IATA

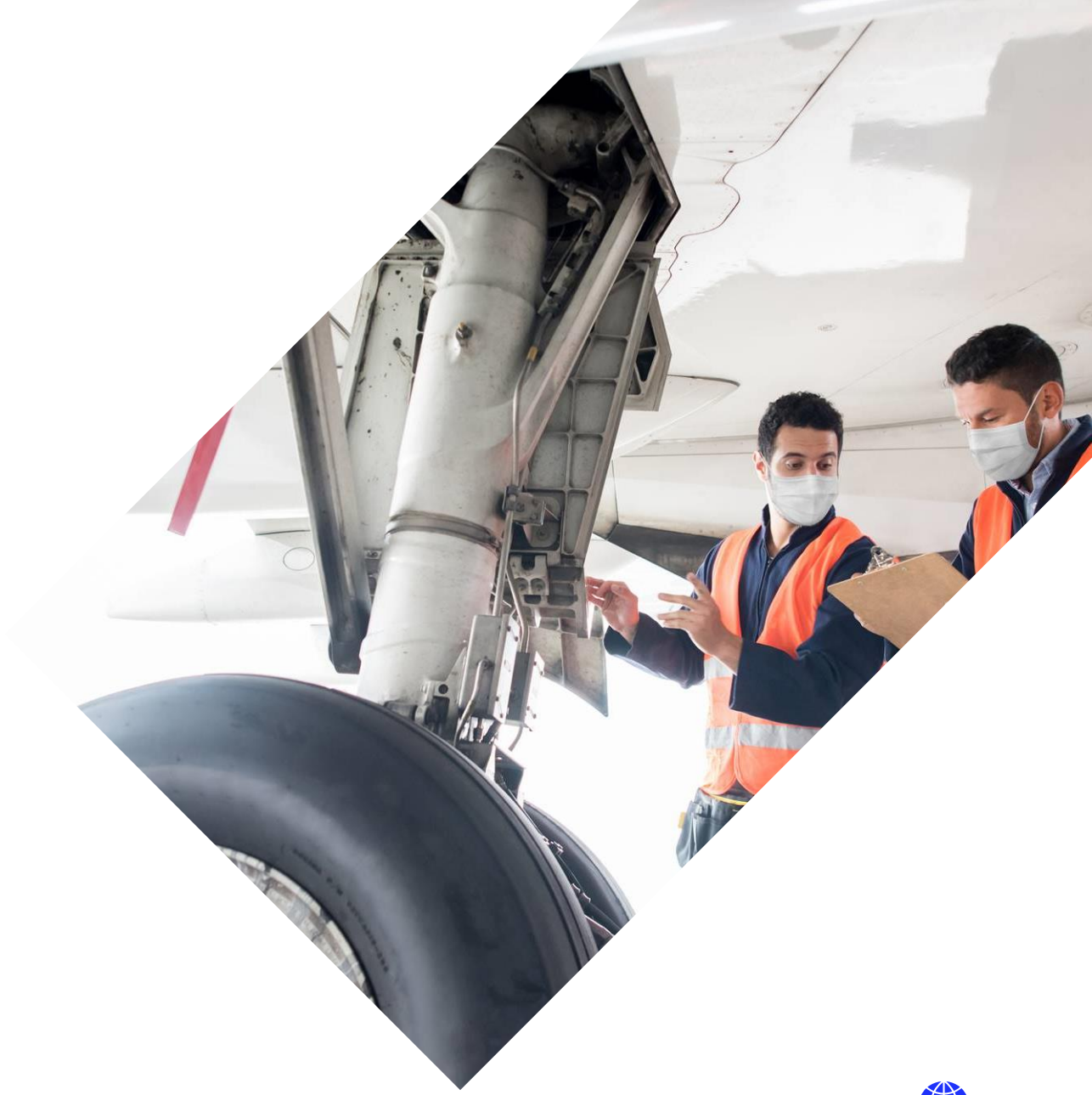
17th MAINTENANCE COST CONFERENCE

WEBINAR SERIES

Episode 1: Industry Status

Wed. September 15, 2021
7:30-9:30am EDT

- This session is **recorded**.
- Your mic is automatically **muted**.
- **Poll:** Click on Submit once you have selected your answer
- Use the **Q&A feature** on the right side of your screen to submit your questions to our panelists
- Competition Law Guidelines



Competition law guidelines

Do not discuss:

- Any element of prices, including fares or service charges
- Commissions
- Allocations of customers or markets
- Marketing plans, commercial terms or any other strategic decision
- Group boycotts
- Your relations with industry stakeholders
- Any other issue aimed at influencing the independent business decisions of competitors

Opening Remarks

Our host today:

Chris MARKOU

Head, Operational Cost Management – IATA

markouc@iata.org

- Role of the MCC
- MCTG Data collection ⇨ www.iata.org/mctg
- Poll and Q&A

Next Episodes

Episode 2 – Sept 22

(7:30am EDT or 1:30pm in GVA or 7:30pm SIN)

- IATA/Rolls Royce agreement

Episode 3 – Sept 29

(7:30am EDT or 1:30pm in GVA or 7:30pm SIN)

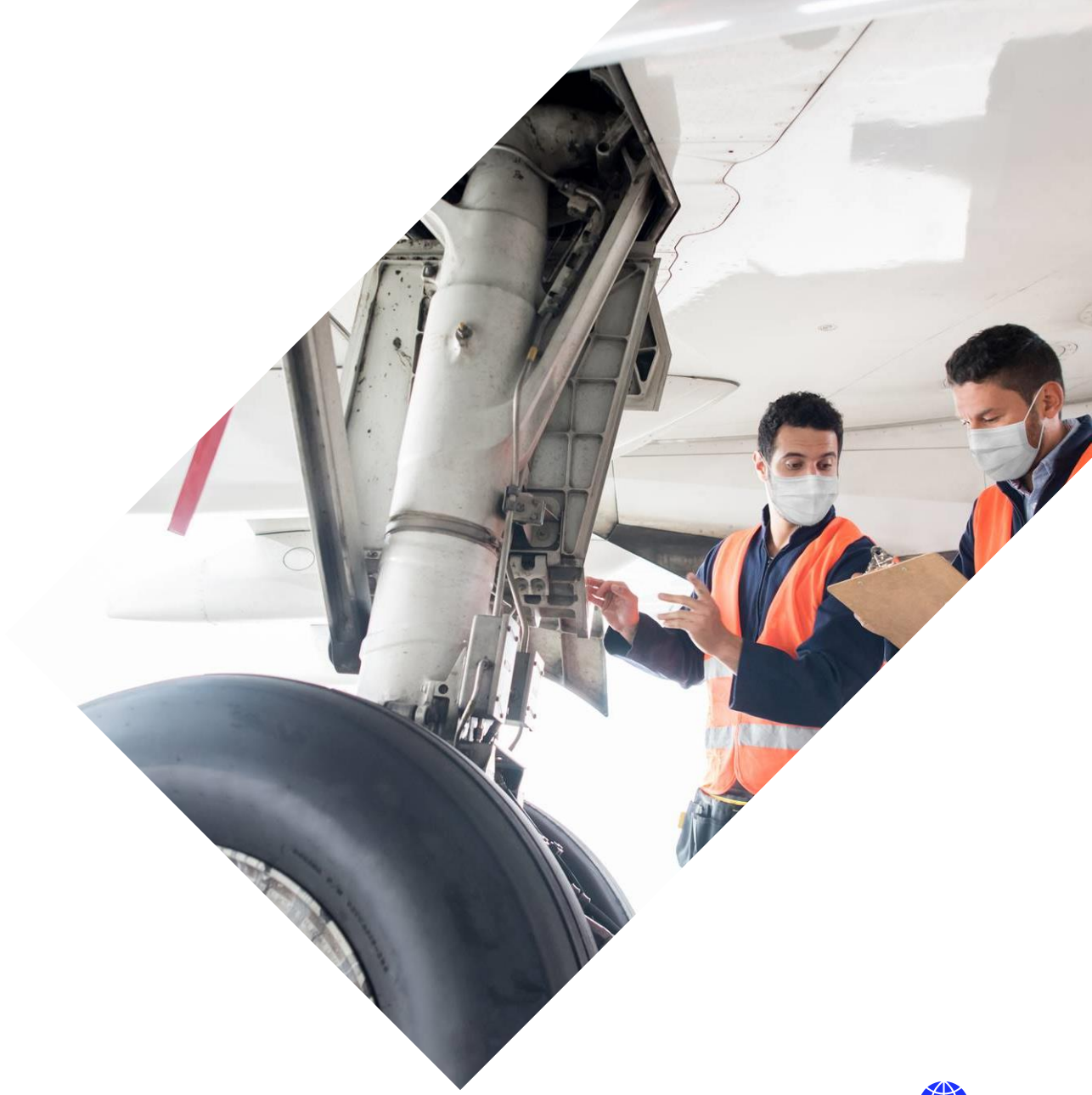
- Digital Aircraft Operations

Episode 4 – October 6

(7:30am EDT or 1:30pm in GVA or 7:30pm SIN)

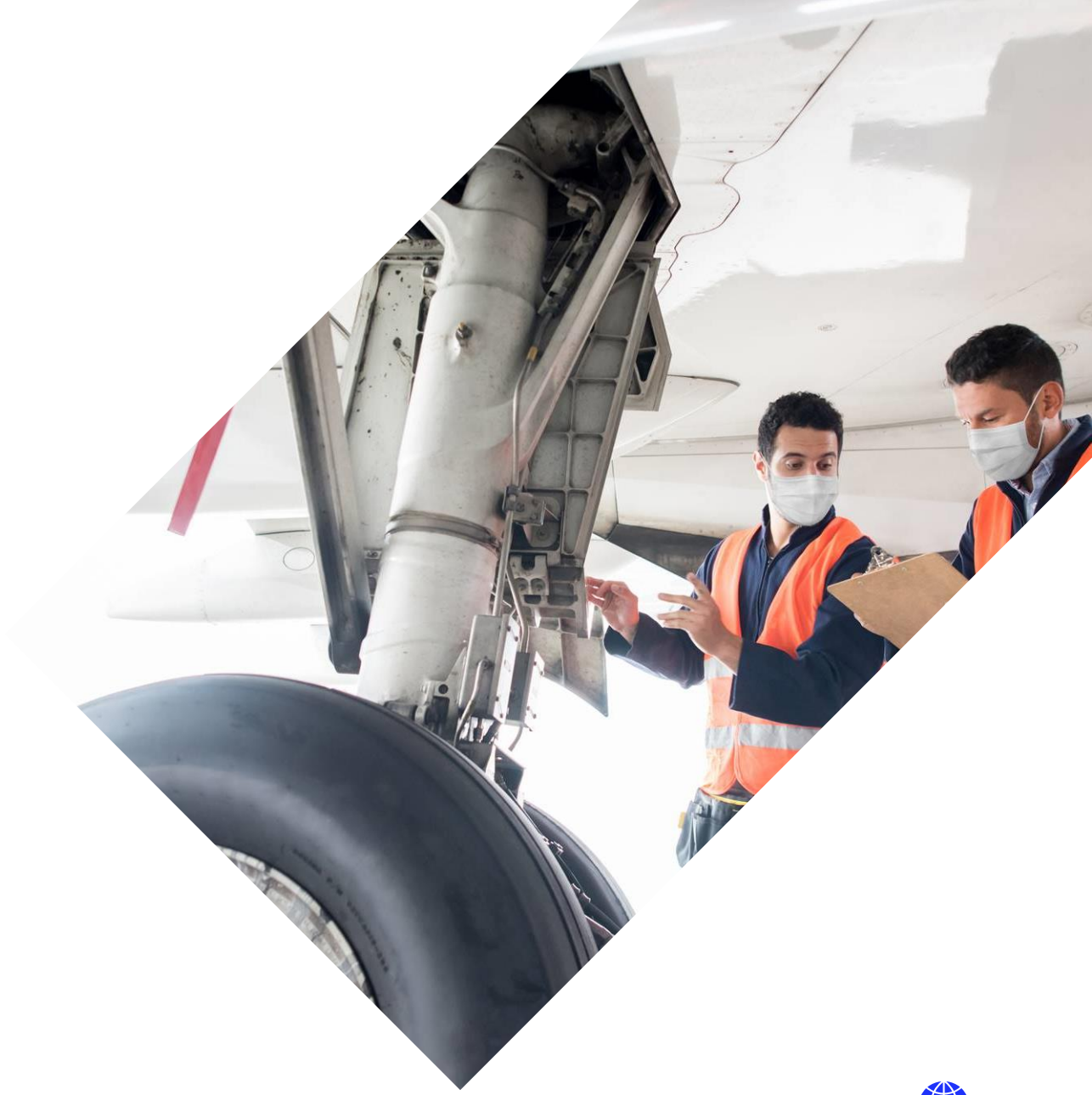
- Operating in the post pandemic

Visit www.iata.org/mcc to register



Agenda

- Speaker introductions
- Poll
- Impact of COVID on the industry
- State of the airline industry and outlook
- Fleets & Utilisation
- Aviation Restart, Safely Managing Aircraft Return to Service



Our Speakers

Adam PILARSKI

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Michael MOOSBERGER

Senior Economist – IATA

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Andrew DOYLE

Senior Director, Market Development – Cirium

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MCTG Vice-Chairman

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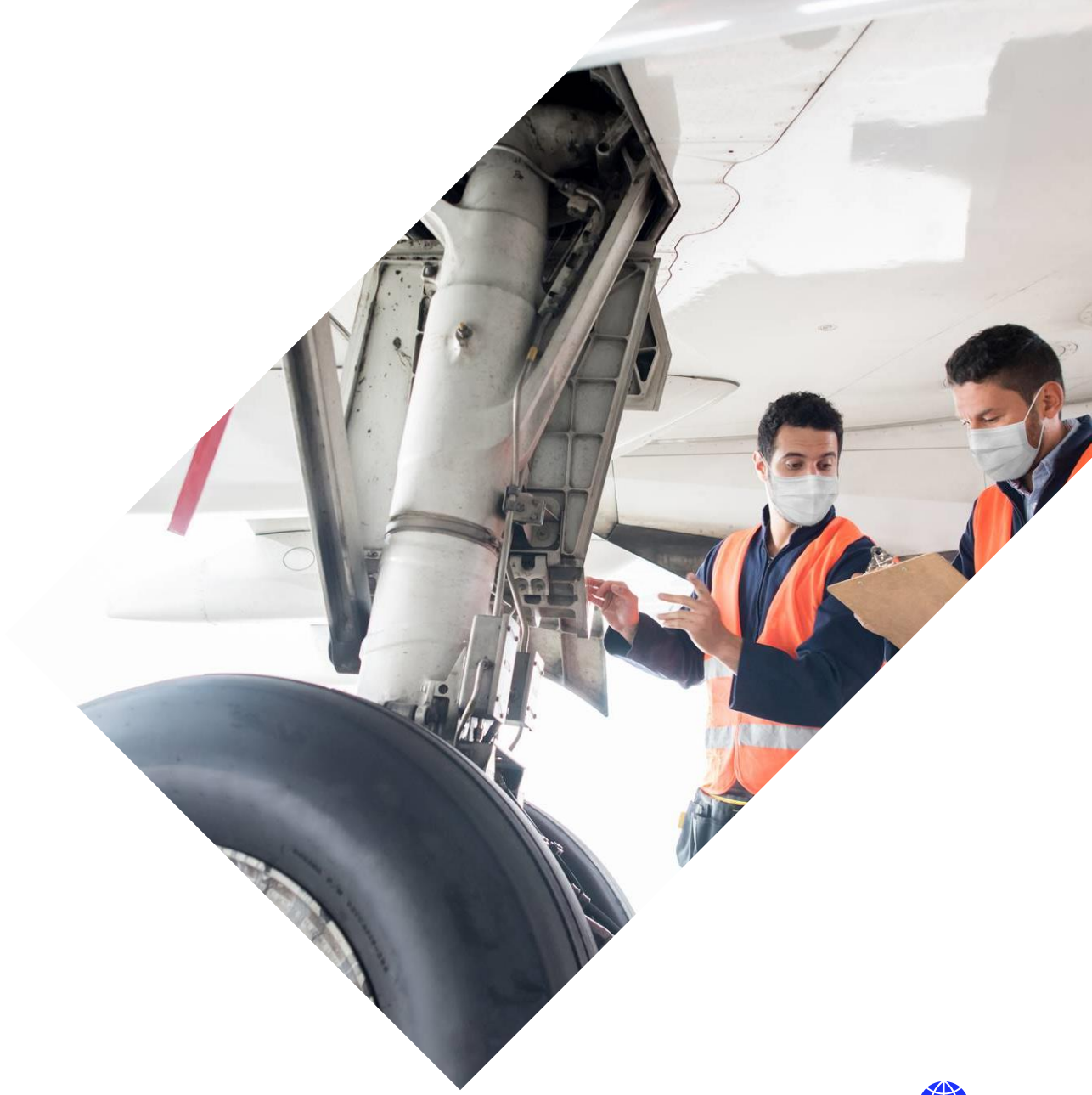
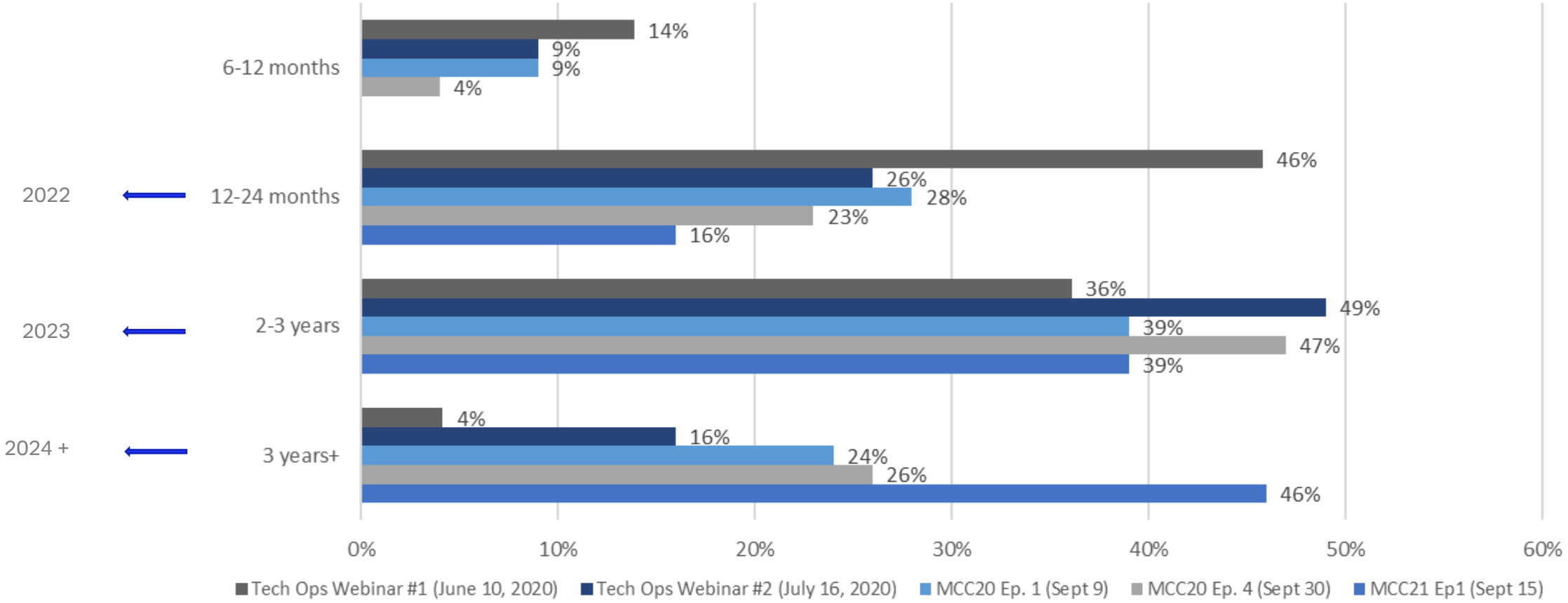
Poll



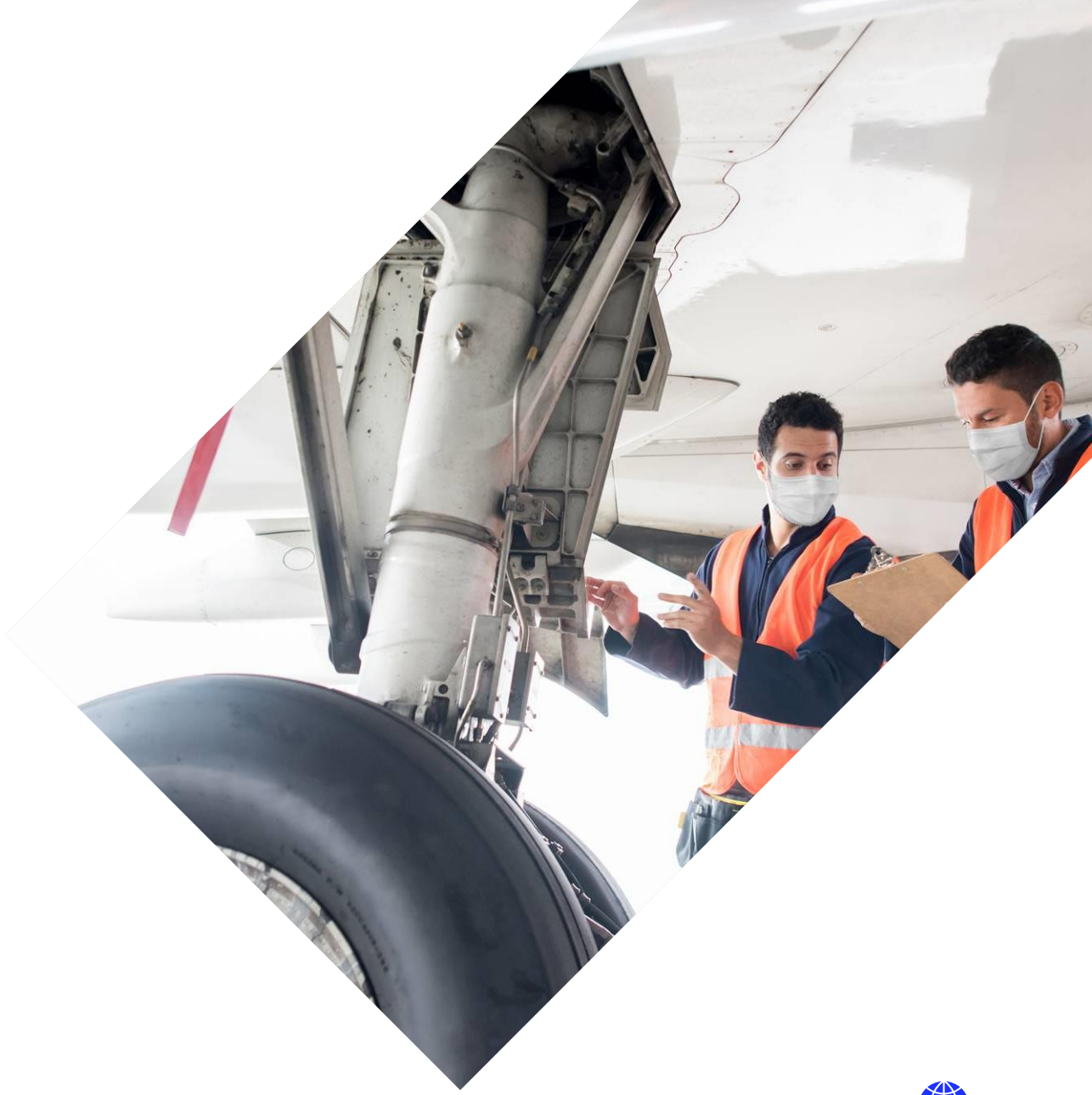
When will demand for travel be back to 2019 levels? (Results from 2020 & 2021 polls)



Impact of COVID on the industry

Adam Pilarski

SVP – Avitas



Impact of COVID on the industry

IATA 17th Maintenance Cost Conference

Adam Pilarski,
Senior Vice President, AVITAS, Inc.
September 15th, 2021

AVITAS®

Not Good!!!

- **Some general thoughts**
- **Short term considerations**
- **Long term considerations**

AVITAS®

Accept the reality that there is a power greater than you

VIRUS

AVITAS®

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Best guess for return to 2019 levels

2024

What we know

- **Domestic travel ahead of international**
- **Direct ahead of hubs**
- **Narrowbodies do better than widebodies**
- **The worst may still be ahead of us, at least financially**

AVITAS®

Long Term Questions

- **Future of business travel**
- **Future of leasing**
  - Provides financing to airlines
  - Impact on orders but even on the design of airplanes
- **Role of Governments**

AVITAS®

Future of Forecasting

- **Traditional models do not work right now**
- **Times of experiments**
- **New airlines, new airplane types, new fuels**

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Thank you for listening!

Please be safe and sane

Adam Pilarski

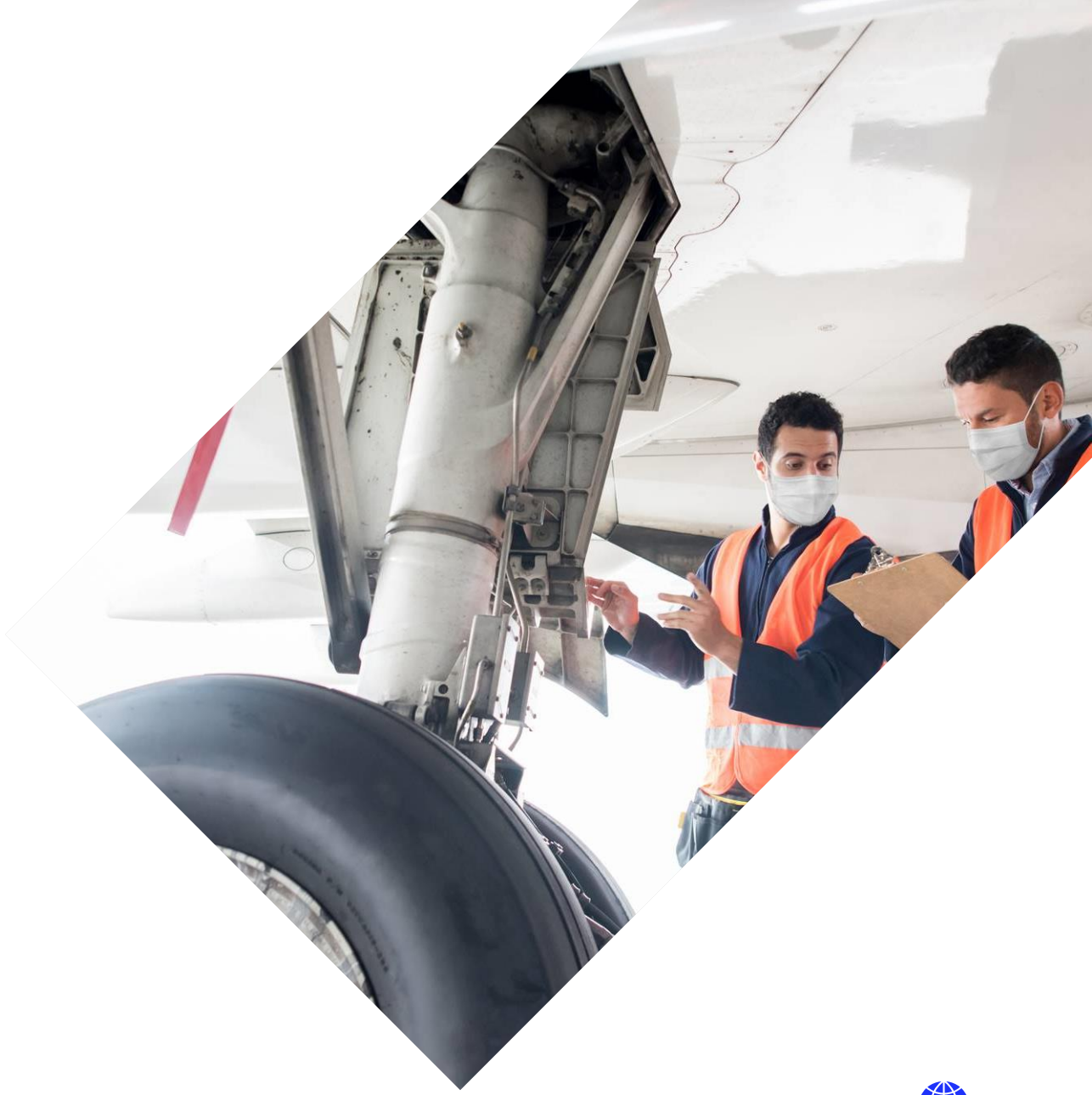
AVITAS®

Gurudude@AVITAS.com

Questions?

Adam Pilarski

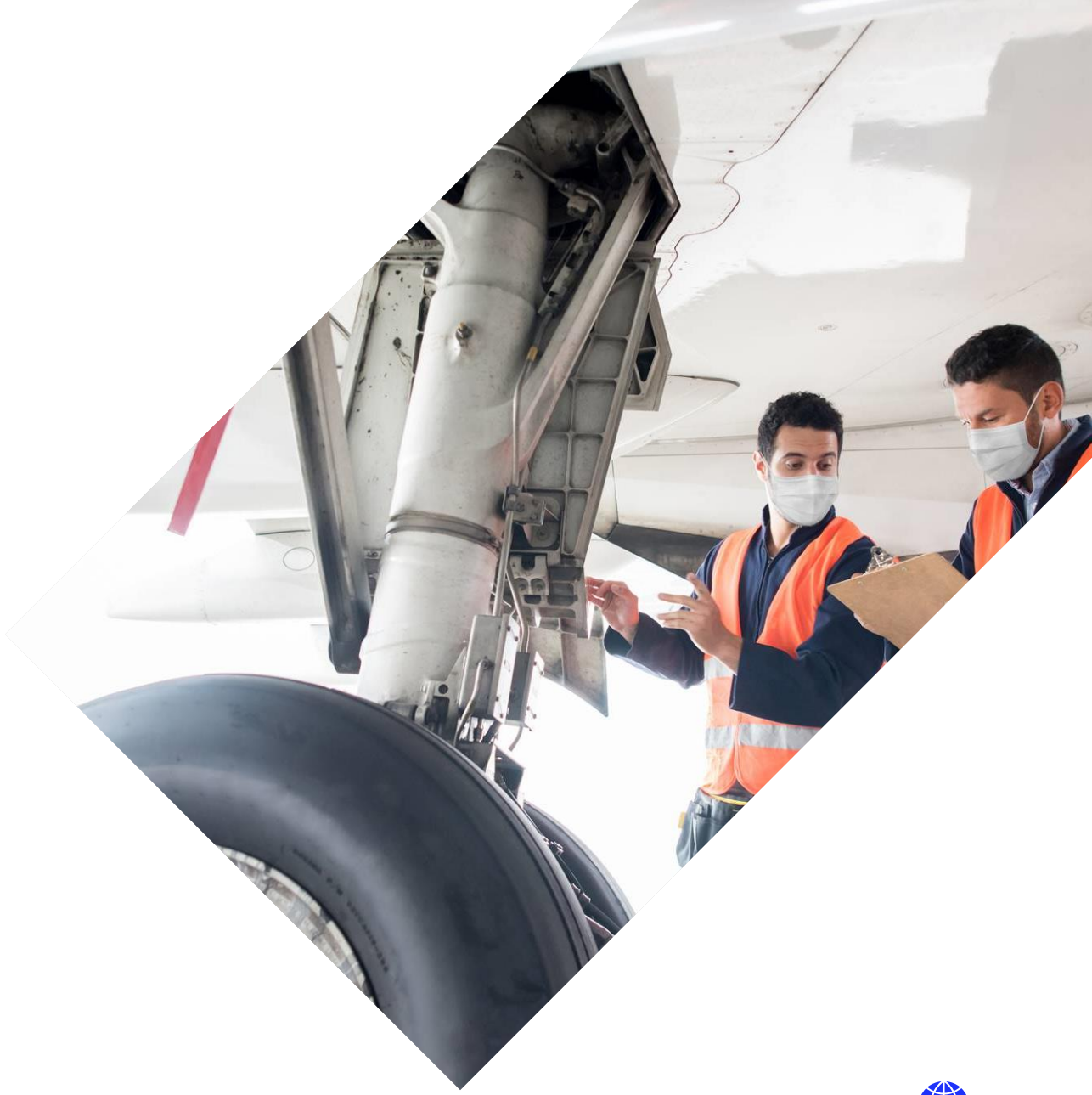
SVP – Avitas



State of the airline industry and outlook

Michael MOOSBERGER

Senior Economist – IATA



COVID-19

Update on the state of the airline industry and outlook

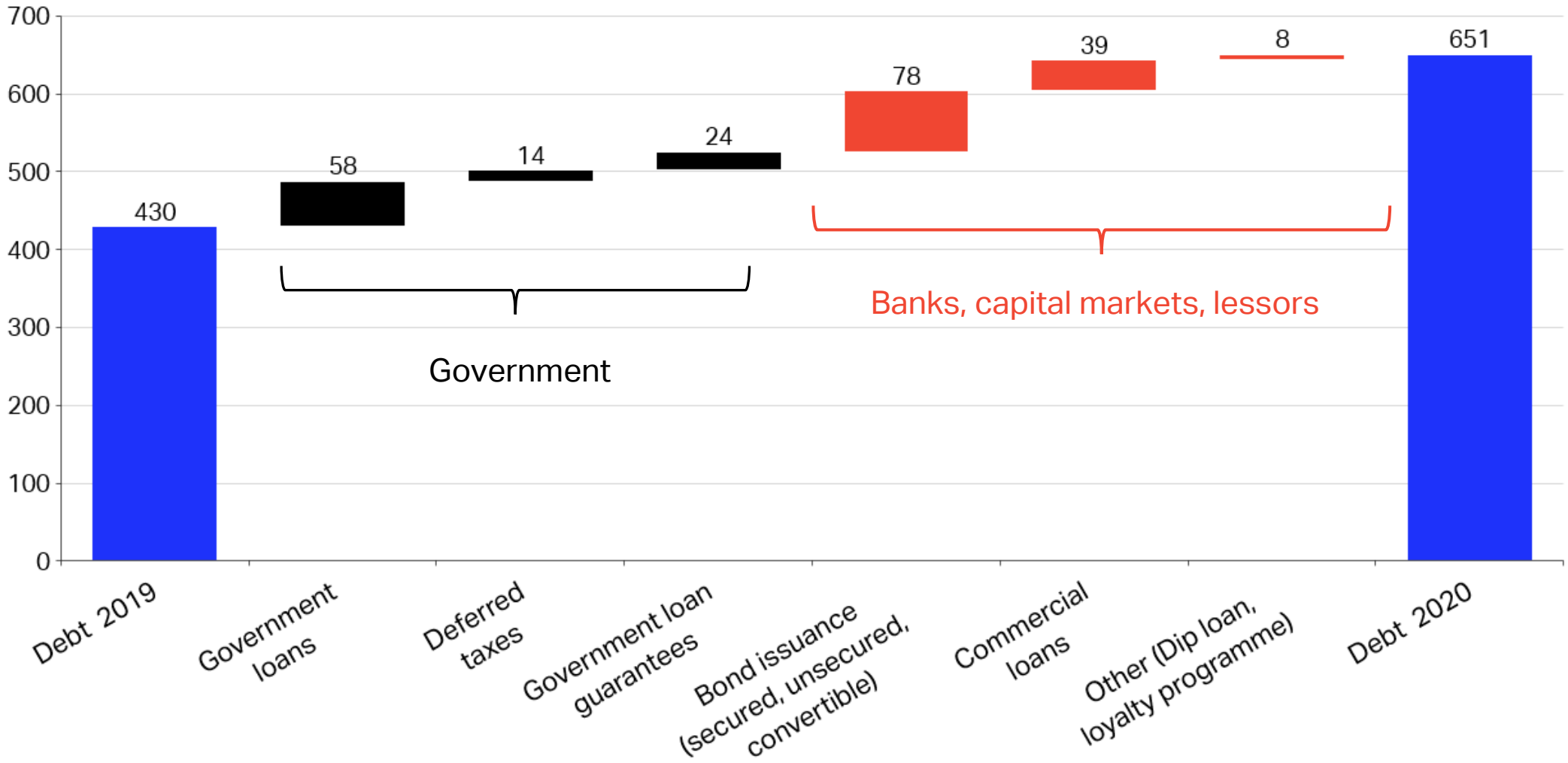
Michael Moosberger

Senior Economist

15th September 2021

Survival cost - a huge rise in airlines' debt by end-2020

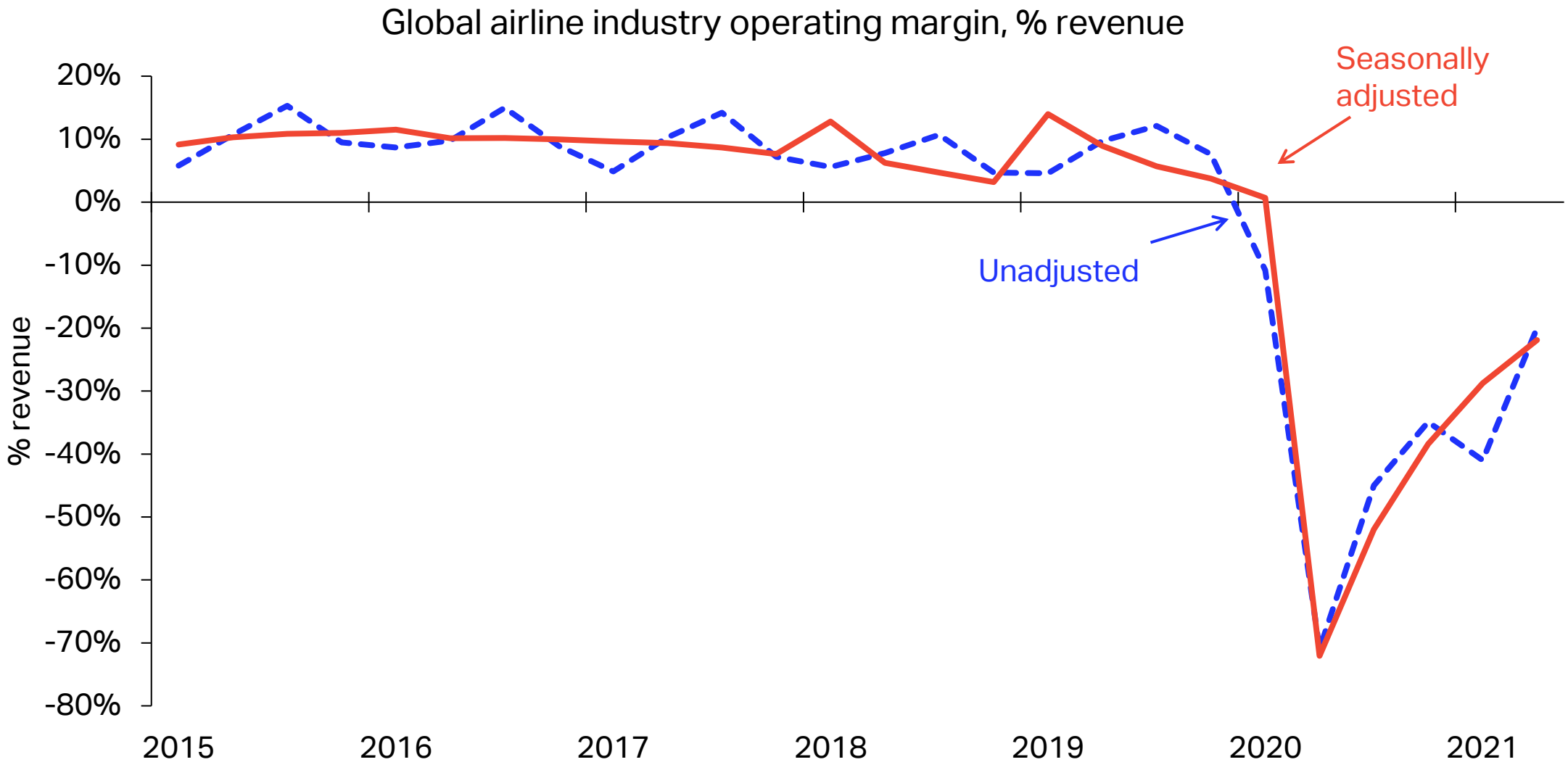
$220bn rise in airline debt as a result of govt aid and market issues



Source: IATA Economics using data from own estimates of Government aid, private debt estimates from Airfinance Journal, November 2020. Debt includes adjustment for operating leases.

Airline industry financials are improving but still negative

Operating losses reduced to 20% of revenues by Q2 of 2021

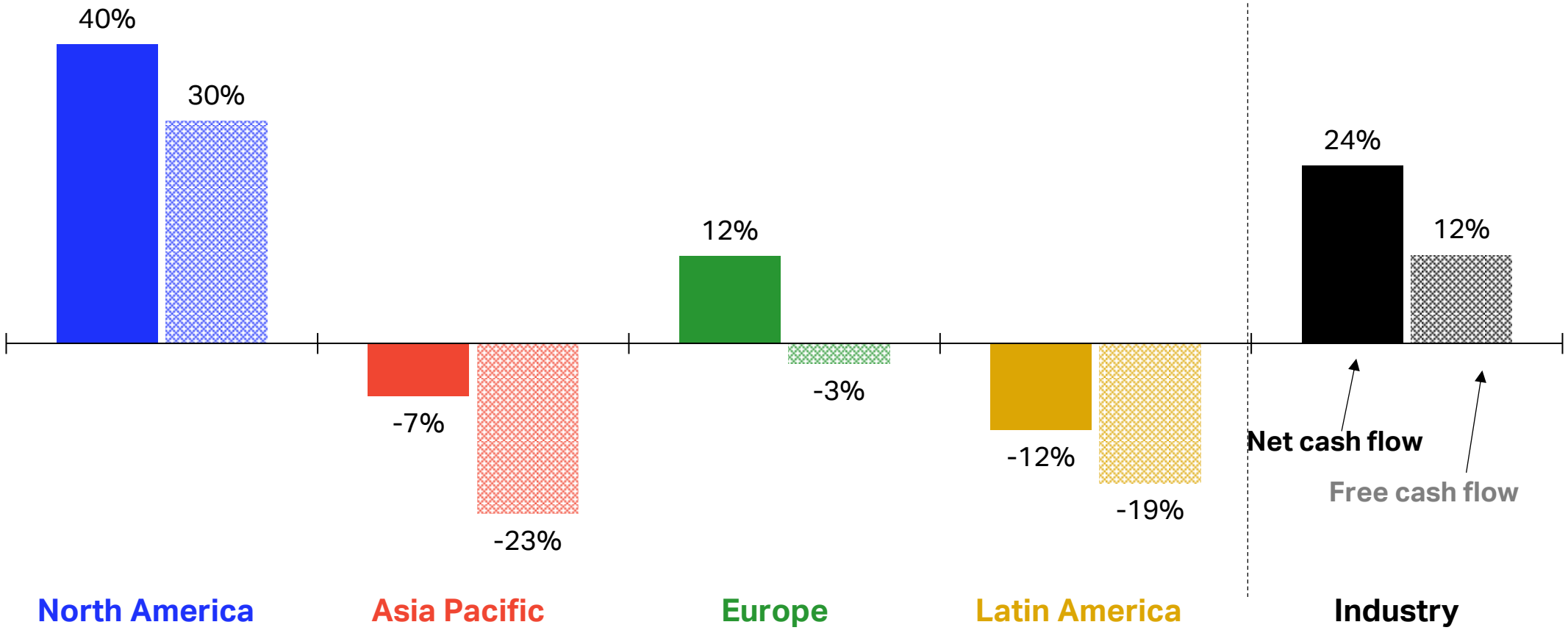


Source: IATA Economics using data from the Airline Analyst

Transition to cash flow generation but uneven

North America and China ahead of others with strong domestic recovery

Net cash flow from operating activities (darker colour) and free cash flow (lighter colour) in Q2 2021*, % of revenues

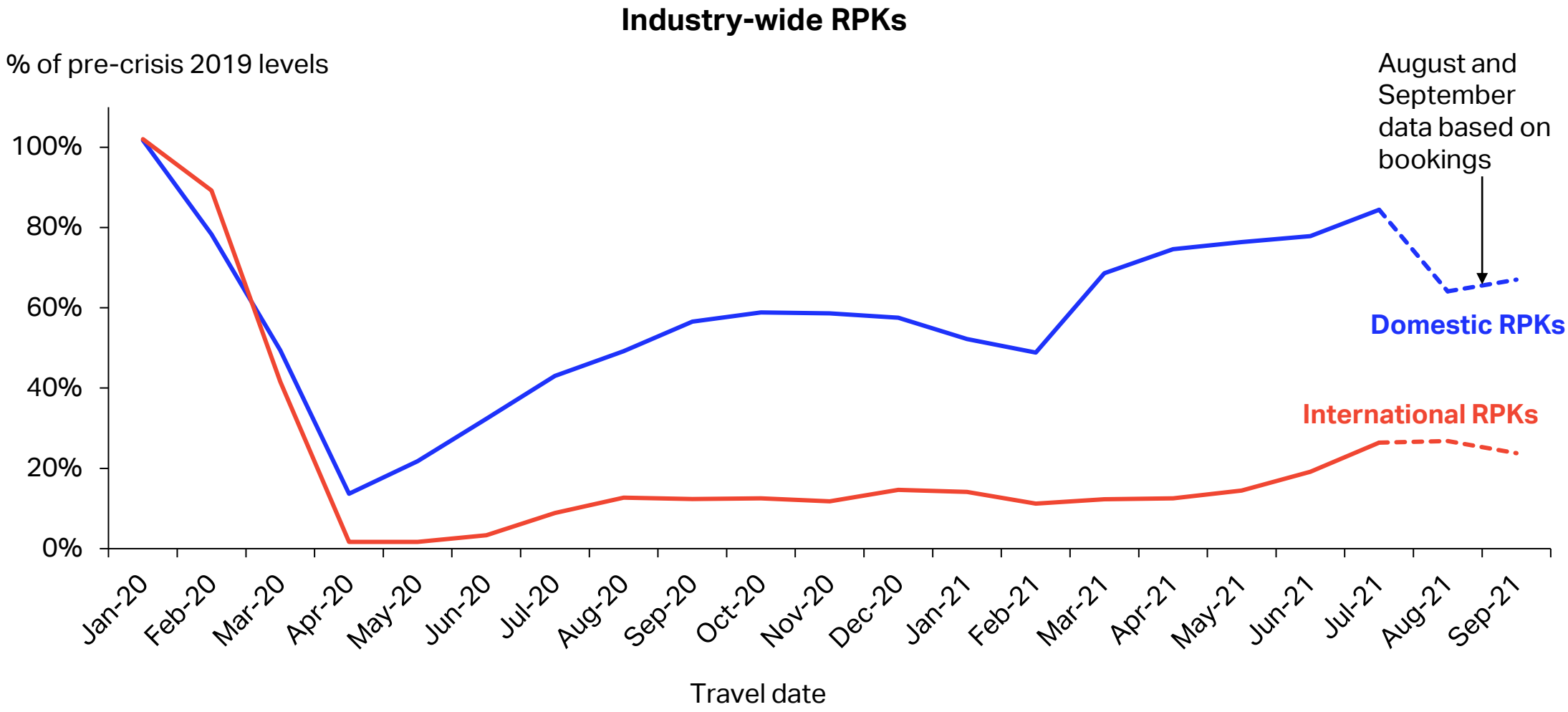


*sample of 40 airlines

Source: IATA Economics using data from the Airline Analyst

Air travel rebounded in July, but risks are rising

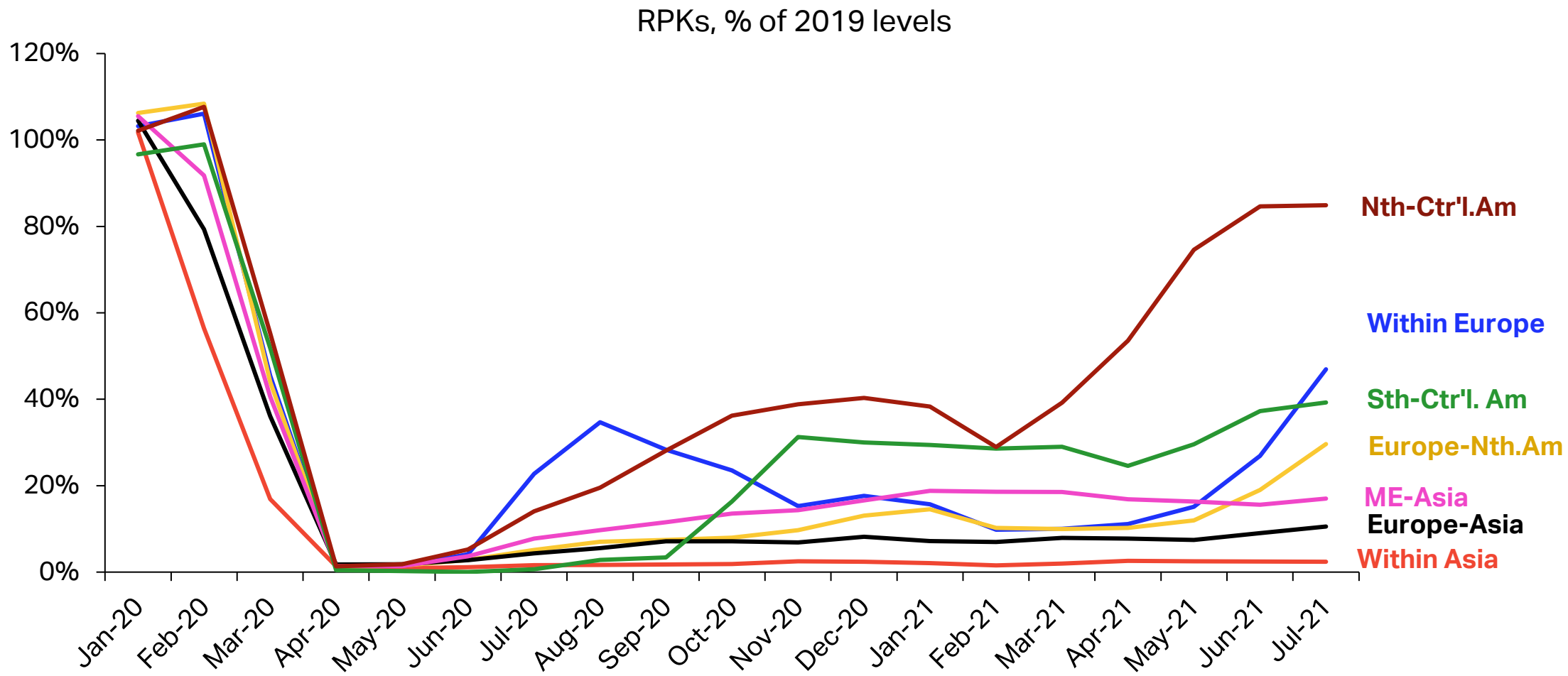
Global RPK recovery may stall after the rebound in Northern summer



Source: IATA Economics using data from IATA Statistics and DDS ticketing data

International air travel recovery based on few markets

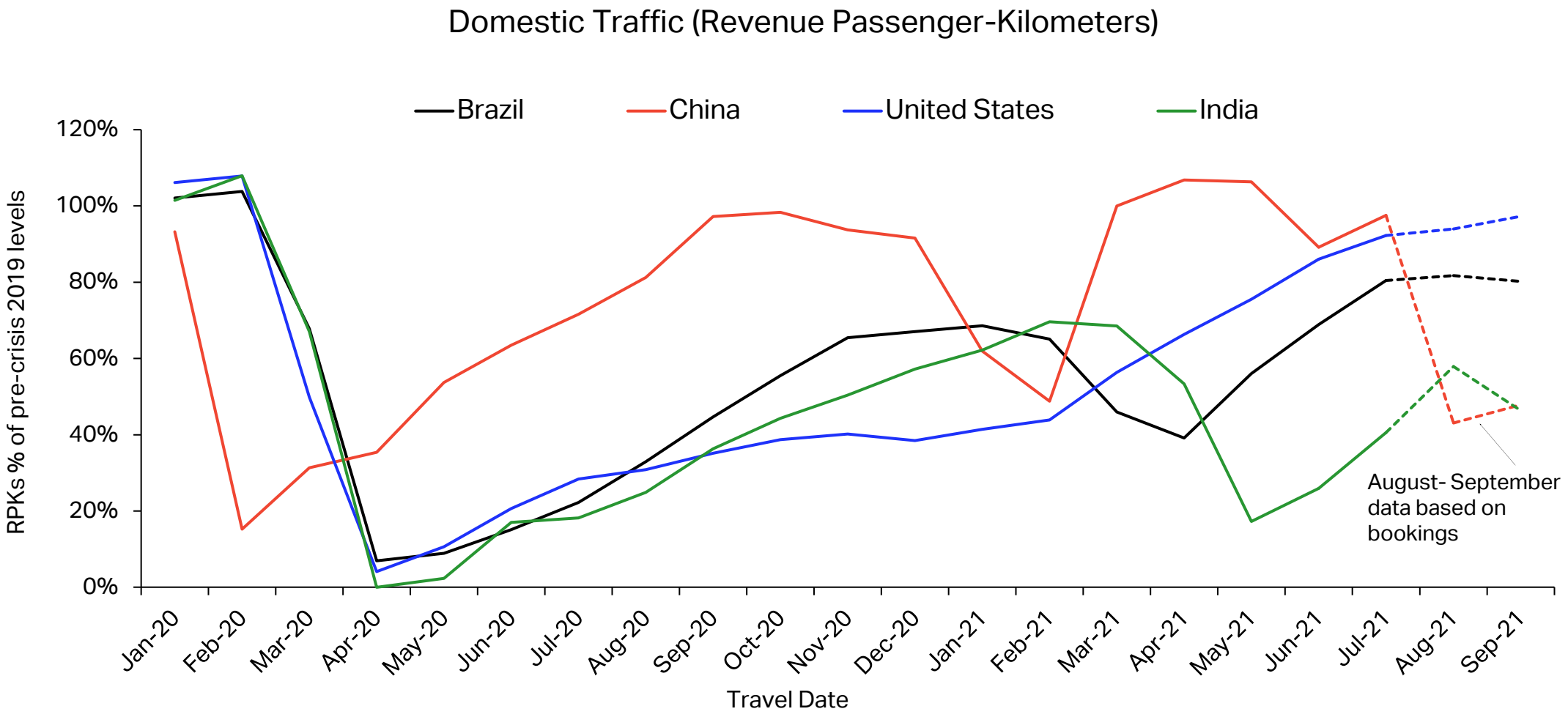
Within Europe and North-Central America routes have improved



Source: IATA Economics using data from IATA Statistics

Domestic markets are vulnerable but rebound quickly

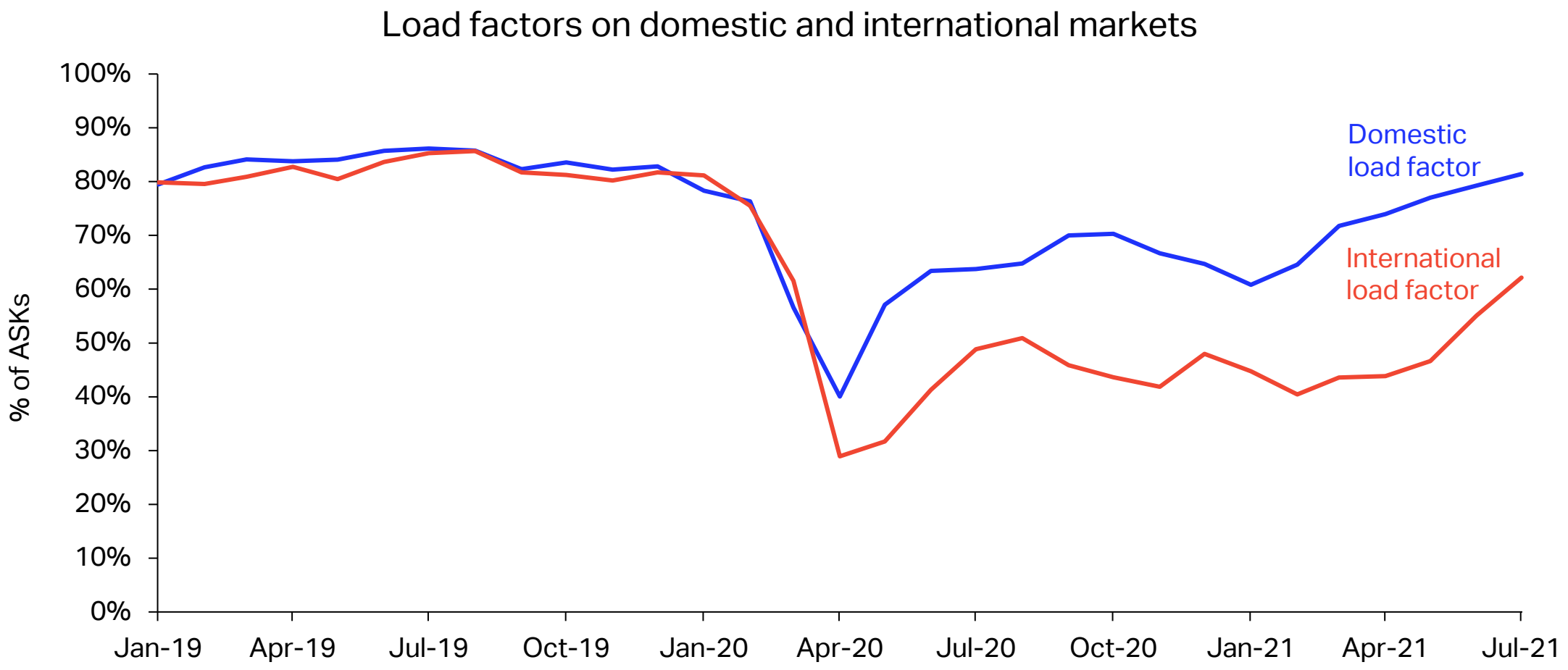
Setback in China but recovery continues once outbreak is under control



Source: IATA Economics using IATA Monthly Statistics and DDS ticketing data

Domestic load factors much stronger than international

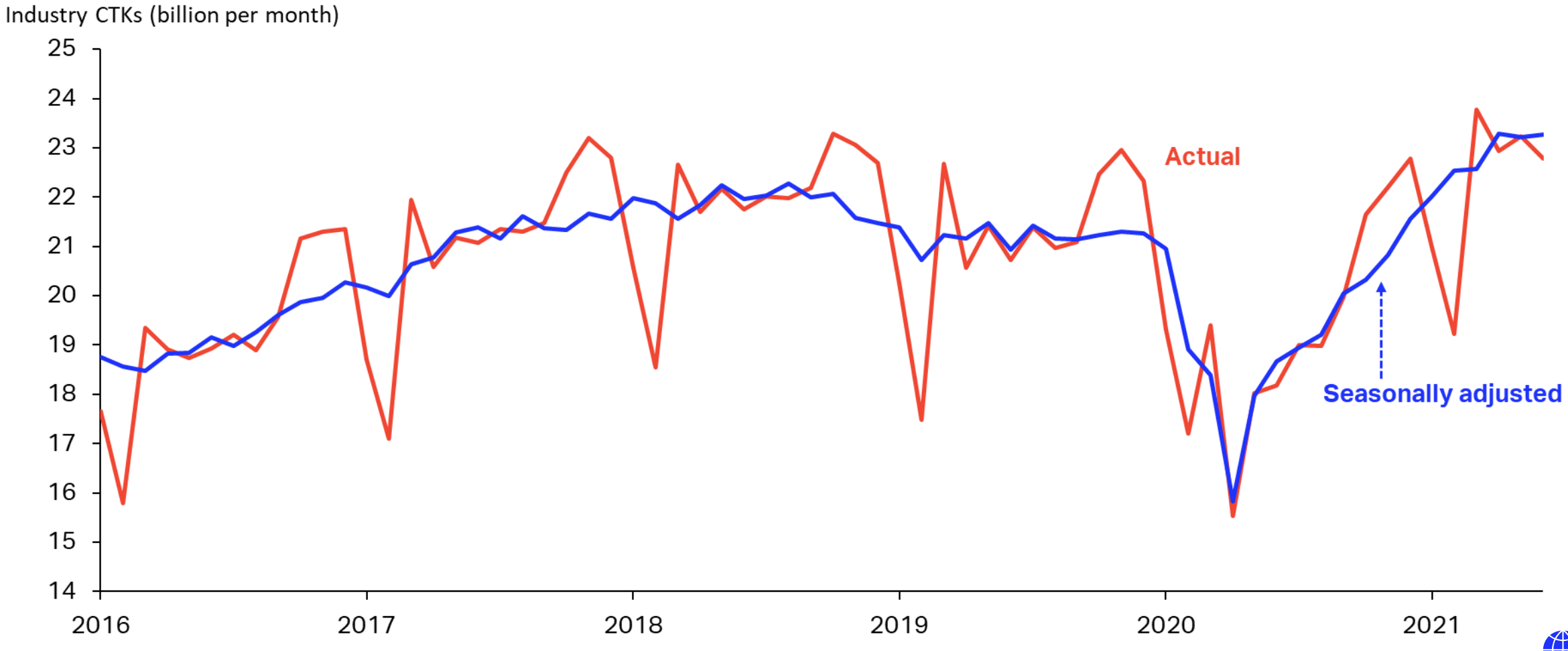
Domestic load factors close to pre-crisis levels, international improving



Source: IATA Economics using data from IATA Statistics

Air cargo volumes (CTKs) on strong upward trend

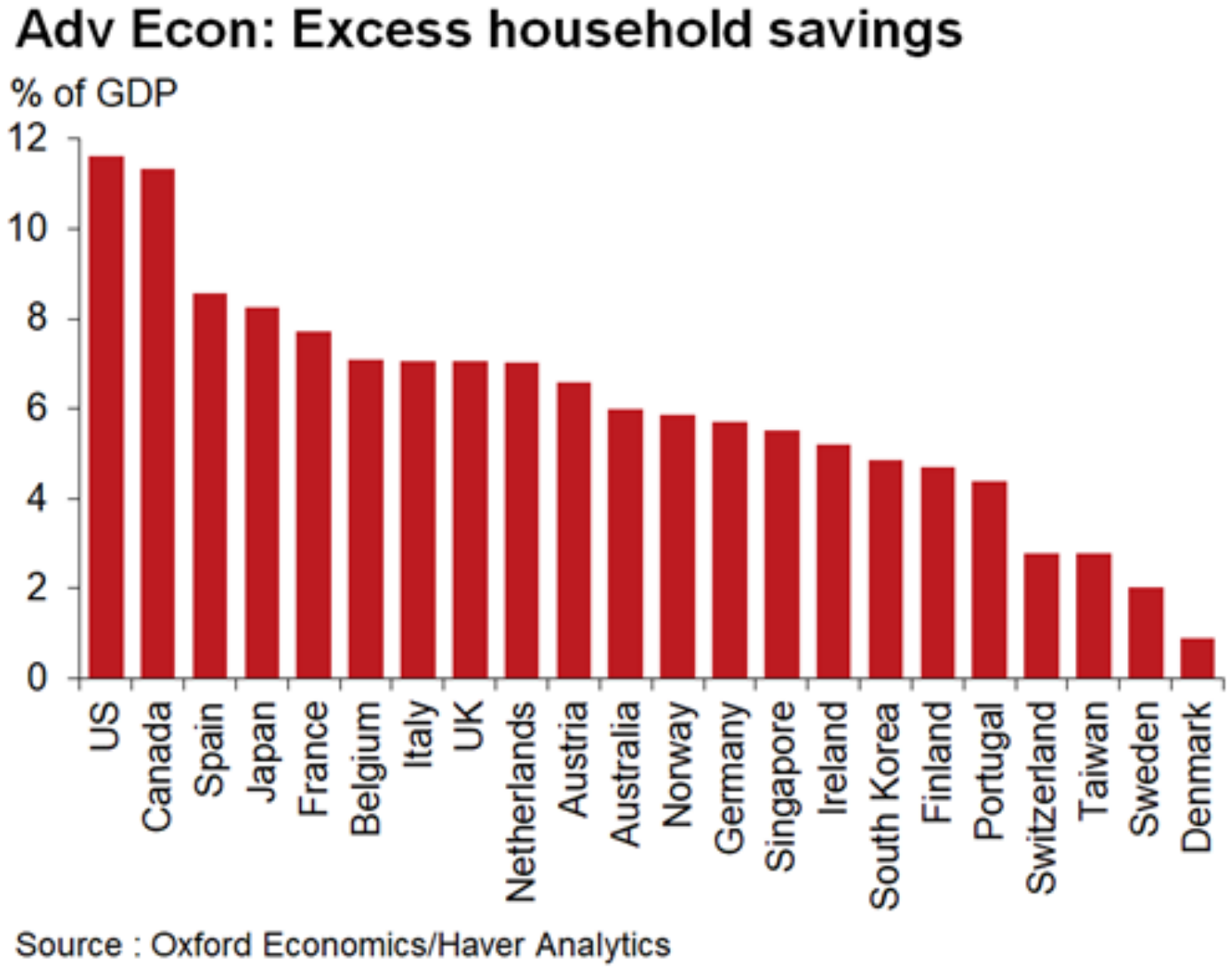
Seasonally adjusted CTKs 4.5% above pre-crisis peak by mid-2021



Source: IATA Economics using data from IATA Monthly Statistics. Data is adjusted for seasonality.

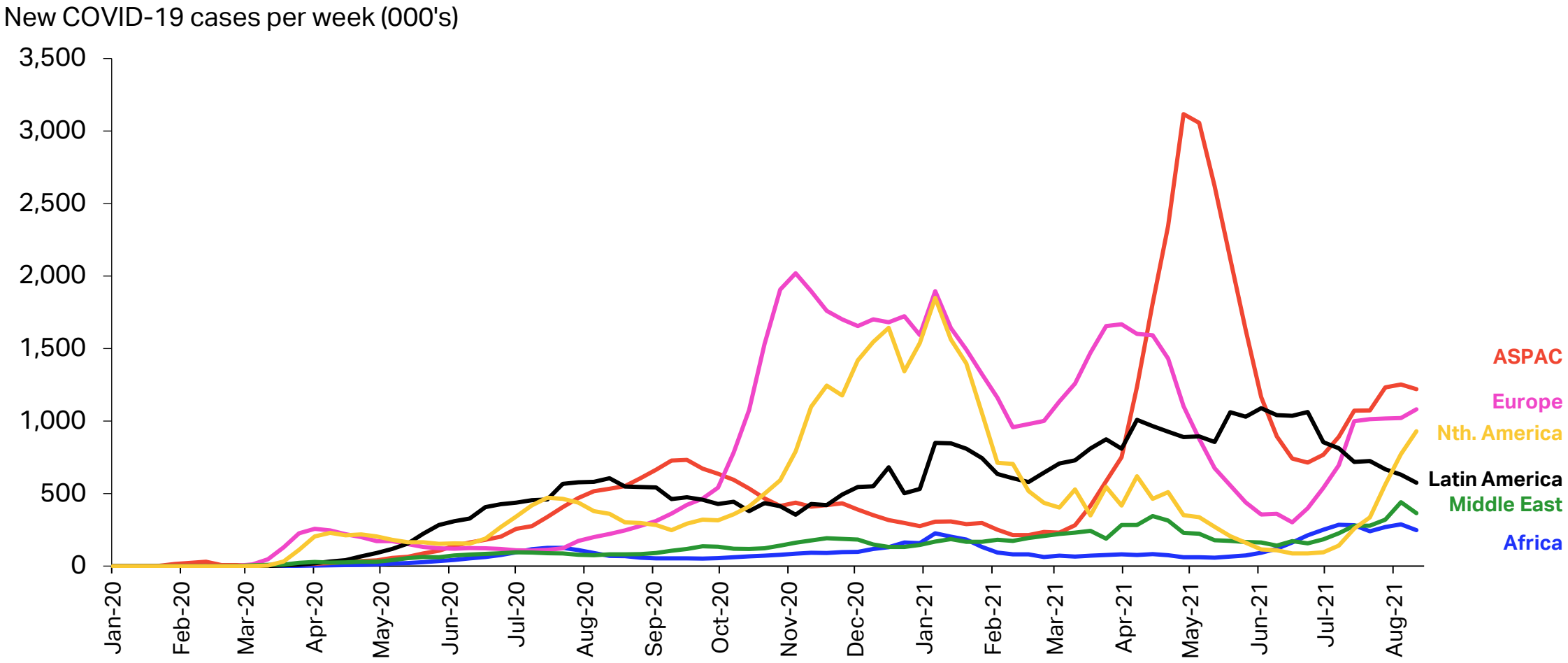
Consumers have accumulated savings to spend

In some markets consumers 'excess' savings exceed 10% of GDP



New COVID-19 cases are rising in most regions

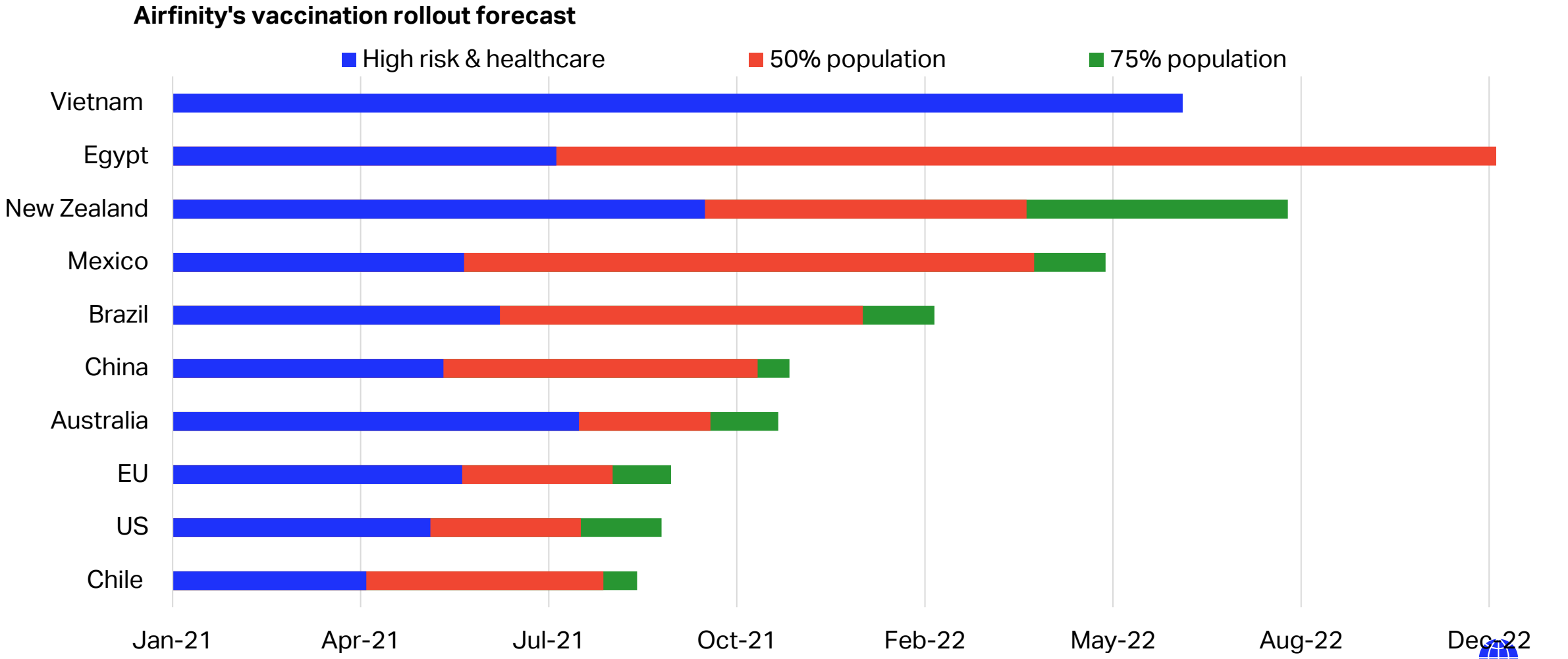
New variants have meant virus control much harder than expected



Source: IATA Economics using data from European Centre for Disease Control

Vaccine rollout creates differences in recovery paths

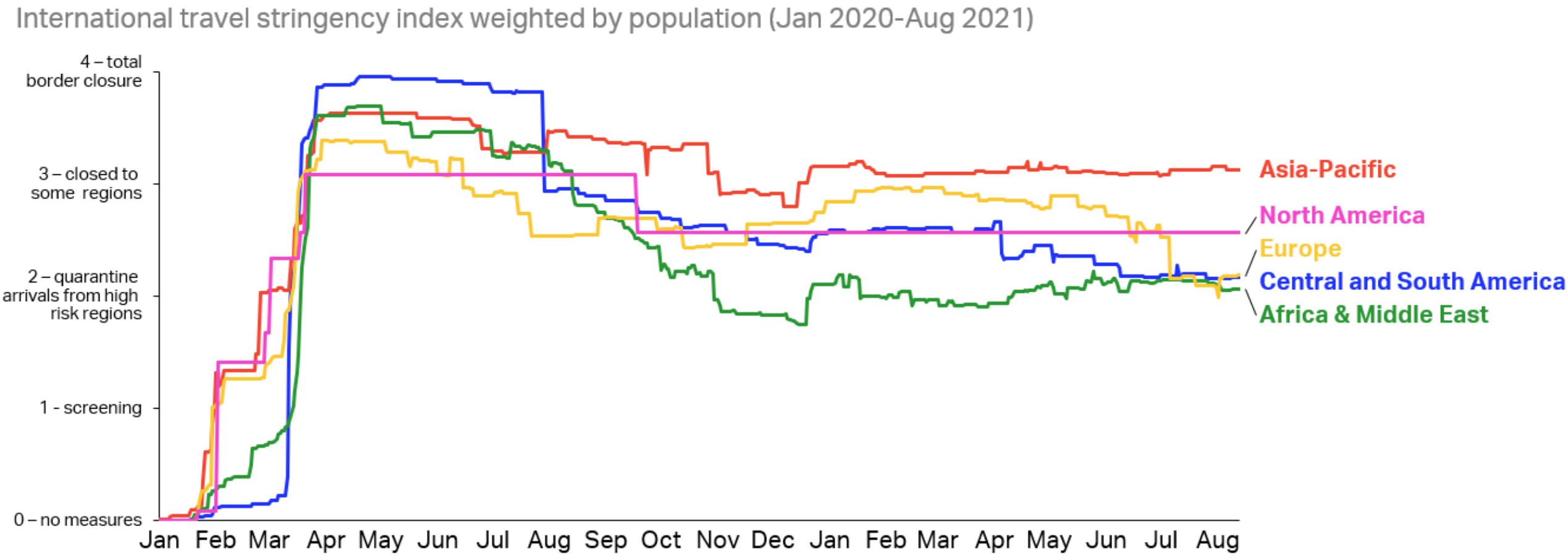
High income countries + China to recover first, but many will lag behind



Source: IATA using data from Airfinity (23rd July)

International travel restrictions remain high

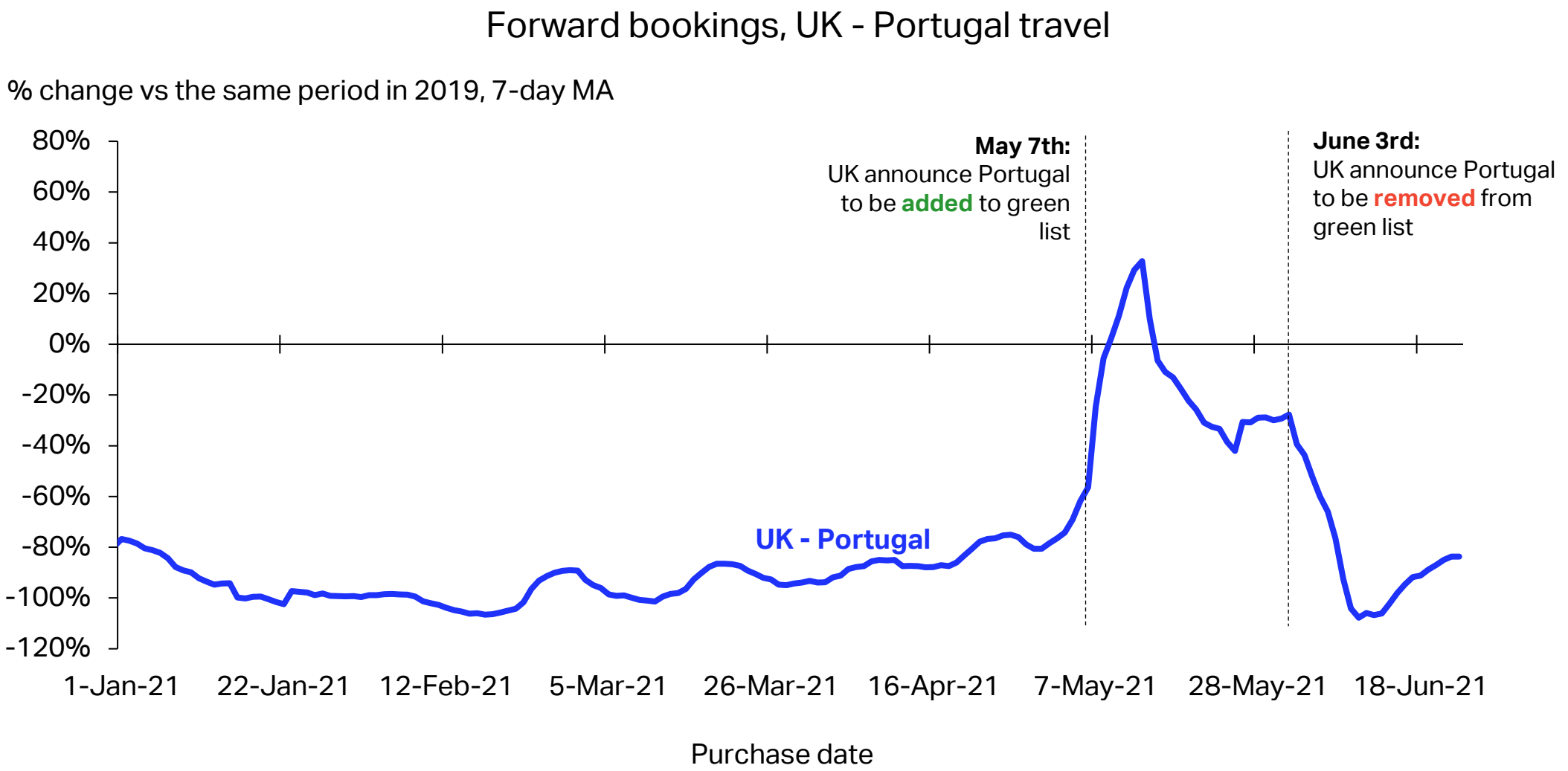
Asia remains most stringent, Latin America and Europe improve



Source: IATA Economics using data from Oxford University

There is substantial pent-up demand but it is fragile

Surge of bookings from the UK to Portugal reversed in a month

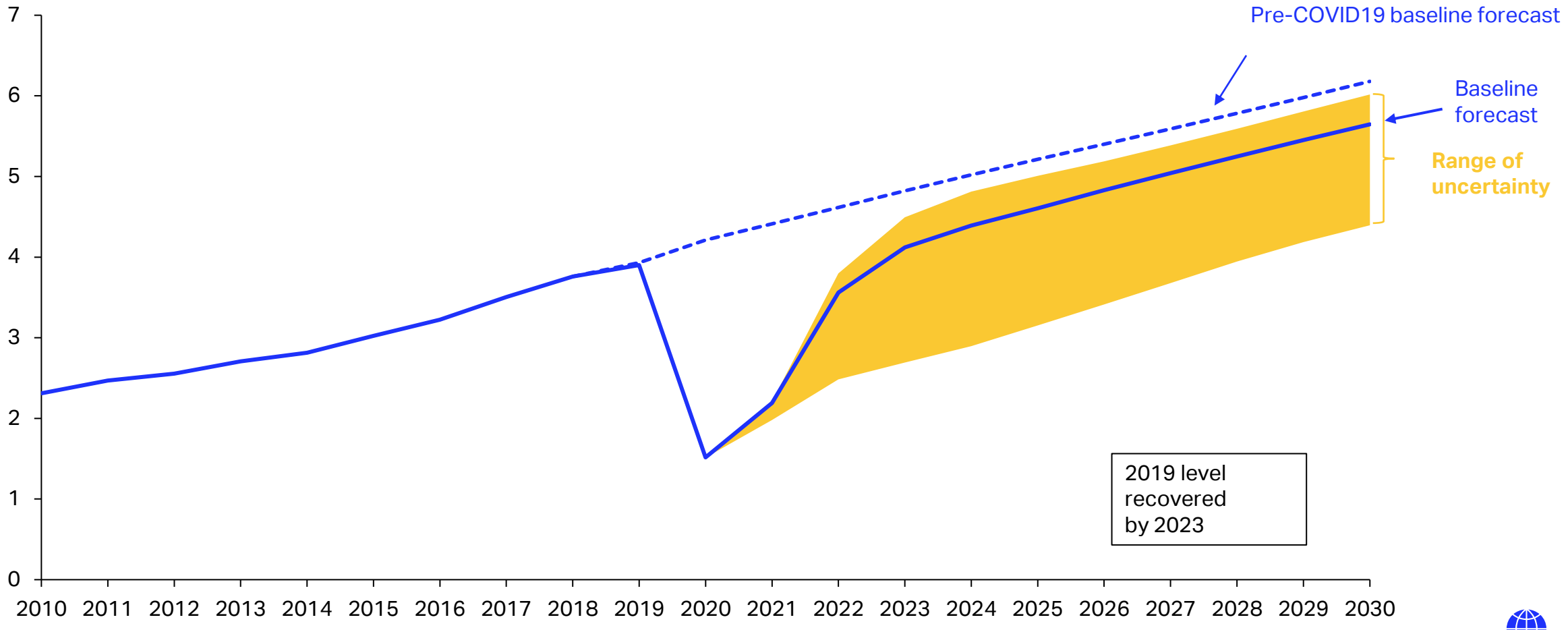


Source: IATA Economics using data from DDS

Full recovery of air travel will still take several years

Downside risks linked to virus variants and border policy

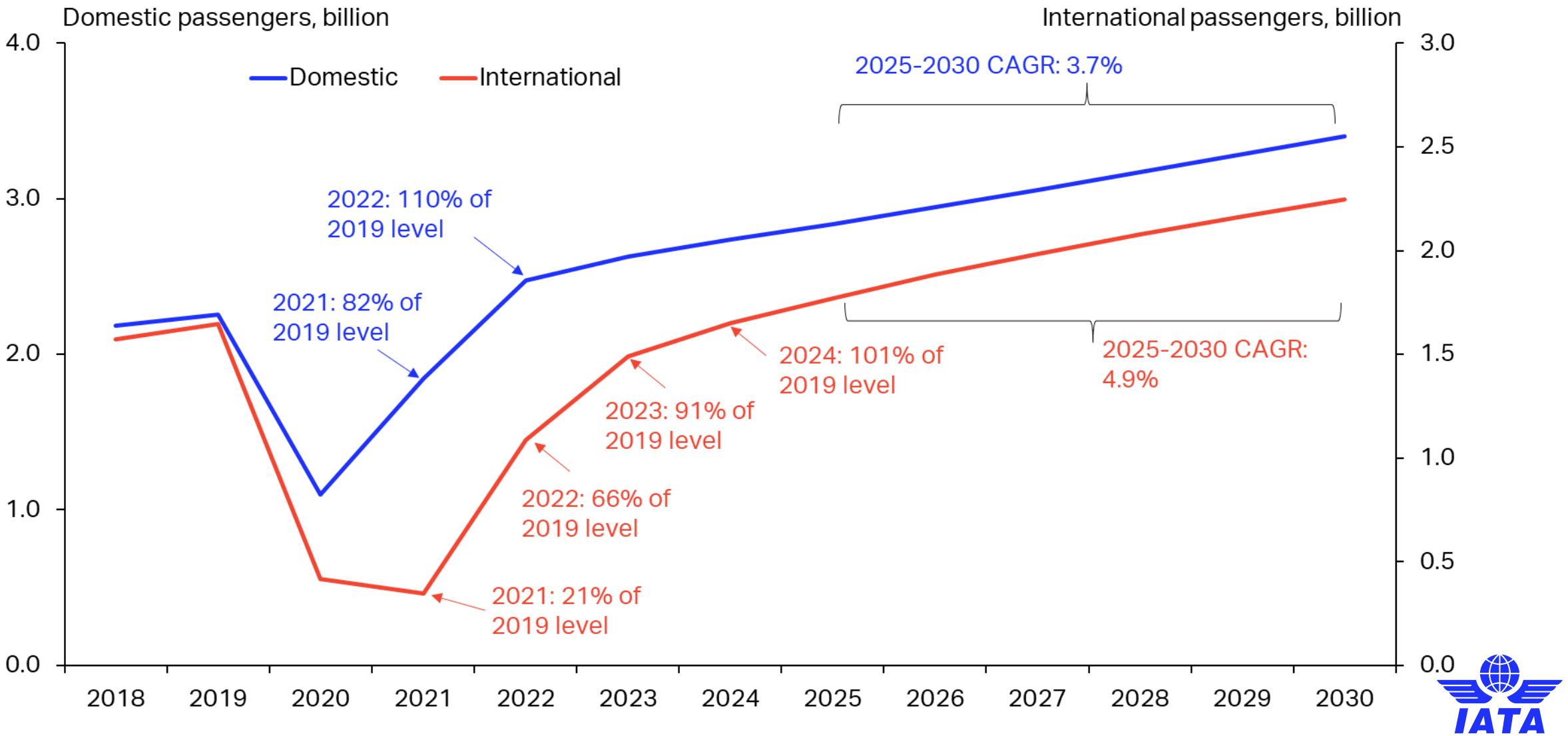
Global passenger departures, billions per year



Source: IATA/Tourism Economics APF, July 2021

Rapid recovery in domestic but international lags

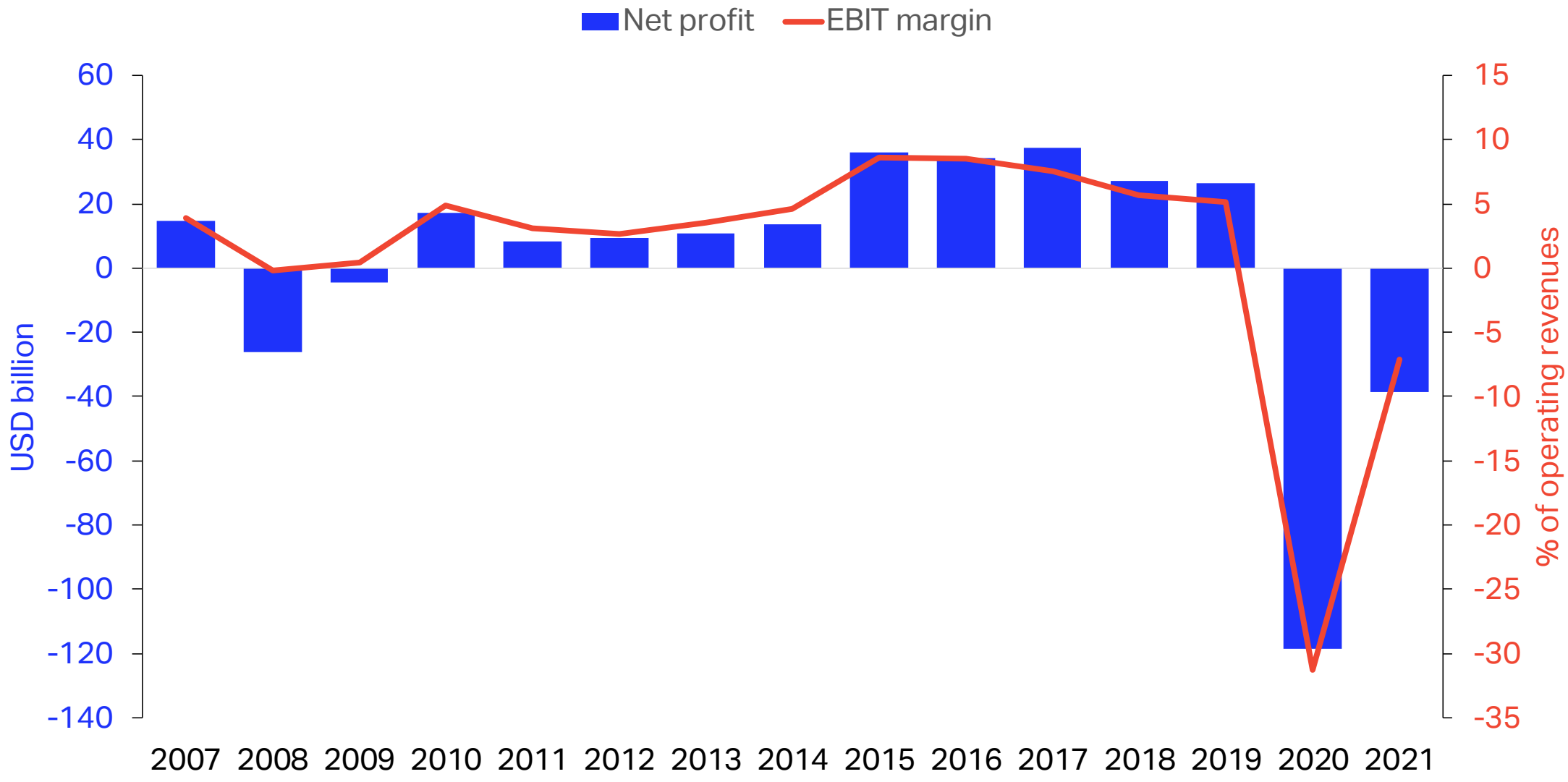
Domestic above 2019 level by next year. International not until 2024



Source: IATA Economics using data from Tourism Economic/IATA Air Passenger Forecast, July 2021

Losses forecast to be reduced to USD38bn in 2021

Regions with large domestic markets to lead improvement



Source: IATA Economics

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Questions?

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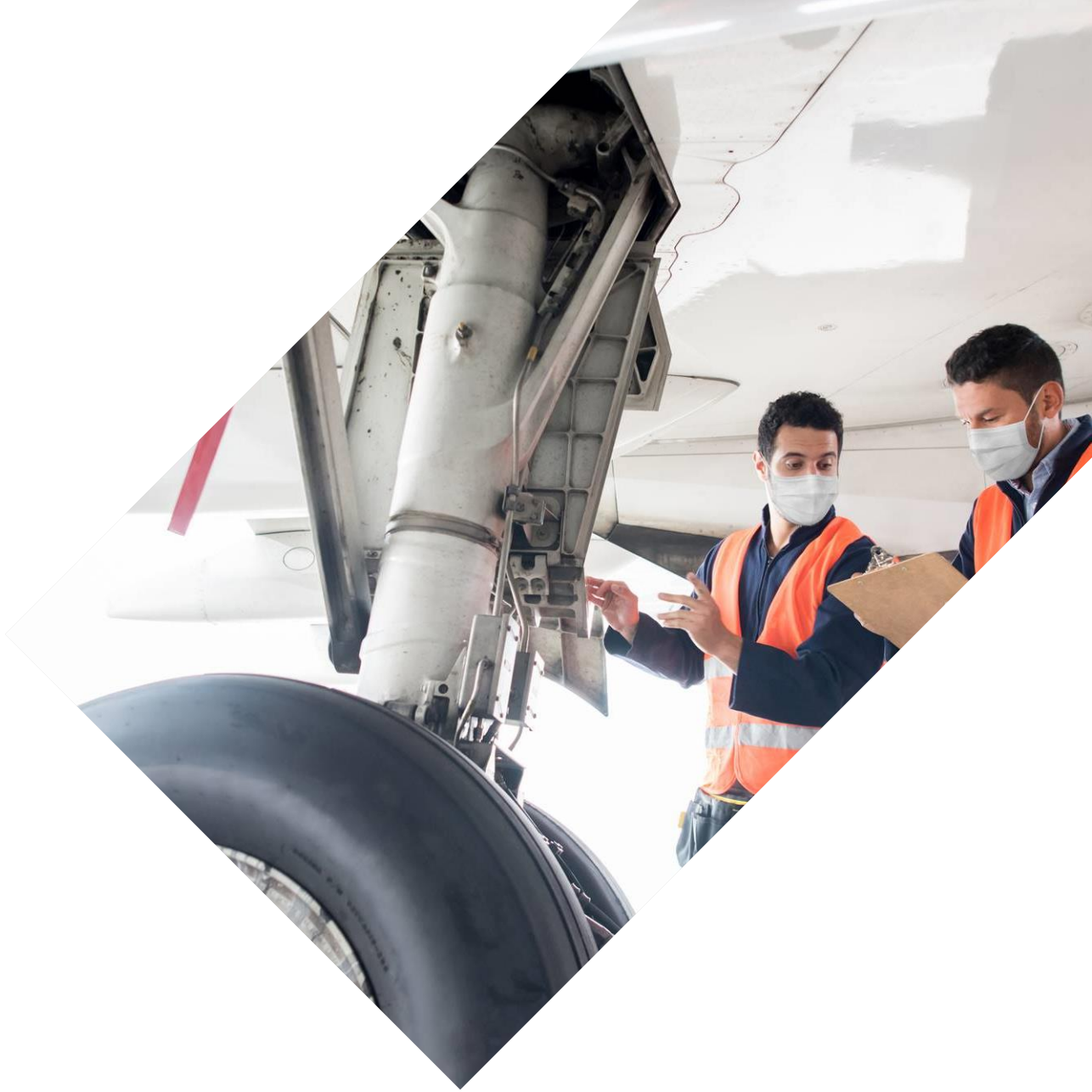
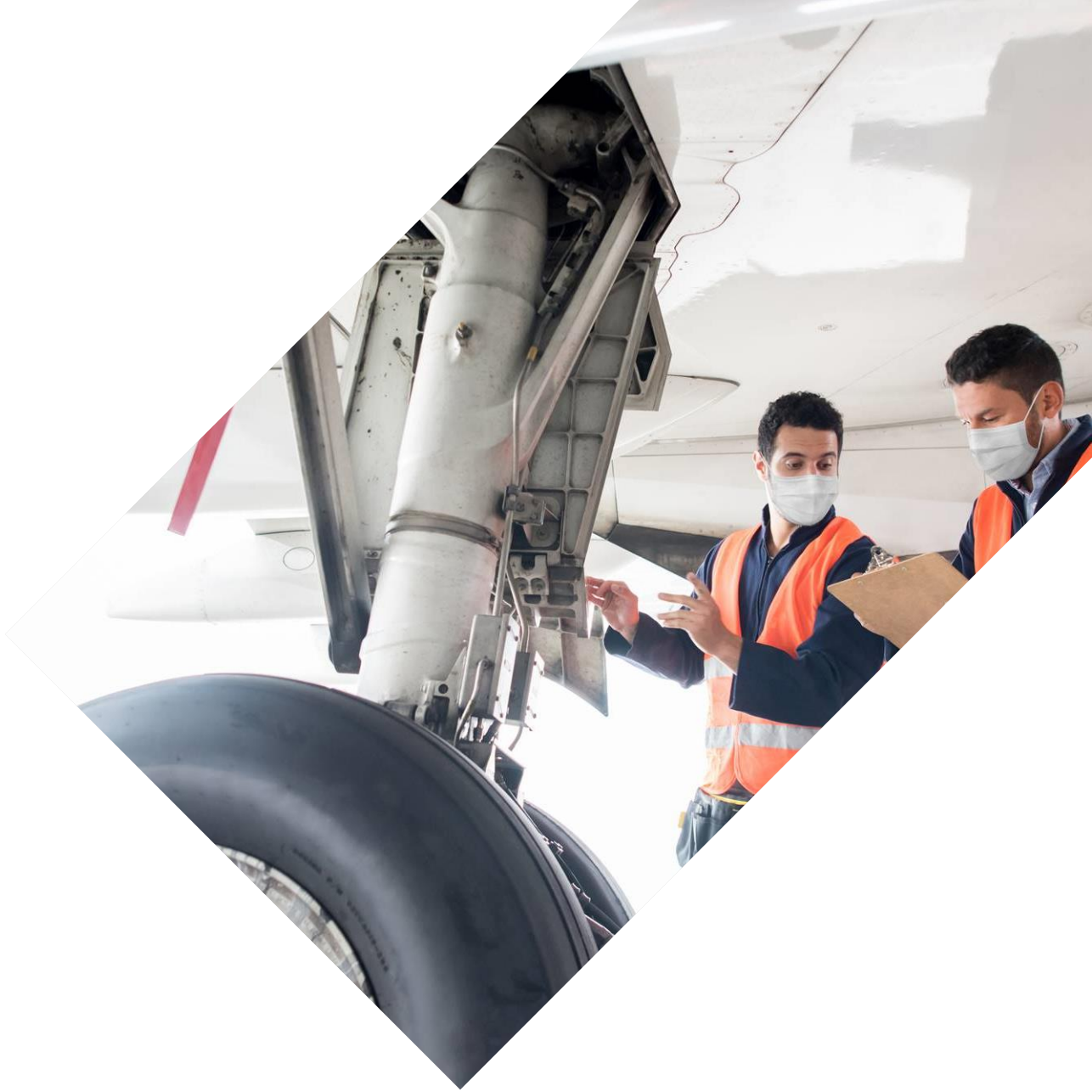
Senior Economist – IATA



Fleets & Utilisation

Andrew DOYLE

Senior Director, Market Development – Cirium



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FLEETS & UTILISATION UPDATE

September 15, 2021

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We allow data to flow fluidly, making it available how, where and when it is most needed, regardless the systems and services where it was created or will be consumed

Accelerating
Digital transformation

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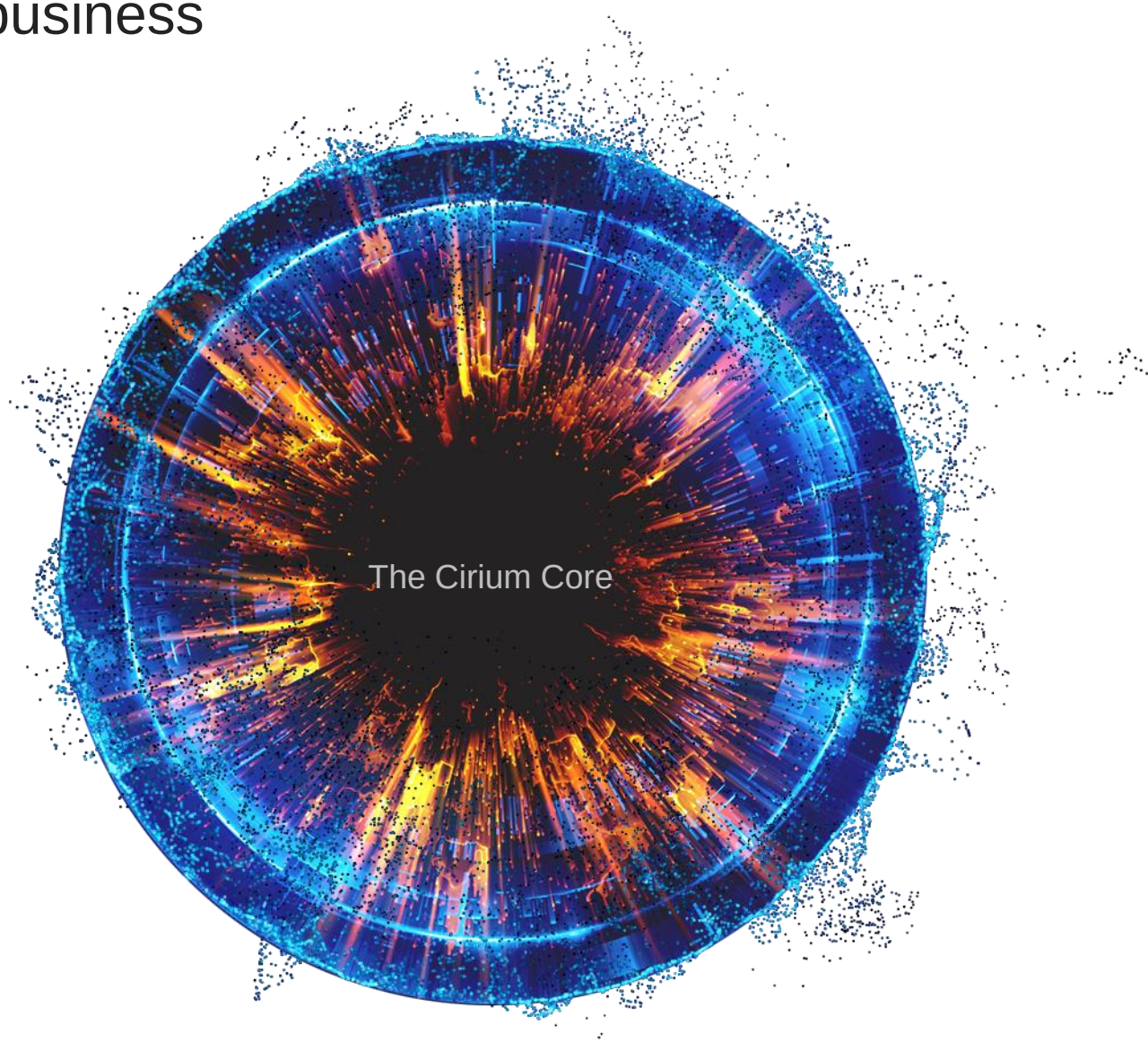
- Providing an endless combination of practical datasets helping you make informed decisions ***to shape an intelligent future*** for your business and our industry.



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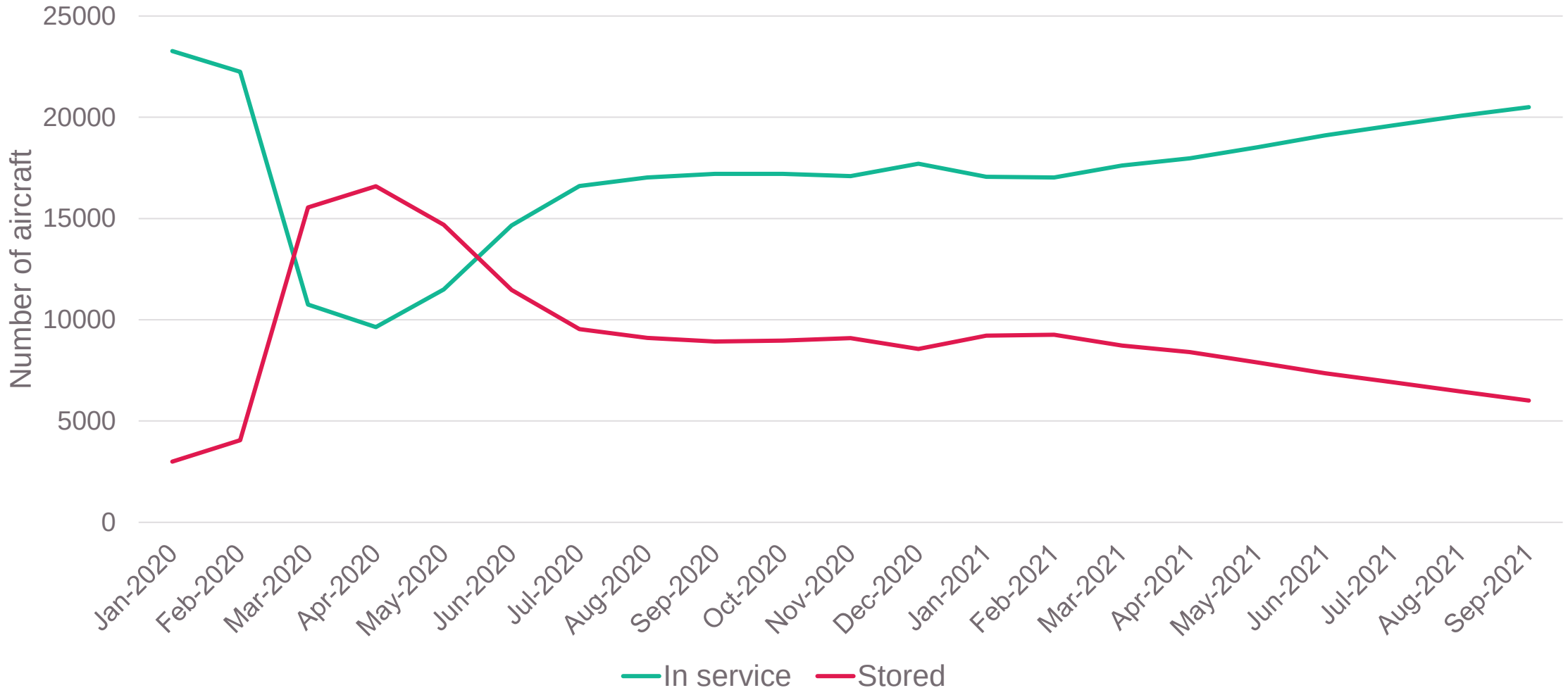
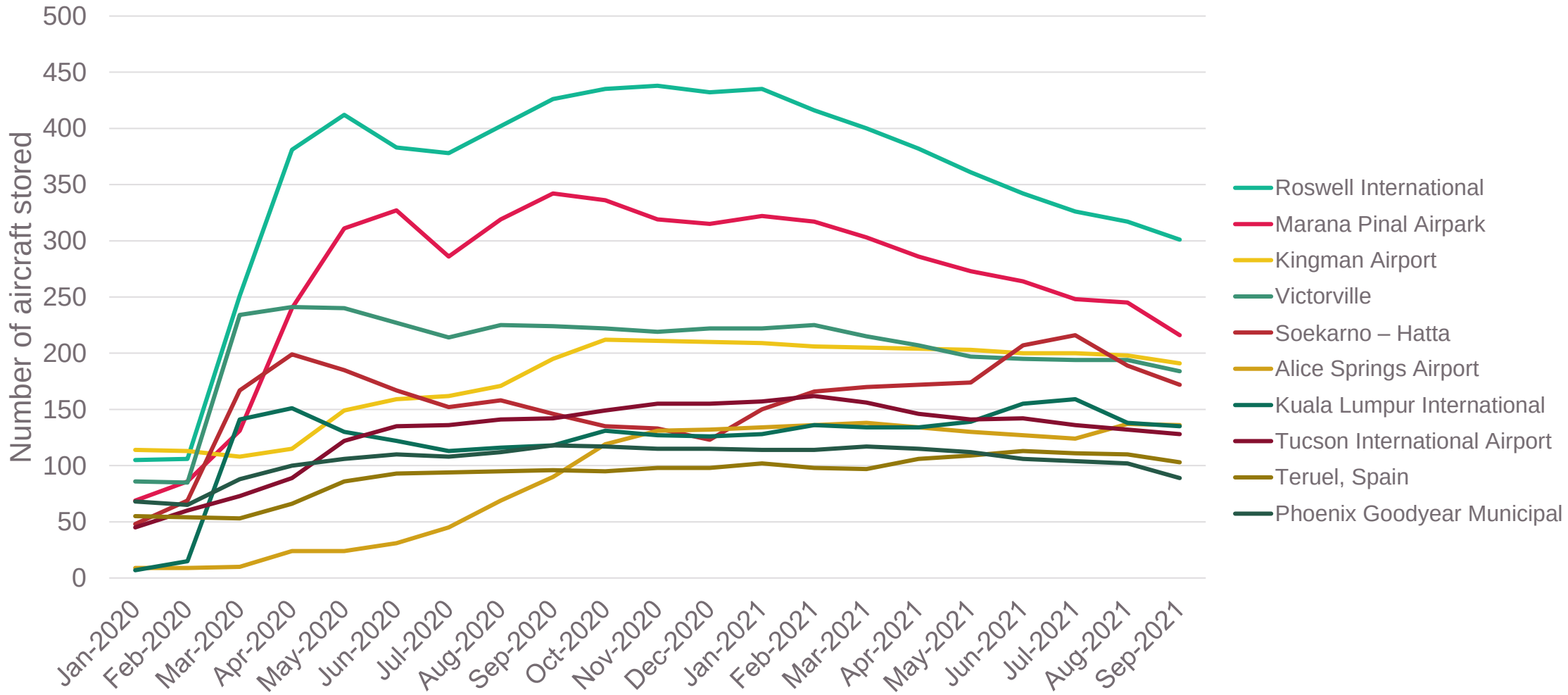
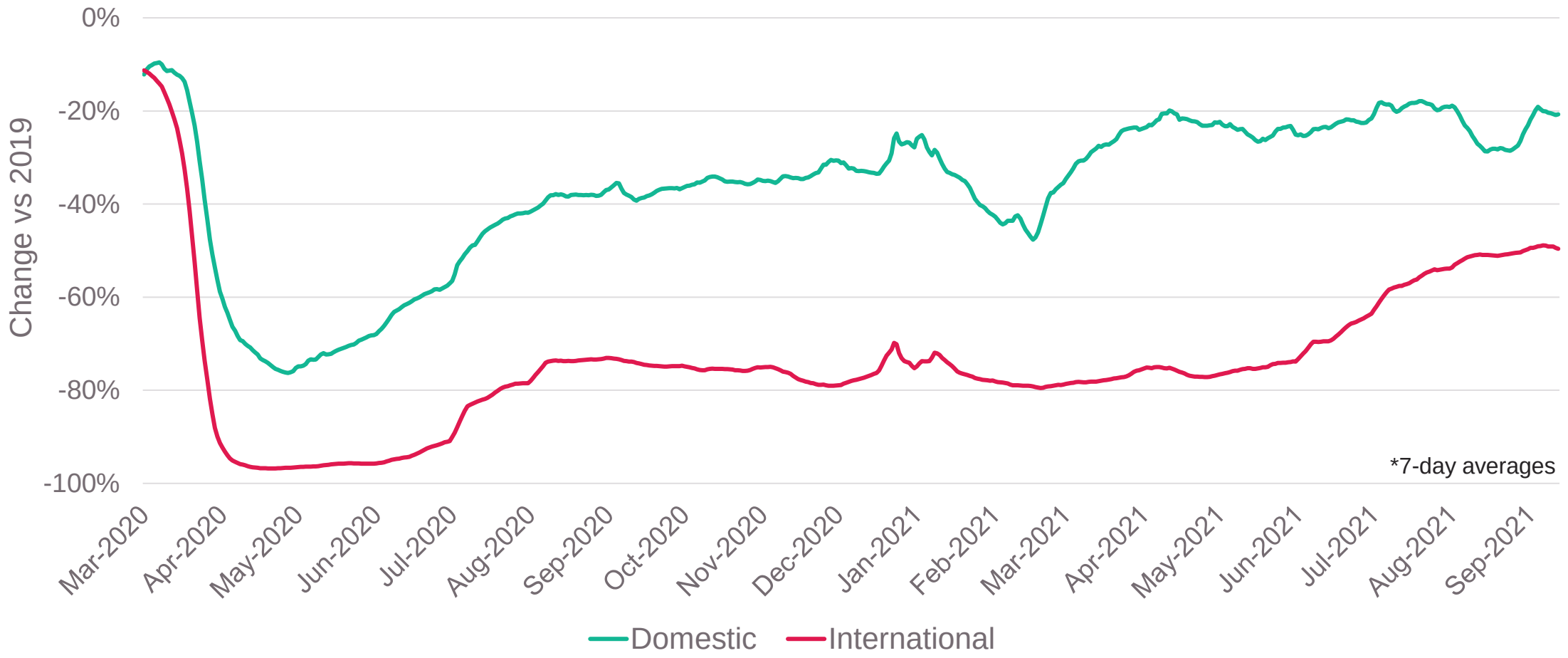
The in-service passenger jet fleet has been growing steadily since February



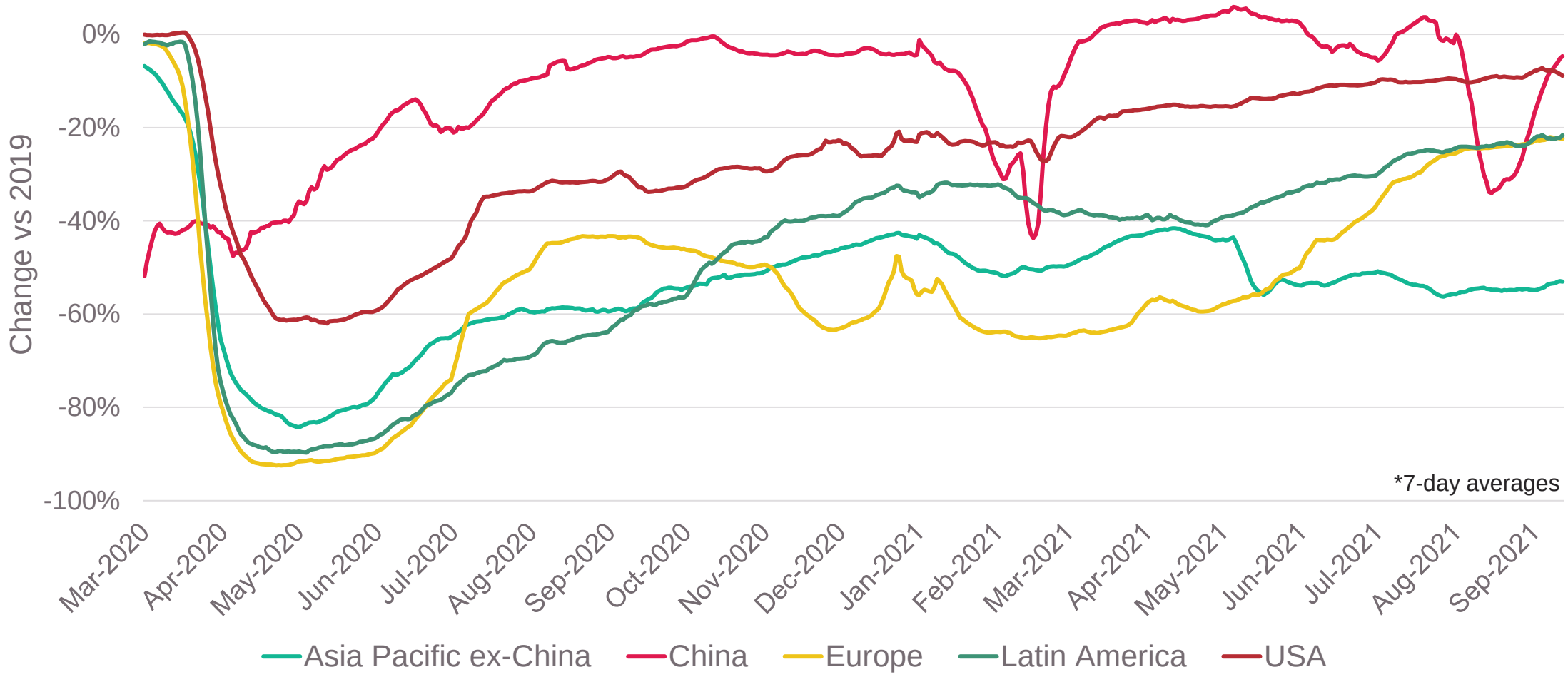
The top 10 passenger jet storage locations have also seen inventories decline



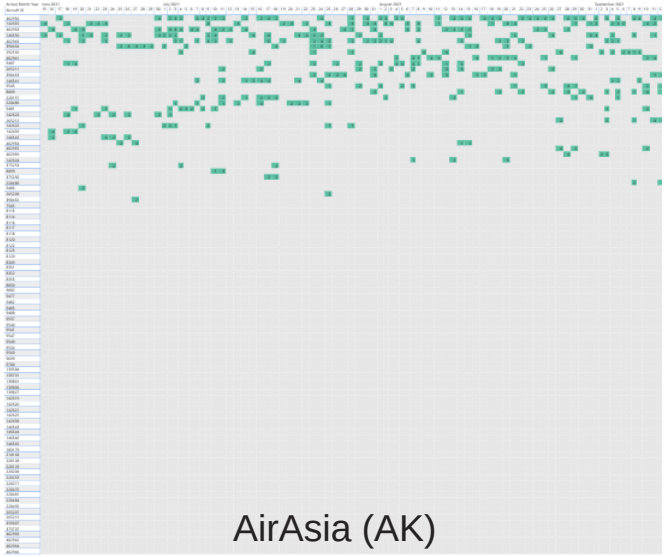
However, recent improvements in tracked daily passenger jet flight numbers may be levelling off, with international volumes still at half of pre-pandemic level



Number of passenger jets tracked daily with Chinese operators is almost back to 2019 levels, but the rest of Asia Pacific is lagging

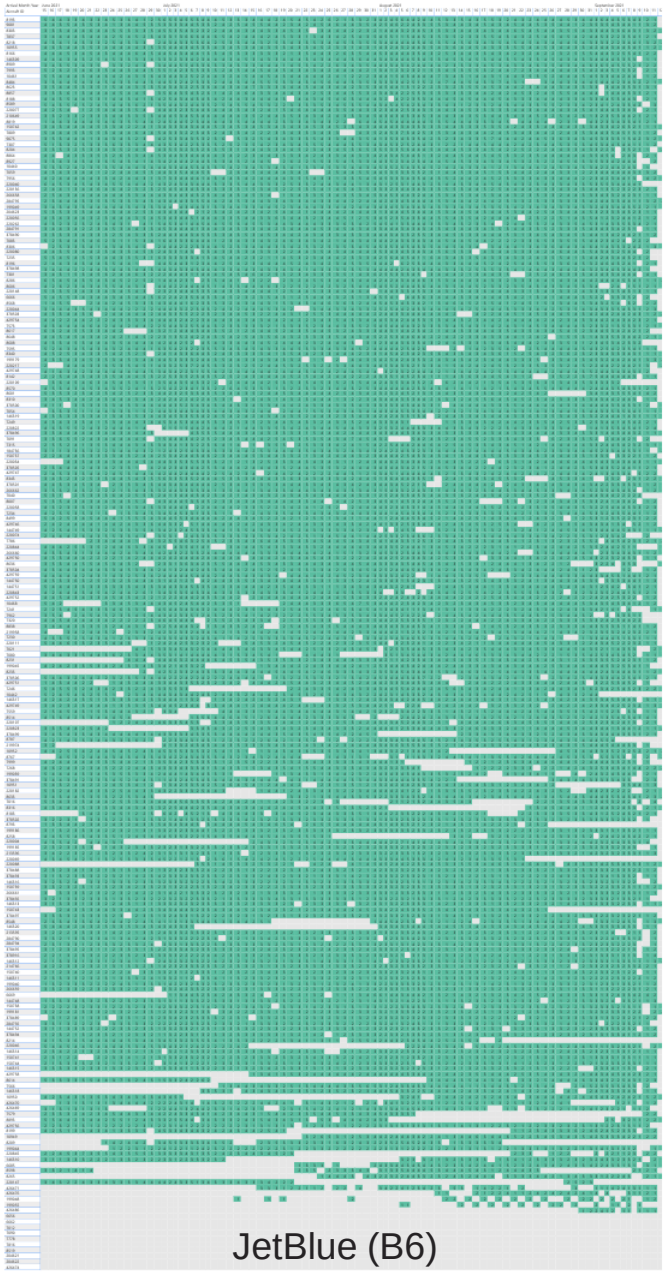


Fleet activity for past 90 days shows stark impact of travel restrictions by region



AirAsia (AK)

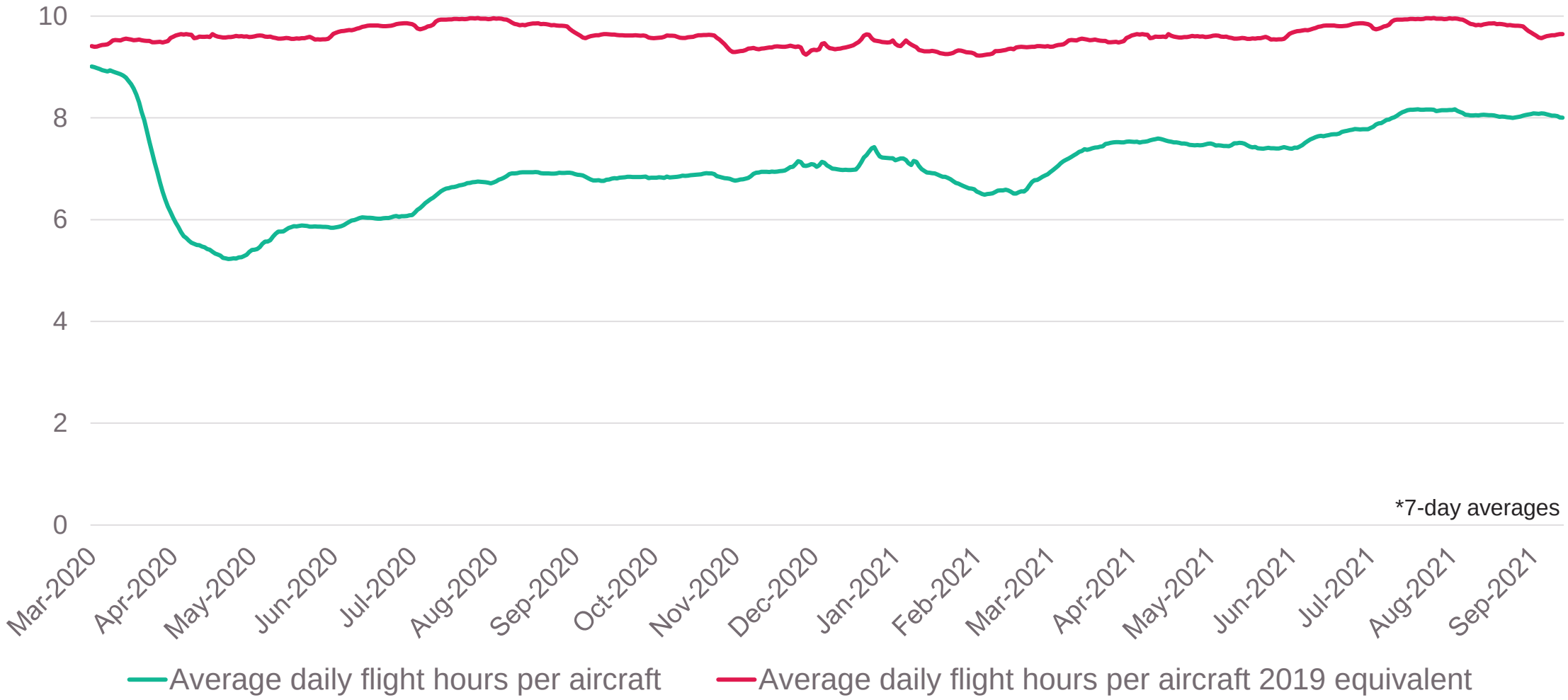
easyJet (U2)



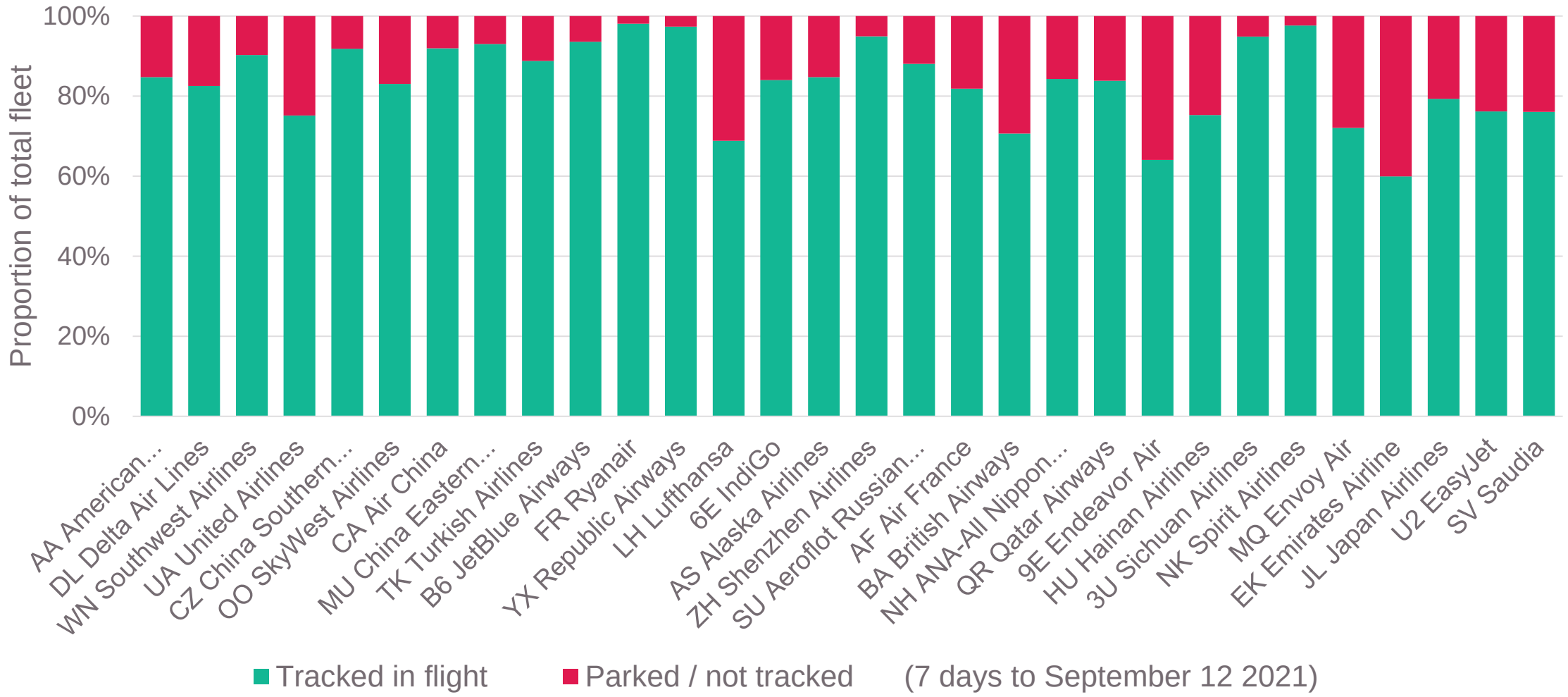
JetBlue (B6)

Daily flights tracked per MSN
(90 days up to and including September 12)

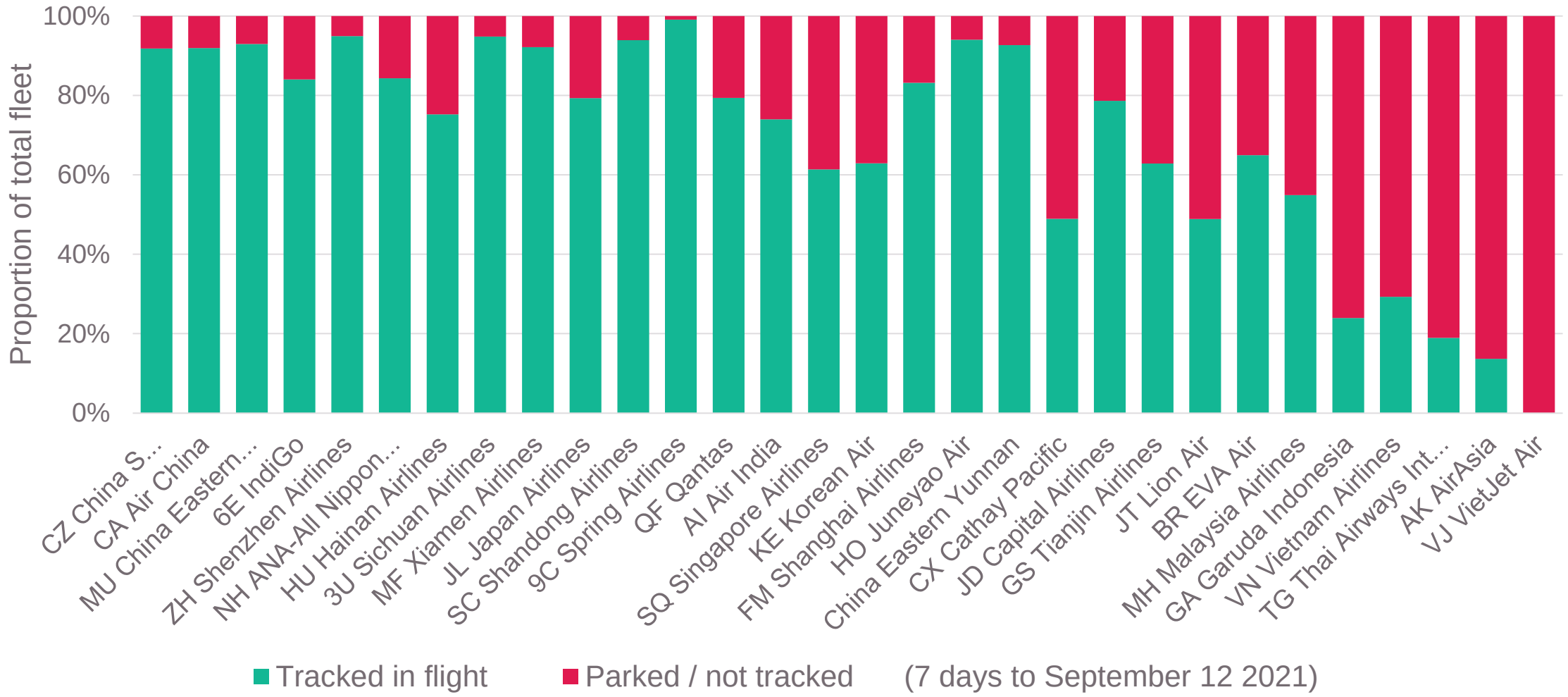
Meanwhile in-service passenger jets are on average flying almost two hours less per day compared with 2019



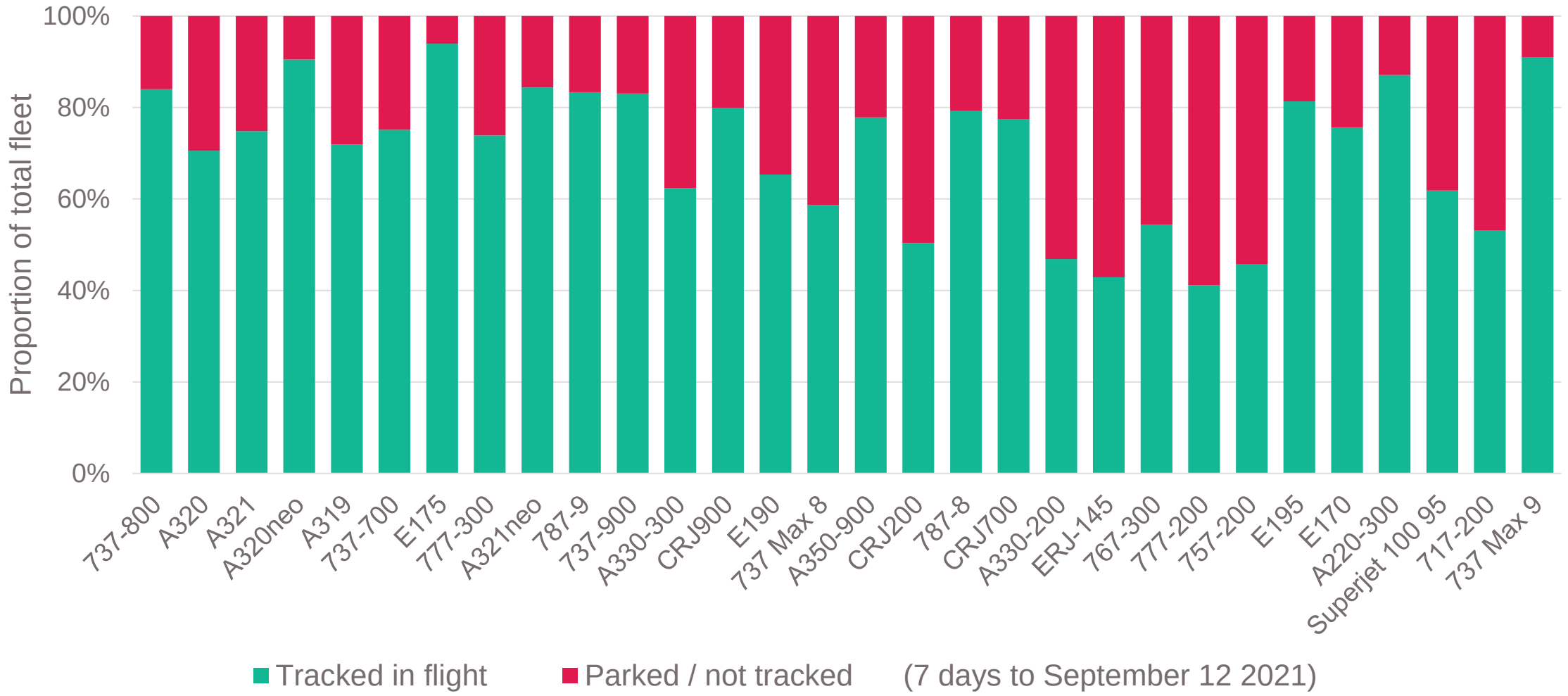
Top 30 global carriers by fleet size flew majority of their aircraft at least once during seven days to September 12...



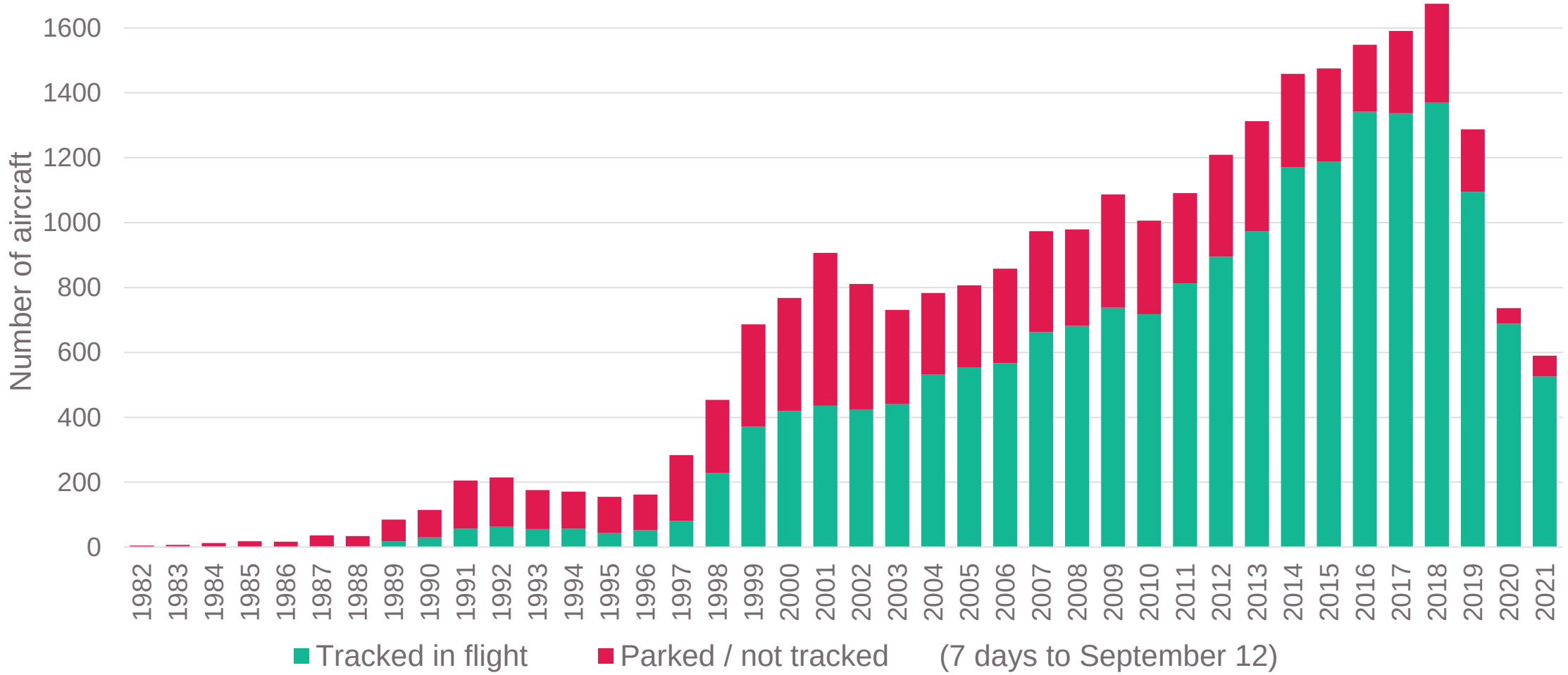
...but this was not the case for some Asia Pacific operators



For certain legacy aircraft series, less than half of fleet was tracked in flight during seven days to September 12...

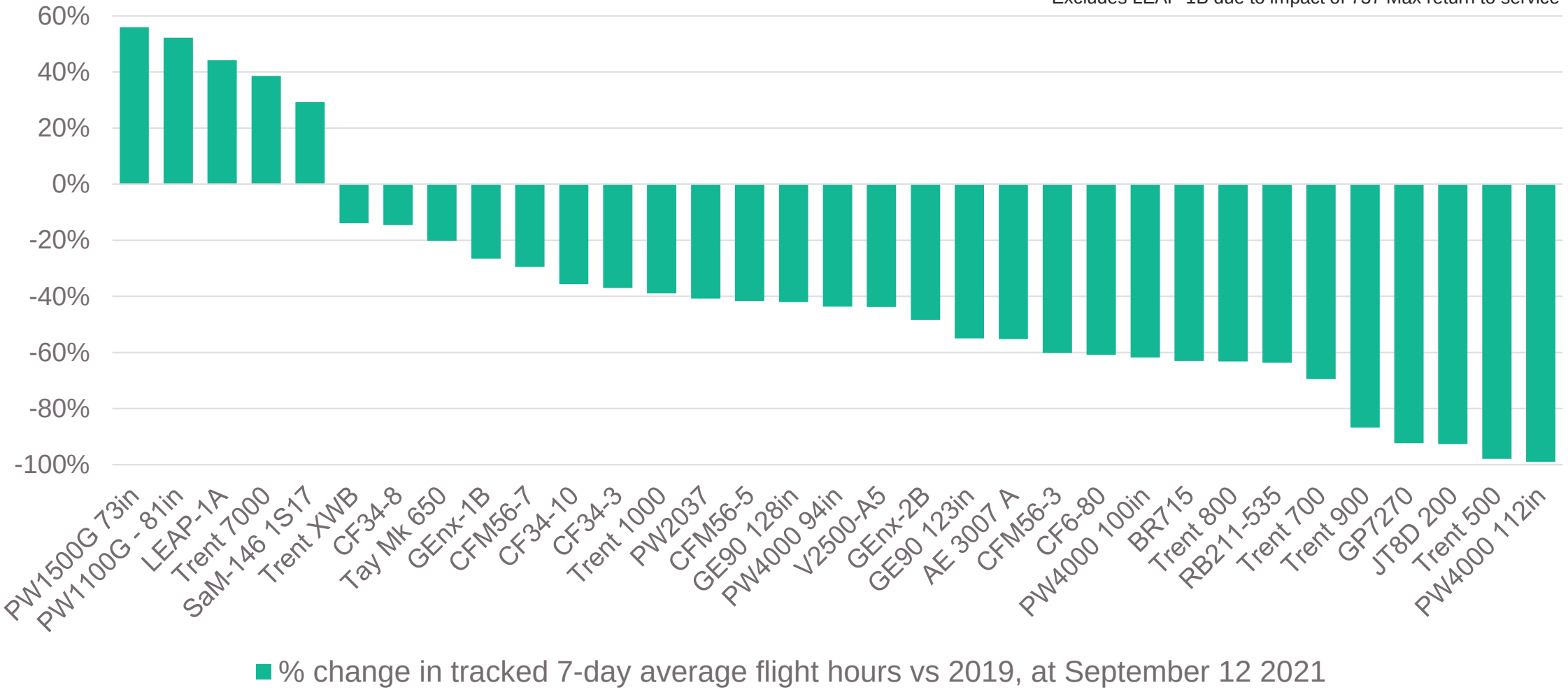


...and high proportion of in-active passenger jets were pre-2004 build

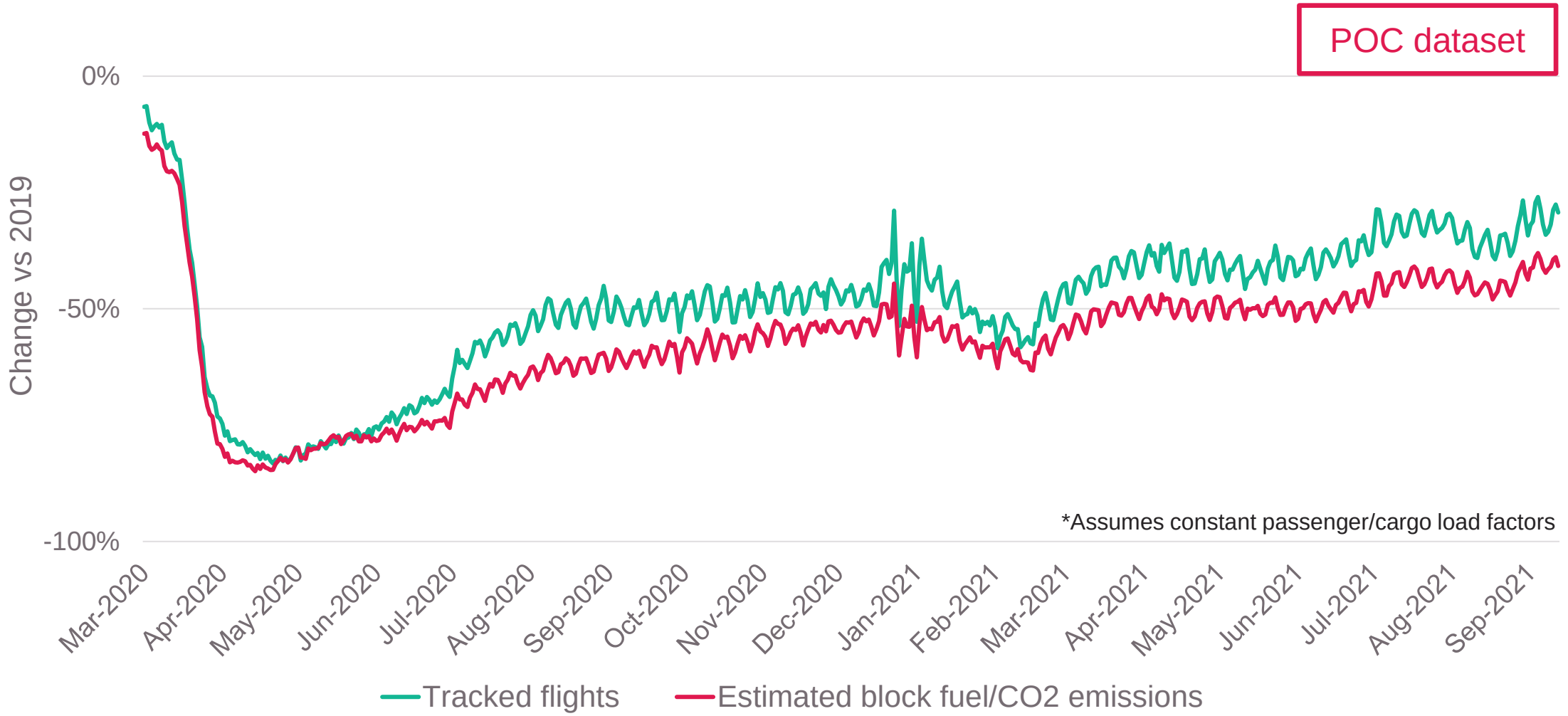


Some latest-generation engine series are achieving higher average daily flight hours than in 2019

*Excludes LEAP-1B due to impact of 737 Max return to service



Daily estimated block fuel/CO_2 has declined more than flight volumes as operating patterns change and airlines favour newer-generation passenger jets

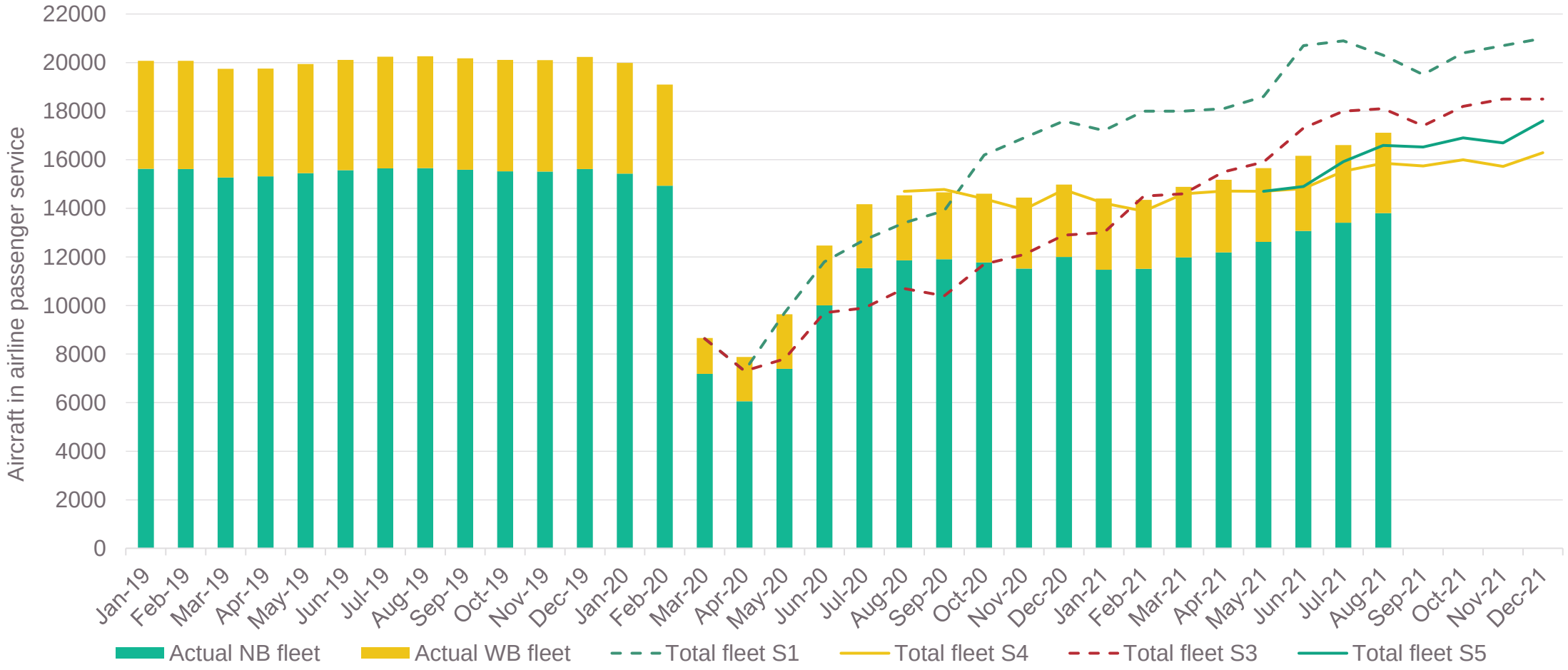


Fleet recovery scenarios

Definition & data sources

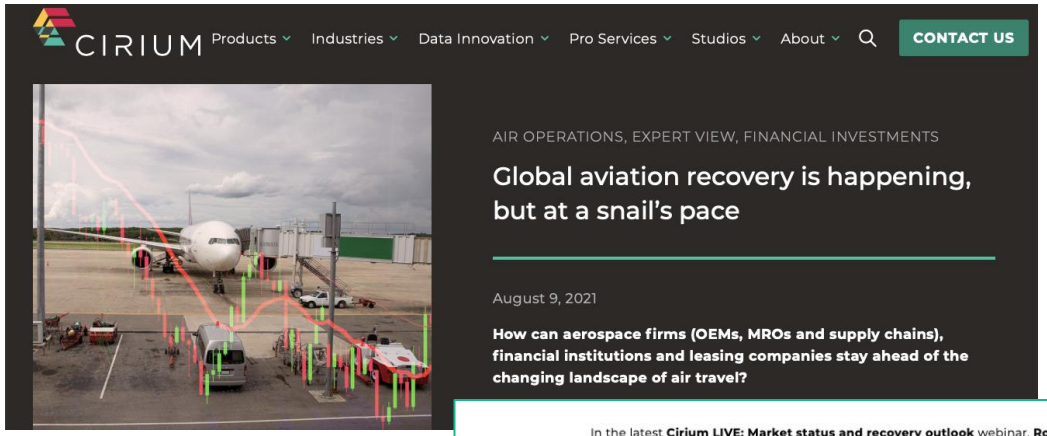
- Scenarios derived by **Ascend by Cirium**, using Cirium Schedules data and Cirium Fleets Analyzer as the key data sources for monthly capacity and in-service fleets
- Capacity (ASKs) factored using IATA's published global passenger load factor to derive monthly traffic for Jan 2019 to Feb 2020
- Initially, three forward demand & capacity scenarios outlined, corresponding to differing severity of demand impact, and time to recover to 2019 traffic levels:
  - Scenario 1: Three month 'hibernation' phase, followed by gradual traffic recovery. 2019 traffic level reached by Q3 2021
  - Scenario 2: Three month 'hibernation' phase, followed by faster recovery. 2019 traffic level reached by Q1 2021
  - Scenario 3: Up to six month 'hibernation' phase, followed by slower recovery. 2019 traffic level not reached until 2023
- Subsequently, two additional scenarios constructed in September 2020, which included assumptions for separate domicile regions:
  - Scenario 4: Traffic stagnates over winter 2020/2021, then gradual traffic recovery from Q3 2021. 2019 traffic level reached by 2023-2025, dependent on region
  - Scenario 5: as per Scenario 4, but faster rebound from Q3 2020
- Input assumptions on load factor, single-aisle/twin-aisle capacity split, and aircraft productivity
- Outputs are monthly global RPKs, ASKs, and in-service fleet numbers

Passenger fleet in service is increasing ahead of more optimistic recovery scenario (S5)



Source: Cirium Fleets Analyzer, Ascend by Cirium analysis

For more on our latest recovery scenarios visit cirium.com/thoughtcloud...



In the latest **Cirium LIVE: Market status and recovery outlook** webinar, **Rob Morris,** global
of consultancy**, Max Kingsley-Jones**, senior consultant, and **George Dimitroff**, head of valu
at **Ascend by Cirium** – the consultancy arm of the business – covered the insights to take av
anticipate future market supply and demand.

To view the full Cirium LIVE virtual event click here.

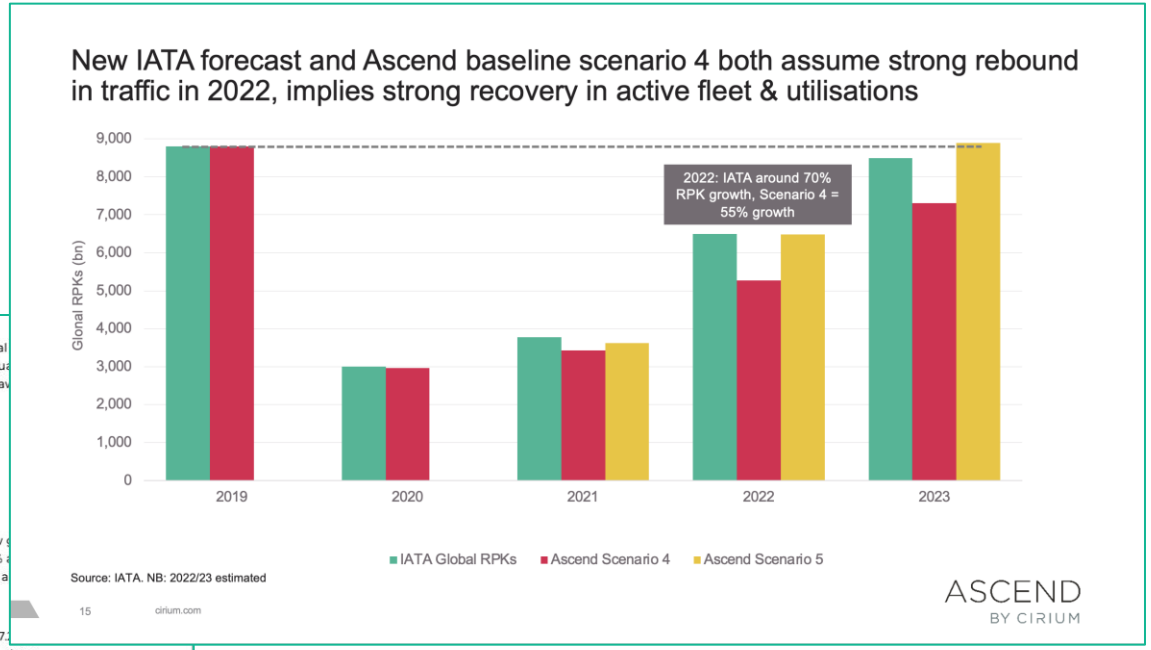
The dynamic is positive, the trajectory is positive

It's no surprise that recovering from the impact of the pandemic will be difficult as we saw
capacity down 52% cumulatively in 2020 over 2019. In fact, capacity remained down by 57%
end of March 2021 over 2019, with the global airline schedule projecting a recovery to -52%
-50% by the end of July and August respectively.

IATA's more recent forecast predicted capacity growth in 2021 of 21.9%, which equates to 47.
down over 2019. According to the latest **Cirium schedules data**, capacity is projected to be down only 40% this year over 2019 albeit there remains plenty of scope for revision here given five months of the year remain in outlook in the schedule. For now, this is a slightly more positive outlook than IATA. Looking at the seven-day average trend for global capacity scheduled this year worldwide, we were 42% down over the 2019 equivalent at the end of July.

The key point is the dynamic is becoming more stable and the trajectory is more positive. For example, the current projection for the global schedule for August shows further recovery to -36% down over 2019 by the end of the month.

> *Airlines are still making revisions on a weekly basis and typically removing capacity from the schedule; however, it is less impactful than previously seen.*

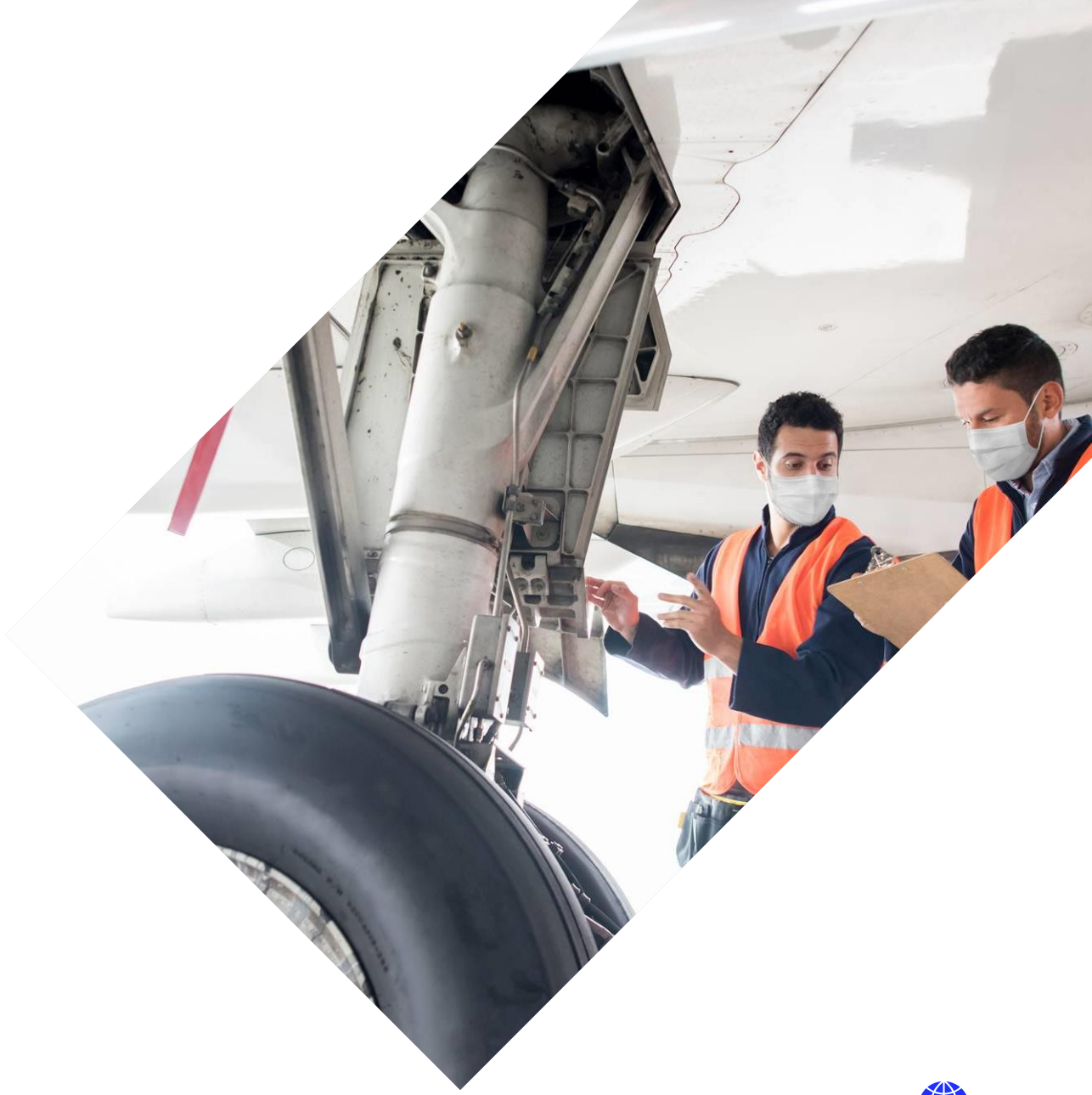



CIRIUM

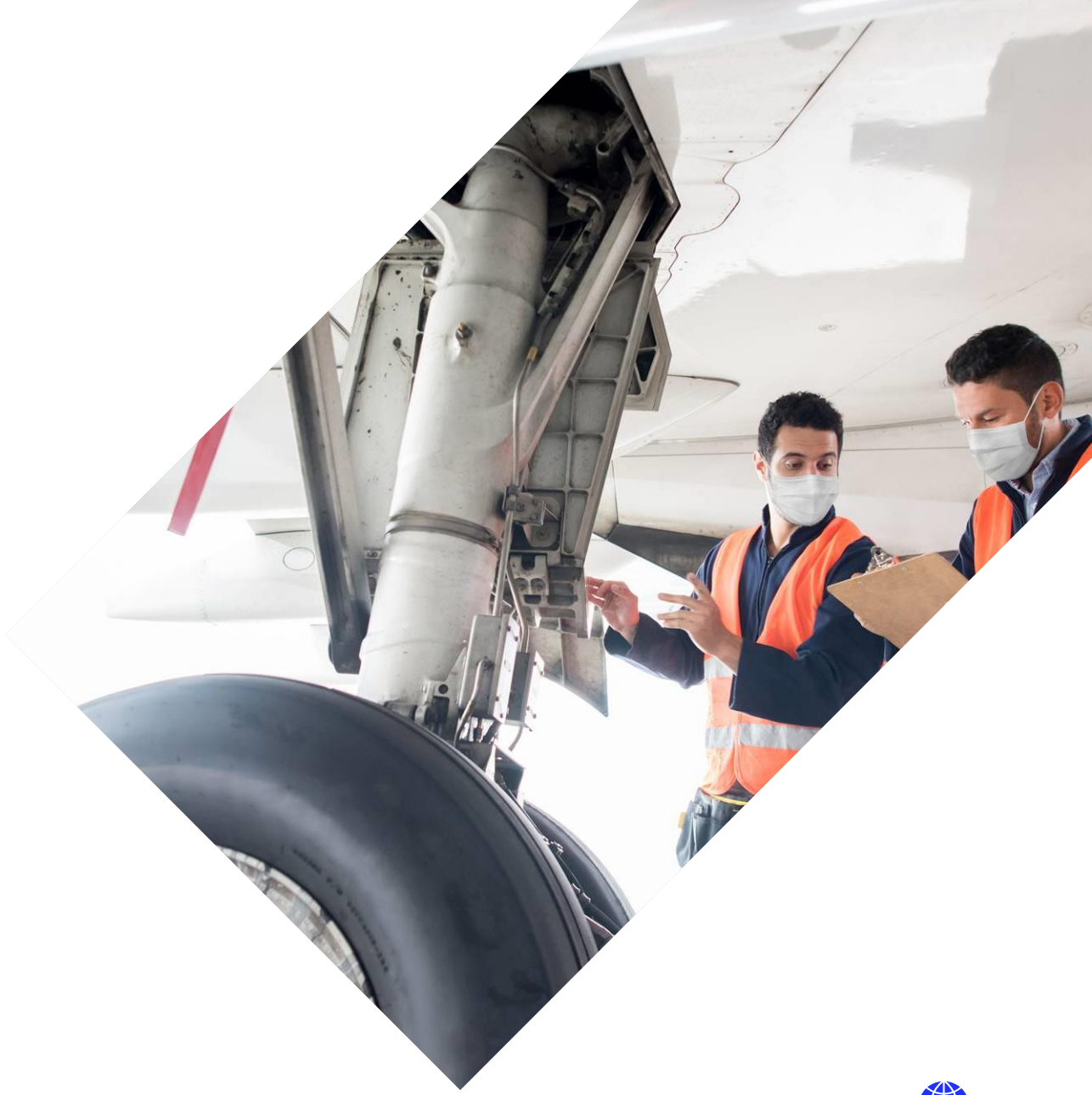
Questions?

Andrew DOYLE

Senior Director, Market Development – Cirium



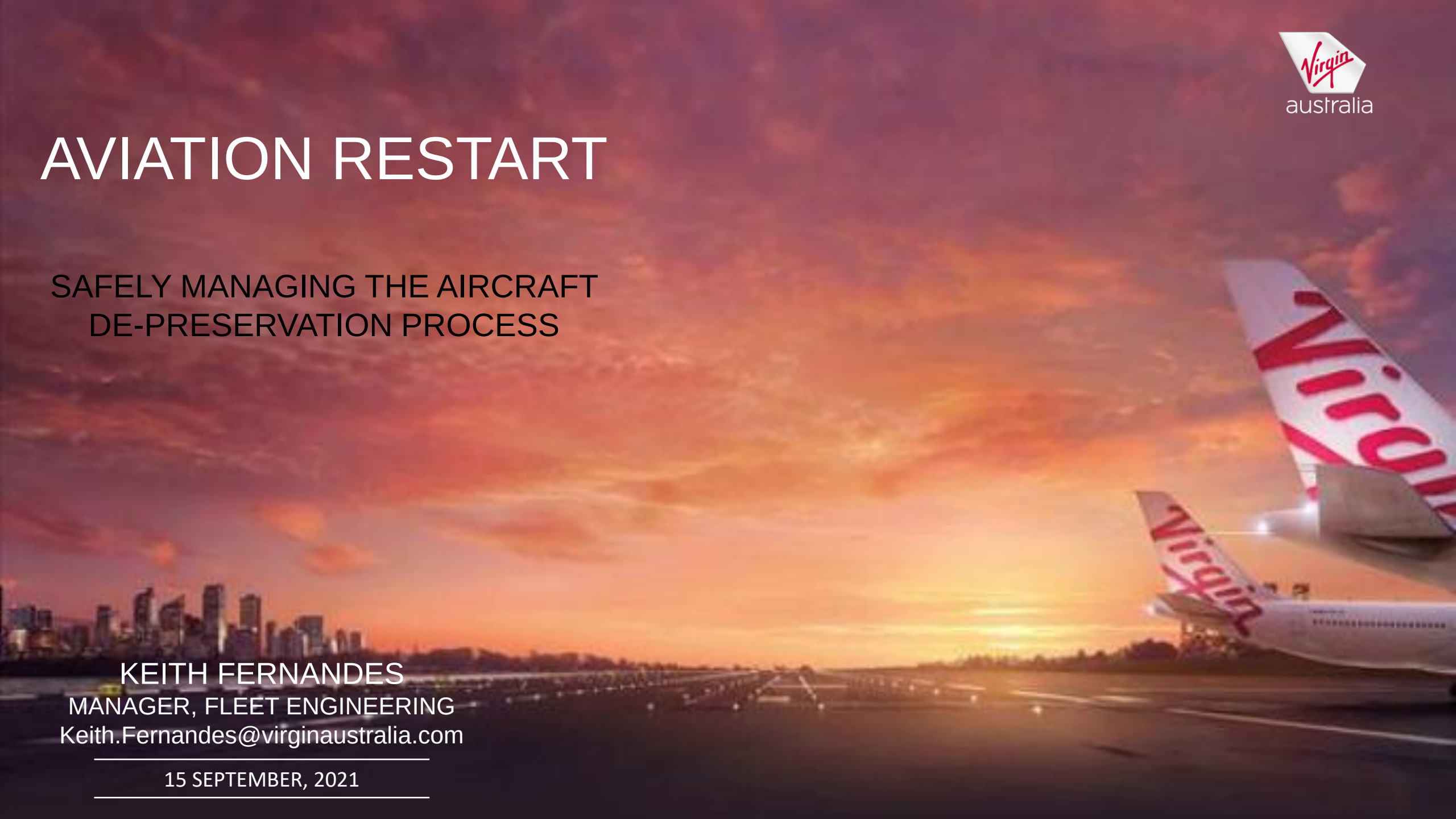
Aviation Restart, Safely Managing Aircraft Return to Service



Keith FERNANDES

Manager, Fleet Engineering – Virgin Australia

MCTG Vice-Chairman



AVIATION RESTART

SAFELY MANAGING THE AIRCRAFT DE-PRESERVATION PROCESS

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15 SEPTEMBER, 2021

SAFELY MANAGING AIRCRAFT RETURN TO SERVICE

1 **Risk Based approach**

-Unexpected Change and identifying risks

2 **Continuing Airworthiness during Parking**

-Program Adjustments

3 **Return to Service Strategies**

-Phased pathway to safe & efficient return to service

Continuing Airworthiness during Parking – preserves C of A / protects valuable assets

	ELEMENTS	DETAIL	ACTIONS
1	**Unexpected Change**	• The pandemic created conditions of global grounding of worldwide fleet resulting in aircraft instantly parked/stores at locations in as-is conditions • Inability to enter aircraft into Parking/Storage programs in a suitable environment • Inability to quickly transition aircraft into Parking programs due to high volume • Non-availability of consumables / materials to preserve aircraft	Identify associated Risks and introduce effective controls Update internal processes and associated work instructions to manage rapid change
2	**Continuing Airworthiness Management**	• Follow ICAs including OEM approved deviations • Monitor Program changes - AMM / Temporary Revisions / Service Letters / TAs • Ensure effective tracking controls – inspection consistency, transitions in/out of parking, repeat maintenance intervals	Resource to monitor, validate, and ensure compliance with the latest ICA revisions, re-work of existing task cards
3	**Program Adjustments**	• Optimize maintenance frequencies ○ Engine/ APU run ○ Operate aircon packs to ventilate cabins & manage relative humidity ○ Fuel testing / treatments / Biocide – effectively control microbiological growth ○ Defect Management - early identification and rectification impedes deterioration ○ Corrosion (e.g., Engine Lip Skin) , Bird & Insect Nesting preventions • Parking / Storage location environmental considerations	Customise to local conditions to manage environmental deterioration, damage, defects
4	**Communication**	• Communicate on key status updates and changes to Parking Programs ○ Deviations/Extensions as published by OEMs ○ Identified program issues, adjustments ○ Introduced Optimisations	Establish regular update protocols with key stakeholders (Regulatory Authorities, CAMO, AMO)

KEY CONSIDERATIONS

Return to service

Risks

Consideration of all identified risks/hazards/treatment measures captured in the initial and regular Risk Assessments

Configuration

Configuration controls, compliance with the allowable configuration and actions to address existing gaps – hardware & software configurations

Address any aircraft components / parts removed for off-wing maintenance or storage or robberies (cannibalization)

Maintenance

COVID impacts to AMO - Performance of non-familiar tasks
- Training & re-certification

Transport constraints - Material lead times & shipping delays

Lessons Learnt post RTS - Analyse post operation defects and introduce preventative actions
- Heavy Maintenance – Corrosion (e.g. Spoiler Cables)
- Landing Gear Scraper rings (Leaks)

Establish a Safe and efficient pathway for return to service

1 Scheduled maintenance

- Acquit scheduled maintenance
- Mandatory Instructions for Continuing Airworthiness (AD / ASB)
- Overdue Maintenance / deviations ➡ OEM Justification & Regulatory Approvals

2 De-Preservation

- De-preservation maintenance instructions per AMM / Service Letters
- Open Defects acquittal; robbed parts
- Loadable Software updates – NDB, Terrain DB..
- Part power engine runs (80%)

3 Optimise

- Operational checks – Engine Cowl Thermal Anti-Ice /Bleeds / Isolation & Pack Valves
- Lights – Internal/External/Cockpit/Emergency
- Cabin readiness; Deep Clean, carpets, furnishing, galley equip, lavatories
- External wash

4 Validate

- Maintenance Provider capabilities
- Primary & Secondary flight controls incl. Spoilers, Speed brakes, Flaps, Slats
- Extensive pre-flight checks – Critical systems & Alternate/Standby systems
- Full Thrust Take-off
- Verification (shake-down) non-revenue flight

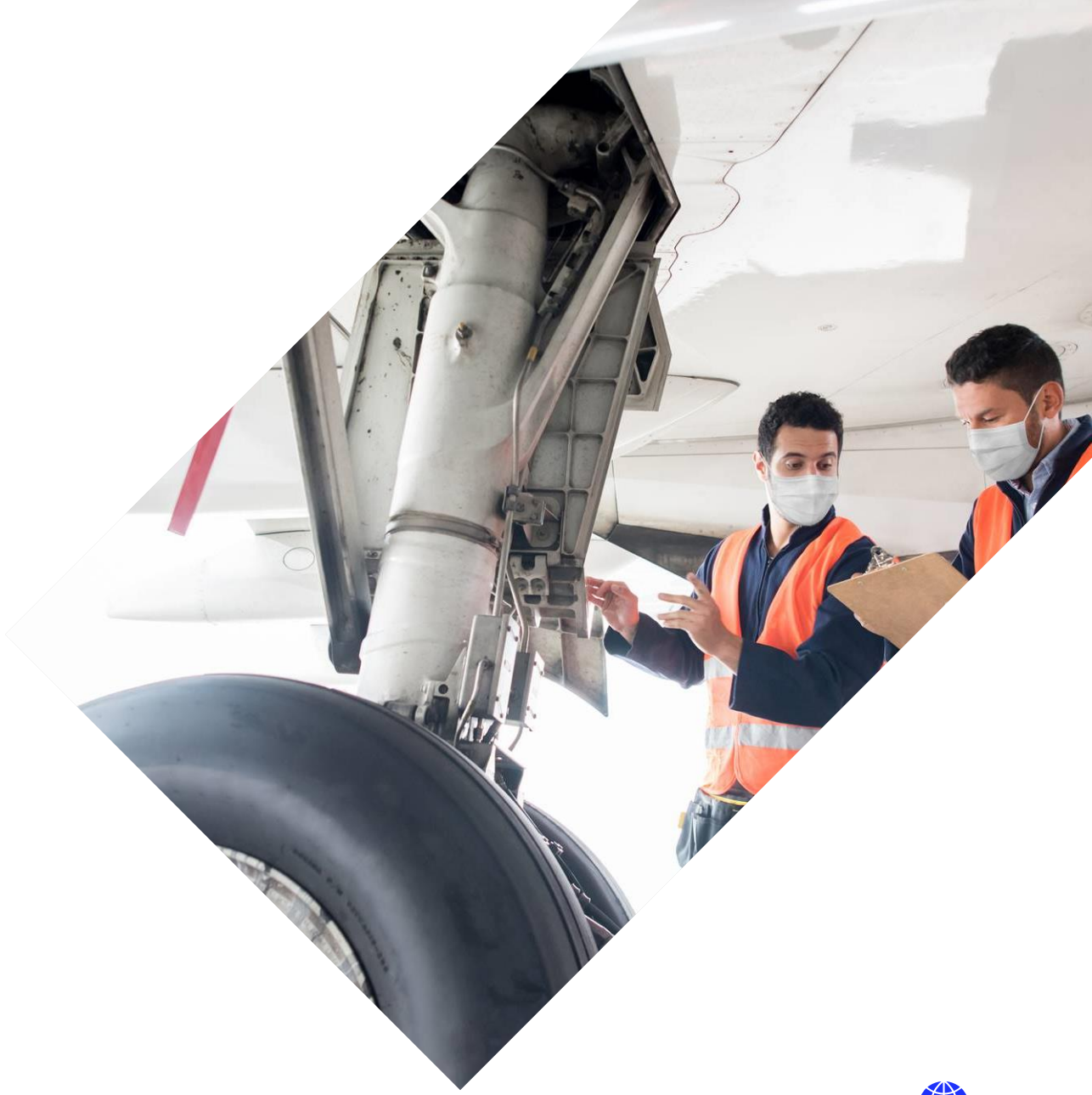
SUMMARY

- ❑ **Comprehensive Risk Assessments to manage unexpected change & de-preservation**
- ❑ **Effective Continuing Airworthiness Controls during Parking / Storage / Restoration**
- ❑ **Detailed analysis of maintenance requirements - pathway to safe & efficient return to service**
- ❑ **Introduce effective monitoring of post RTS reports**
- ❑ **IATA Document – Guidance for managing Aircraft Airworthiness for Operators during and Post Pandemic**
  - ✓ Input from operators based on experience includes Best Practices and Lessons Learnt
  - ✓ The **Safety Risk Assessment template** provides a sample of the most common hazards, risks and mitigation actions.

https://www.iata.org/contentassets/d0e499e4b2824d4d867a8e07800b14bd/iata-guidance-managing-aircraft-airworthiness-during-post-pandemic.pdf

Thank you.

Questions?



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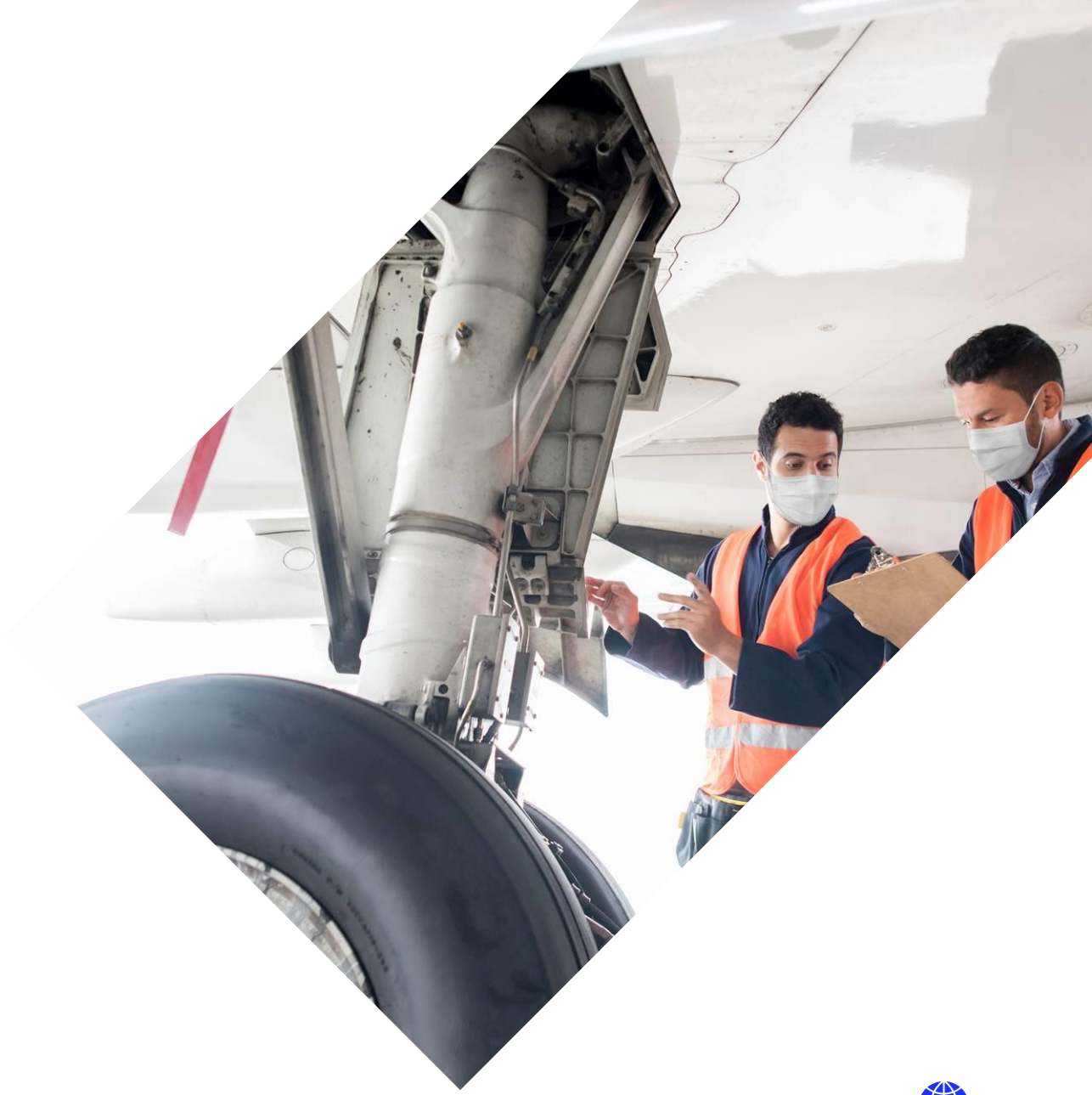
Useful links

- Maintenance Cost Technical Group
  www.iata.org/mctg
- Technical Operations Working Group
  www.iata.org/tog
- Safely Restarting the Aviation Industry



Thank you!

For more information, please visit
www.iata.org/mcc

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