Many US airports are at risk of losing regular air service

Methodology on the how we analyzed how the Covid-19 pandemic affected scheduled domestic air service in the lower 48 states.

*More technical methodology, codebooks and data are in a separate folder Methodology.*

For its analysis of changes in the air service at the 354 largest airports in the 48 lower US states, Columbia University School of Journalism used data compiled by the Bureau of Transportation Statistics (BTS). The data is designated as the Form 41 Schedule T-100 Domestic Segment (US carriers). The data comes from certified US air carriers which are required to file monthly their operating statistics. Additionally, I used Federal Aviation Administration categorization of airports by their status as hubs or non-hubs and Department of Transportation list of airports that are included in the Essential Air Service program.

But the bulk of data is BTS. It is available for download in CSV format on the BTS website. I downloaded for this study the monthly files one by one from 2019 to 2022. Twelve months for each year adds up to 48 files in total. Each monthly file typically contained more than 30,000 rows of data. In simple terms, each row details monthly data about an airline's operations from an airport: the number of departures, the airport from the departures originated, the destination airport of those flights and the aircraft used to operate those flights. For instance, a single row might indicate that in January 2019, Delta Air Lines operated 28 flights from Tucson, Arizona, to Minneapolis, Minnesota and carried in total 3,017 passengers on those flights using the McDonnell Douglas MD-90. It's worth noting that on busier routes, an airline might use different types of aircraft between the same two airports.

This granularity means it can be converted into monthly, quarterly, or annual data sets based on various criteria. For example, the raw data allows for annual calculations of total departures and passengers for flights across the 48 contiguous states. Similarly, it can be used to determine the number of passengers transported or departures managed by a specific airline or aircraft type from a particular airport. Essentially, the data can be transformed into a wide array of time series combinations.

The data was then used to analyze how the air traffic at US airports has changed since the beginning of the Covid-19 pandemic. As a starting point, the year 2019 was a logical choice because it was the last normal year of air traffic which had been affected by any external shocks such as the pandemic. The full year for which the data is available was 2022. Since then, the recovery from the Covid-19 disruption has continued and situation has evolved, but the maintain temporal unity in the data, the end of 2022 was set as the cut-off point.

The next major methodological choice was to decide how to measure the changes in traffic. There are numerous different ways to do it. For example, the airlines’ output can be measured by seats they make available and by available seat miles (ASM), which both **measure an airline’s passenger carrying capacity. Since my focus was in studying the changes from airports’ perspective, I decided to use departure and passenger numbers as my measures of traffic.**

**The number of departures is a particularly relevant measure in gauging the level of activity at small airports. All other things being equal, it is better for a small airport to have three daily departures by a 76-seat airliner than a single daily departure by a 206-seat airliner. The crucial difference is that with three daily departures a small airport offers much better connections to the wider commercial air system than with a single daily departure. This degree of connectivity affects potential passengers’ choices regarding whether they are disposed to fly out of a small airport or drive a longer distance to a larger airport. Thus, a small airport needs departures to maintain a viable air service.**

**The number of passengers is then a simple measure to gauge the overall size of an airport. For the purposes of defining which airports to include in my analysis, I used the number of annual domestic departing passengers at an airport.**

The airports that studied were selected by the following criteria. Geographically, I decided to exclude airports in Alaska, Hawaii, U.S. trust territories, Puerto Rico and Virgin Islands because due to their distance and separation from the US mainland these airports form their own eco-systems that are distinct from the commercial air network formed by the lower 48 states. For example, the state of Alaska has its own Essential Air Service program that operates in parallel to the Essential Air Service in operation in the lower 48 states.

In terms of the size of the airports included in this study, I used 10,000 annual domestic departing passengers as a cut-off point. This may sound like a lot, but on a daily basis it translates to an average of 27 passengers departing from an airport per day. Thus, comparatively small airports were included in the study. On the other hand, for the communities they serve these small airports are important, they are still sufficiently large to served small jet airliners and they are the airports which–due a confluence of factors–are now experiencing the biggest changes in the US air travel infrastructure.

To sum up, the sample of airports in this study include 354 airports in the lower 48 states that had 10,000 either in 2019 (prior to the Covid-19 pandemic) or in 2022 (the latest year available). The point of including airports that made cut in 2022 but not in 2019 was to include small airports have experienced growth in traffic.