



ARE VACCINATIONS BRINGING BACK FLIGHT TRAVEL?

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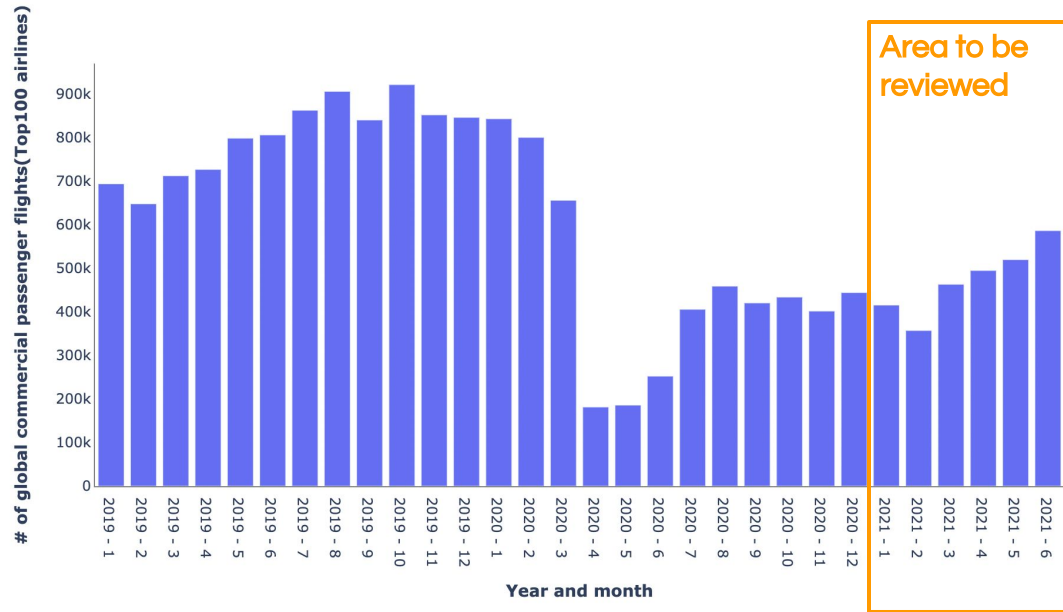
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01

RESEARCH
QUESTION

RESEARCH QUESTION

NUMBER OF GLOBAL COMMERCIAL PASSENGER FLIGHTS



COMMENTARY

- Global flight levels dropped by >80% during the initial phases of the Covid pandemic, and have still only partially recovered
- A review of the impact of vaccination levels per country on flight recovery will help understand future recovery of flight levels.
- We will review:
 - How recoveries in June 2021 compare between countries
 - How recoveries by country are correlated to the countries vaccination levels

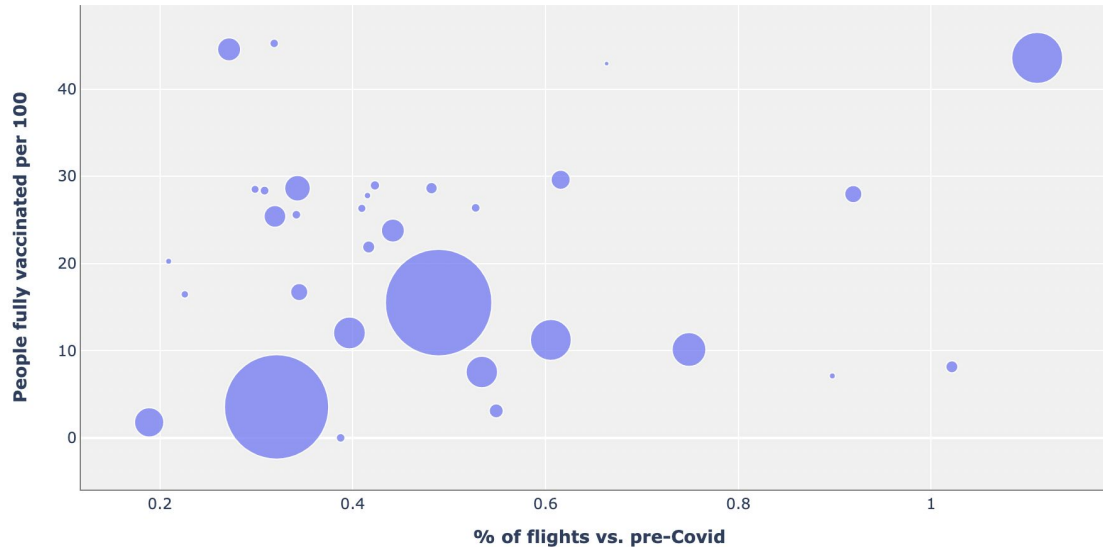
Source: Global flights for Top100 commercial passenger airlines

02

COUNTRY COMPARISON

COUNTRY COMPARISON

FLIGHT LEVEL RECOVERY VS. VACCINATION LEVELS BETWEEN COUNTRIES (BUBBLE SIZE = COUNTRY POPULATION)



COMMENTARY

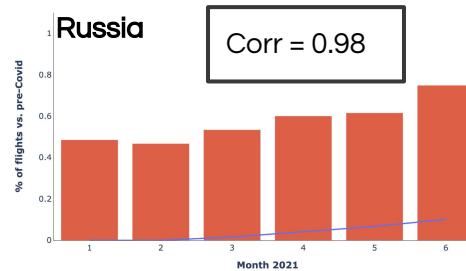
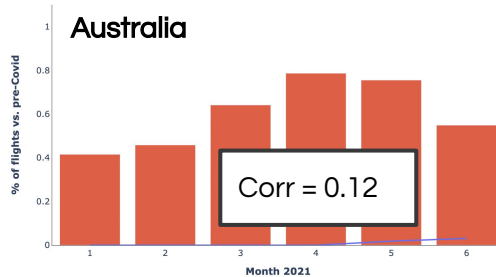
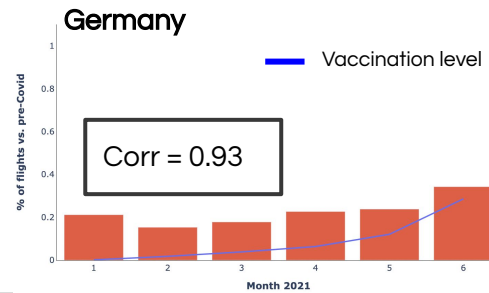
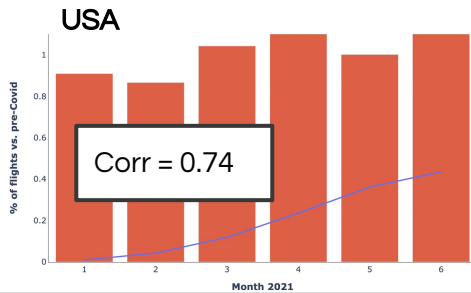
- ▲ We can observe a slight correlation of flight level recovery vs. vaccination rates
- ▲ However, a lot of countries deviate from average in both directions, likely driven by a range of other external factors (e.g. Delta variant distribution, comfort-level of travelers)
- ▲ Further review of external factors needed to normalize review

03

DEVELOPMENT OVER TIME

DEVELOPMENT – TOP COUNTRIES

FLIGHT LEVEL RECOVERY VS. VACCINATION LEVELS OVER TIME
TOP 4 COUNTRIES BY TOTAL NUMBER OF FLIGHTS IN 2021



Source: Global flights for Top100 commercial passenger airlines

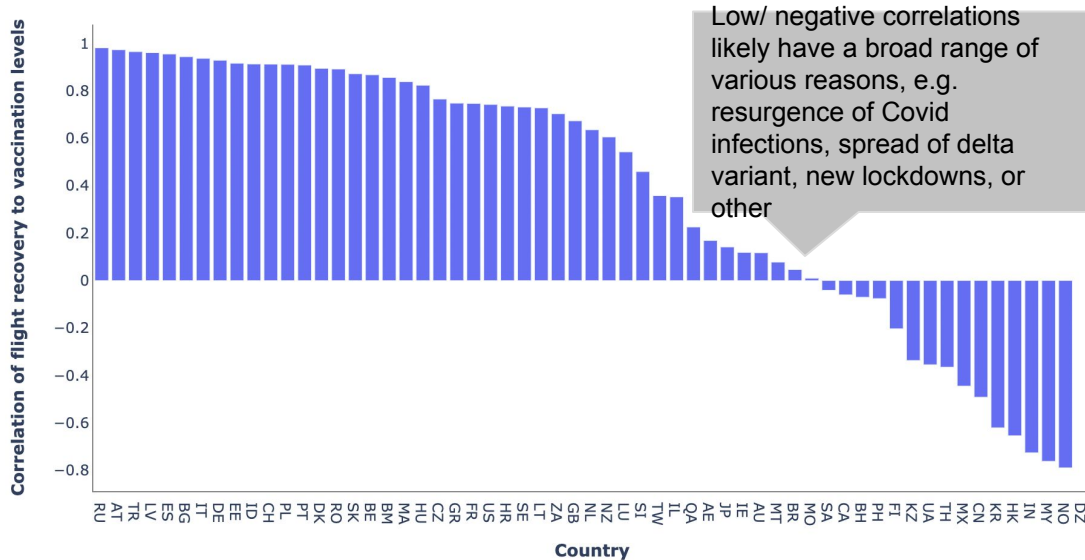
COMMENTARY

- Correlations are visible especially for countries with lower flight levels coming into 2021 (Germany and Russia)
- Correlations between increase vaccination levels and flight numbers vary strongly between countries
- Low correlation for Australia likely due to increased restrictions in May/June due to Covid resurgence

Correlation levels explain how recovery and vaccinations are related

DEVELOPMENT – CORRELATIONS

FLIGHT LEVEL RECOVERY VS. VACCINATION LEVELS OVER TIME
CORRELATION, ALL COUNTRIES WITH DATA FOR ALL MONTHS



COMMENTARY

- When looking at all relevant countries, correlation levels vary greatly
- For a range of countries, correlations are negative, likely due to a range of different reasons related to covid, e.g. increased case numbers
- Negatively correlated countries include many cases, which did not rely on vaccines, but rather on strict lockdowns to reduce covid levels, and now face new hotspots due to the delta variant (e.g. India, China)

04

NEXT STEPS

NEXT STEPS

INTEGRATE FURTHER EXTERNAL FACTORS

- ▲ Integrate comparison of data to covid case-rates, and covid-delta-variant case rates
- ▲ Review government-imposed travel restrictions

FORECAST FLIGHT RECOVERY RATES

- ▲ Review speed of vaccinations, in consideration of slowing vaccination rates
- ▲ Utilize correlation between vaccination rates and flight levels to forecast flight levels once vaccinations are completed

APPENDIX

DATA OVERVIEW AND RESTRICTIONS

FLIGHT DATA

- Open source data including all flights by flight between 01/2019 and 06/2021
- Data includes commercial, leisure, private, military and other flight activity
- Origin and Destination airport were mapped based on first/ last known coordinates and include significant amounts of missing data
- Data was filtered for:
 - Existence of origin airport
 - Commercial airtravel, based on airline (top 100 considered)

AIRCRAFT MAPPING

- Open source mapping of aircraft icao24 codes to aircraft operator and owner
- Where available, used aircraft operator, otherwise aircraft owner, to filter for only commercial passenger flights

AIRPORT LOCATIONS

- Mapping of all ICAO 4-digit airport codes to countries

COVID VACC. RATES

- Table including percentage of fully vaccinated people per country per day since 2020

OTHER

- List of Top100 global commercial passenger airlines by number of daily departures (webscreaped)
- ISO 2-digit to 3-digit country code mapping from Python module pycountry

DATA SOURCES

FLIGHT DATA

<https://zenodo.org/record/5092942#.YPHuXS1h1pQ>

AIRCRAFT MAPPING

<https://opensky-network.org/datasets/metadata/>

AIRPORT LOCATIONS

<https://datahub.io/core/airport-codes>

COVID VACC. RATES

<https://ourworldindata.org/covid-vaccinations>

OTHER

<https://www.flightsfrom.com/top-100-airlines>