



#virus

## Data Science High Frequency Indicators

# US Airport Traffic Is Down and Falling

**Based on geolocation data, as of March 7, traffic in US airports is down in the area of 10% vs a 2019 baseline.**

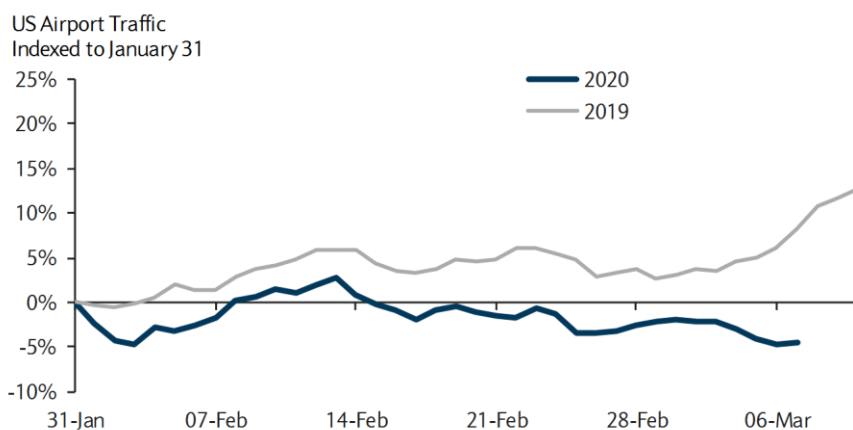
**The declines are more pronounced in areas that have seen the most virus cases – California, Seattle, and New York City:** Of those three, California's large airports – Los Angeles International (LAX) and San Francisco International (SFO) – have seen the biggest drop; New York's airports have collectively seen the smallest.

**The rest of the country has been less affected, but volumes are still down at most of the 30 airports we examined:** Florida airports appear to be the least affected, with Broward County, Orlando, and Miami among the lowest decliners (or have even seen slight gains).

**Because of the instability of geolocation panels, it is best to think of these traffic declines in terms of magnitude, direction, and rank, rather than absolute measures:** To calculate this traffic, we take the raw geolocation counts, normalize them based on a baseline established across ~1,000 zip codes, and then index the traffic to a date we believe was relatively unaffected (January 31 of each year). We expect random error of at least +/- a few percentage points. We believe the baseline is stable, but drift could always bias our results; that said, we checked our observations for consistency across locations to reinforce our confidence.

FIGURE 1

**US airport traffic appears to be down double-digits versus the same period in 2019**



Source: Complementics, Barclays Research

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## Geolocation Can Provide High Frequency Data About Airport Traffic

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Geolocation data is one of the highest-frequency sources we have available, and we believe it can provide a useful way to track changes in aggregate behavior from social distancing measures in the US. Our provider updates our data daily, but because of the collection and delivery process, there is a 2-3 day lag until all the data has been collected and made available to us.

A general overview about our methods for working with geolocation is available in our report *Data Science Methods: Making Geolocation Data Work*, October 16, 2019.

For this particular use case, we used the following process:

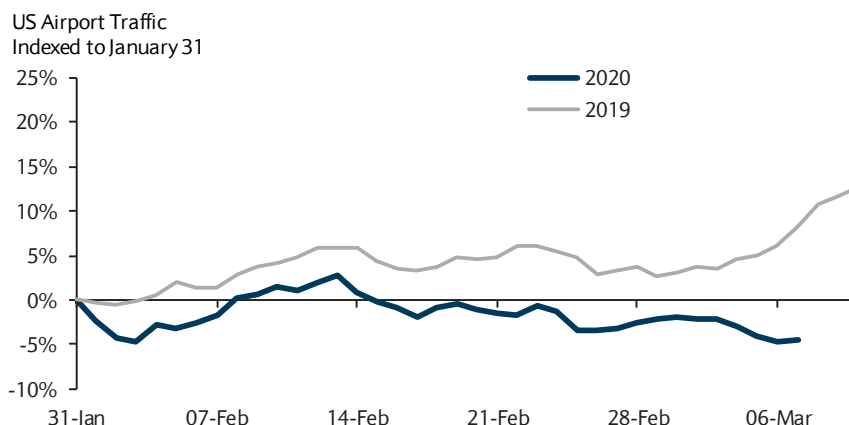
- Identified the 30 largest US airports by passenger traffic, created geofences for them, and then counted the number of unique users who generated a ping in each location daily;
- We normalized those ping counts relative to a baseline count established by looking at the unique users detected across about ~1,000 suburban zip codes. The goal of this baseline was to provide a count of users that would be unaffected by behavior changes related to the COVID-19 outbreak;
- We smooth the intra-week variation in the series by taking the 7-day lagging average in traffic;
- There is some remaining uncertainty about the level shift. This could be because of changes in ping frequency, or because there were still behavior shifts in our underlying normalization baseline. So we then index the traffic to a date we believe was relatively unaffected (January 31 of each year).

That adjustment should give a reasonable estimate for the direction of the path relative to the prior year. But we would be cautious about the exact magnitude of the change, because we expect random error of at least +/- low single-digit percentage points (and possible higher – it is difficult to know with certainty given that we don't have ground truth to calibrate against), and there is risk that shifts in the baseline could bias our results.

### **Airport traffic tracking suggests double-digit traffic declines overall, with a recent acceleration**

We take the traffic index for 2020 and compare it to 2019. As Figure 2 shows, in 2019 traffic grew from the January 31 baseline, but in 2020 we have actually seen traffic decline since the end of January. To us, that indicates a clear decline in airport traffic (and by extension air travel) that matches with airline commentaries and anecdotes about the relative (un)crowdedness of the terminals.

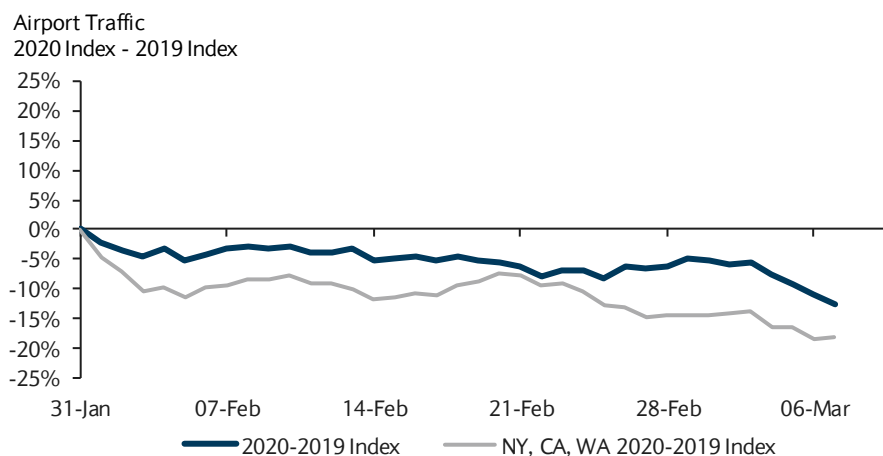
FIGURE 2

**US airport traffic appears to be down double-digits versus the same period in 2019**

Source: Complementics, Barclays Research

We then treat the difference between the two series as the estimated net loss in traffic. That suggests that overall, there has been a high single-digit, or low double-digit loss in traffic this year versus last year.

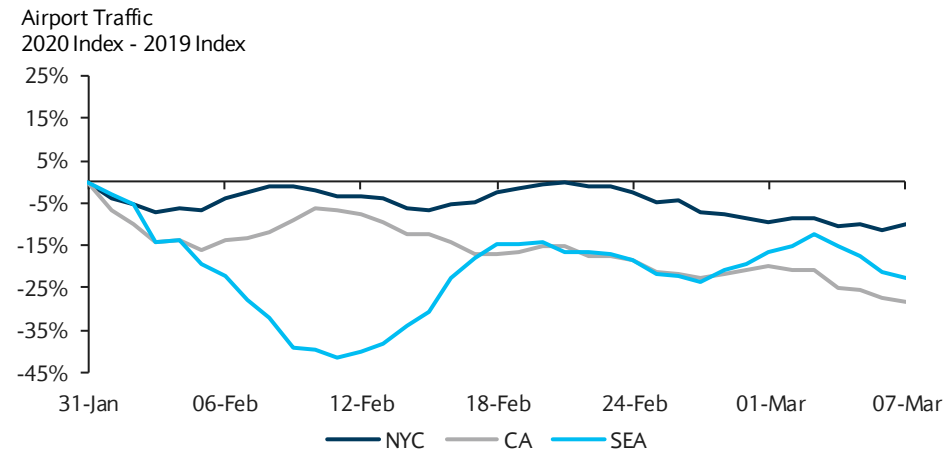
FIGURE 3

**Geolocation data suggests that overall US airport traffic is down from 2019, with steeper declines in the areas that have already seen the most cases.**

Source: Complementics, Barclays Research

There is significant variation in traffic loss across airports. The airports in the areas with the most reported cases have been the most affected (Figure 1), with SFO in particular seeing the sharpest decline. On the other end of the spectrum there are a few airports where traffic looks flat or up still. The Florida airports (Orlando, Miami, and Broward County) stand out as a group at the top of the list.

FIGURE 4  
Of the most affected areas, California's airports (LAX and SFO) have seen the greatest declines in traffic, followed by Seattle and then NYC (JFK, EWR, LGA)



Note: Seattle's y/y comparison was affected by a large spike in airport traffic in early February 2019 that we believe was related to heavy snowfall. Source: Complementics, Barclays Research

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