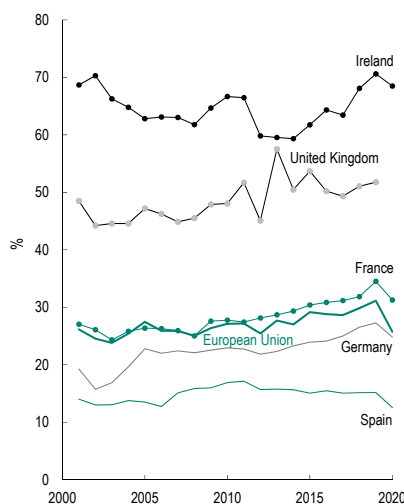
Eurostat provides data for European countries that allows assessing the importance of air traffic for trade, identifying the countries and products most affected, evaluating how air connections affect trade, and to what extent the reduction of air traffic is likely to disrupt global value chains. Building on our analysis, we consider the repercussions that a limitation of air transport could have on international trade if sanitary measures continue or if international commitments to limit greenhouse-gas emissions are made for this sector.

■ Countries specializing in goods, whose value relative to their weight is high, make greater use of air transport for their exports

While air transport accounted for around 25% of EU exports until the early 2000s, this share rose to 31% in 2019, before falling back to 26% in 2020 with the onset of the health crisis (Figure 1). Most countries have experienced a similar evolution. France, for example, saw the share of its exports by air increase from 27% in 2001 to 35% in 2019, before falling back to 31% in 2020.

Figure 1 – In some European countries, more than half of exports ship by air

Share of exported goods transported by air

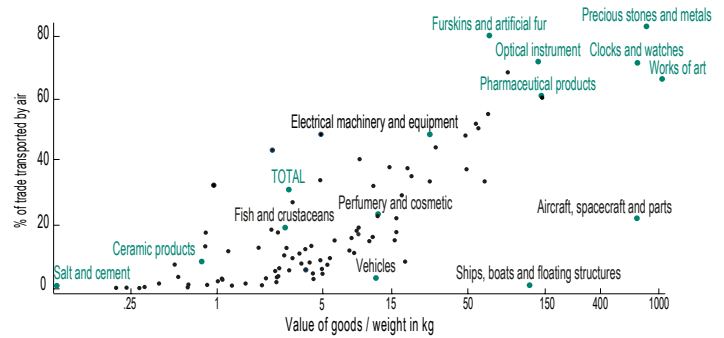


Note: Data for the UK stops in 2019 due to Brexit.

Source: Authors' calculations based on Eurostat, Comext database DS-022469.

However, the importance of this mode of transport varies greatly across EU countries. For example, in Ireland and the United Kingdom more than 50 per cent of goods exports are transported by air (up to 70 per cent for Ireland), while, in contrast, in Spain barely 15 per cent are.

Figure 2 – Products with higher value by weight fly more often



Note: Logarithmic scale.

Source: Authors' calculations based on Eurostat, Comext database DS-022469.

Although air transport is more expensive than sea or land freight, for some products this extra cost can be justified because air shipments are much faster. In general, the higher the ratio of value to weight, the more air transport is used; more than 80% of precious stones and metals are shipped by air, as are more than 60% of pharmaceuticals. Air transport is rarely used for vehicles or ceramic products, which have a much lower ratio of value to weight, let alone for cement (Figure 2).

This specificity of international airfreight explains why some countries use it more than others, depending on their sectoral specialization. This is one of the reasons why Spain is not very dependent on air transport for its exports: its sectoral specialization, marked by the importance of heavy products relative to their value, such as agricultural and food products or automobiles, alone explains 60 per cent of the difference with France in the use of air transport. Similarly, specialization in products whose value relative to weight is relatively high accounts for 40% of the gap with France in the case of the United Kingdom and 80% in the case of Ireland, with electronics and pharmaceutical products playing a particularly important role in the latter case.

■ The more air links countries have between them, the more they exchange

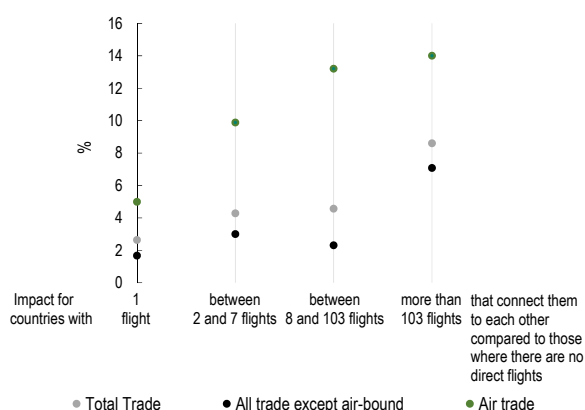
The importance of air transport for some countries suggests that trade is affected by the scarcity of flights. But how important is the average number of air links for bilateral trade? And is it only trade by air that is affected?

To find out, we can examine how a partner's share of a country's imports varies over time with the varying number of flights connecting the two countries, once we take into account the natural tendencies of countries to trade with each other (due to their size, geographic proximity, difference in living standards, etc) and macroeconomic trends.

Trade between partners with at least one air link is 3% higher than that between partners with no direct link (as is the case in 60% of cases on average) (Figure 3). Compared to countries

Figure 3 – The more air links countries have between them, the more they trade

Effects of an increase in the number of flights on bilateral trade, by type of trade



Source: Authors' calculations based on Eurostat, Comext database DS-022469.

with no air links between them, the difference is 4% for partners with 2 to 7 direct air links and almost 9% higher for those with more than 103 links. For goods transported solely by air, the difference is even larger, at 14%.

Less obviously, we find that more direct air links also increases trade in goods that do not ship by air – by about 8% for countries with more than 103 air links compared with those without. This result suggests that business travel has a significant impact on trade.

This effect of face-to-face interactions on international trade flows has been widely documented. Because face-to-face meetings facilitate the exchange of information and to better meet buyer's expectations, they benefit trade, especially when it comes to complex products.⁶ Business trips also help importers gather information that would be difficult or impossible to obtain if they did not travel. This explains, for example, why many textile importers regularly travel to China to assess the quality of products they wish to import. Face-to-face meetings also build trust between importers and exporters, and increase the likelihood that goods will actually be delivered.⁷ For many importers, therefore, travel is a way to both learn more and reduce the risk of supplier non-compliance. In addition, buyers report that traveling to supplier countries allows them to obtain lower prices, purchase larger quantities, and find new suppliers more easily than through online or telephone meetings.⁸

More generally, facilitating business travel, whether by lowering its cost, reducing travel time or setting up direct flights, significantly increases trade between countries.⁹ The same

is true of the abolition of visas or the introduction of clauses in trade agreements that facilitate the movement of business people.^{10,11} When developing-country entrepreneurs can travel without visas, it even affects the type of products they export; travel encourages them to develop exports of more complex products than commodities.¹²

These different channels through which air transport affects trade explain why distance plays a different role in air trade than in total trade. In the former case, the number of direct air links only matters when there are more than 1,500 km between the two trading partners, and its importance increases with distance, probably because light and high-value goods often ship by air over long distances. The speed advantage of shipping by air comes with high costs, which is not attractive for nearby locations because the time saved, compared to shipping by land or sea, is not large enough.¹³ For total trade, on the other hand, the distance between countries barely interferes with this sensitivity to the existence of air links, except for the most distant destinations, where it is slightly lower. At these distances, business travel is likely to be less frequent because the cost of travel makes online interactions more attractive, even if they do not offer the same benefits.

■ Air transport decisive for standardized intermediate products

Given the different elasticities between products, air transport disruptions are likely to influence the organization of global value chains, limiting trade more severely in certain stages of production (Figure 4).

Indeed, the number of air links has no impact on trade in primary intermediate goods, such as metal sheets or rods, which are upstream in the supply chain and are seldom shipped by air (only 10% of world trade in this category is by air). The impact is positive, but relatively small, for finished goods, 20% of which ship by air. Bilateral trade is 5% higher between partners with at least one direct link than between those without, a difference that does not vary significantly with the number of such links. The effects are most marked for generic or standardized intermediate goods. Trade is 25% higher between two countries with a large number of air links (8 to 103) than between those without.¹⁴ This category of goods is also the one for which air transport is most frequently used after specific intermediate goods; 27% of world

6. Cristea, A. D. (2011). Buyer-seller relationships in international trade: Evidence from US States' exports and business-class travel. *Journal of International Economics*, 84(2), 207-220.

7. Startz, M. (2017). *The value of face-to-face: Search and contracting problems in Nigerian trade*. VoxDev.

8. Startz, M. (2017). *Ibid.*

9. Söderlund, B. (2020). The Importance of Business Travel for Trade: Evidence from the Liberalization of the Soviet Airspace. Working Paper Series 1355, Research Institute of Industrial Economics.

10. Umana Dajud, C. (2019). Do visas hinder international trade in goods? *Journal of Development Economics*, 140, 106-126.

11. Mayer, T., Rapoport, H. & Umana Dajud, C. (2021), Free Trade Agreements and the Movement of Business People, *CEPII Working Paper* (forthcoming).

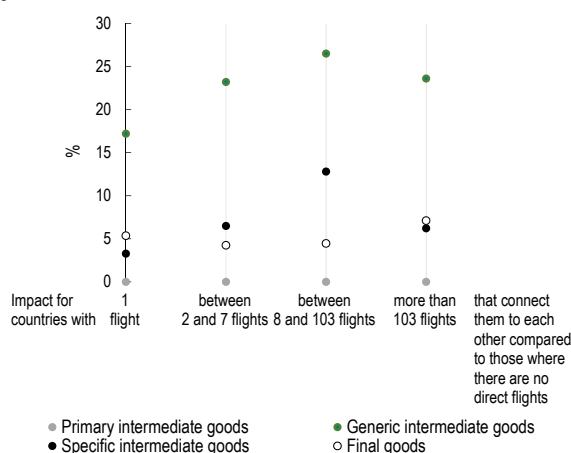
12. Umana Dajud, C. (2019). *Ibid.*

13. Harrigan, J., (2010). Airplanes and comparative advantage. *Journal of International Economics*, 82(2), 181-194.

14. For country pairs with more than 103 air links, the effect is weaker for both generic and specific intermediate goods. This may be due to the fact that most of these situations correspond to relatively close partners, between which land transport infrastructure such as rail, inland waterways and freeways are developing, which constitute attractive alternatives to air transport, particularly for intermediate products.

Figure 4 – Generic intermediate goods are more sensitive to changes in the number of flights

Effects of an increase in the number of flights on bilateral trade by air, by type of goods



Note: Specific intermediate goods are intermediate goods manufactured for a particular use, as opposed to generic intermediate goods which are standardized.

Source: Authors' calculations based on Eurostat, Comext database DS-022469.

trade in generic intermediate goods and 40% of world trade in specific intermediate goods is carried by air. It is therefore at the heart of value chains that the effects of air transport are most noticeable, perhaps because of the importance of time constraints that are inherent in the international coordination of production processes.

In sum, air transport has a substantial impact on trade, which varies by partner, product and stage of production. This is not inconsequential, as the Covid-19 pandemic has abruptly interrupted the trend of at least two decades of increased use of air transport in international trade. It is too early to know how air traffic will evolve after this shock, but it cannot be excluded that it will remain significantly affected by sanitary measures for a long time. Moreover, unless major technological breakthroughs take place, the ecological transition should lead in one way or another to limit the use of this mode of transport. It is therefore well beyond the recent disruptions that we must reflect on the possible consequences for international trade.

Products that mainly ship by air would naturally be the most affected. This includes not only high value-to-weight objects,

but also intermediate products that are integrated into global value chains. Countries would also be unequally affected, due to their geographical specificities and sectoral specializations. Beyond the overall volume of trade, a limitation of air transport could also alter the geographical distribution and organization of global value chains. For valuable intermediate products, for example, the limitation in air transport or an increase in its cost could well lead to a regionalization of value chains.

Anticipating these changes does not, of course, justify excluding air transport from efforts to undertake the ecological transition. The International Civil Aviation Organization (ICAO) was mandated under the Kyoto Protocol and then the Paris Agreement to define measures to reduce emissions from air transport, but this approach has not yielded to date any significant tangible results. This inability to include the sector in international commitments to limit greenhouse-gas emissions is alarming. A resumption of the strong upward trend in air transport that preceded the health crisis would be difficult to reconcile with the ecological transition. The European Commission has taken note of this, stating its intention to tax emissions from flights within the Union. Despite this, global coordination remains essential if this sector is to be fully integrated into efforts to reduce greenhouse-gas emissions.

By showing that air links do not only influence trade in goods transported by air, our results also highlight the importance of business travel. They thus suggest that health-related barriers to air travel may have a lasting impact on the intensity of international trade and global value chains. In the immediate term, this is particularly relevant for China, where the maintenance of a "zero Covid" strategy means drastically limiting international air passenger traffic. As this situation persists, its consequences for China's international trade and for the activity of foreign companies on its soil may well become more substantial.

By moving particular categories of products as well as people, with all that this implies in terms of information and interpersonal relations, air transport is an important component of globalization. Its sensitivity to health conditions and the imperatives of ecological transition may well have deeper implications than its place in international trade would suggest.

