

Global Aerospace

BofA Commercial Aerospace: 2023 in review - Strong year back to normality

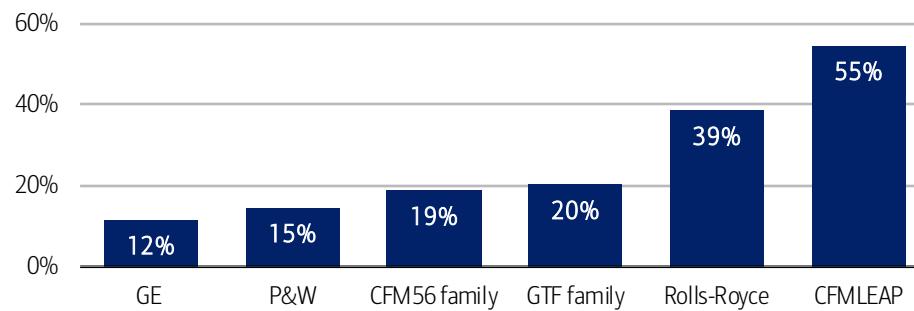
Industry Overview

All major engine families reported strong growth in 2023

All major engine families reported strong YoY growth in 2023 with the CFM LEAP reporting the highest growth with total flight cycles increasing by +55%. This is followed by +39% YoY growth in Rolls-Royce flight cycles and +20%, +19%, +15% and +12% YoY growth in total flight cycles of GTF, CFM56 family, P&W and GE in 2023 respectively.

Exhibit 1: Total Major engine family cycles in 2023 vs 2022

All major engine families reported strong yoy growth over last year vs 2022



Source: BofA Global Research, Flightradar24

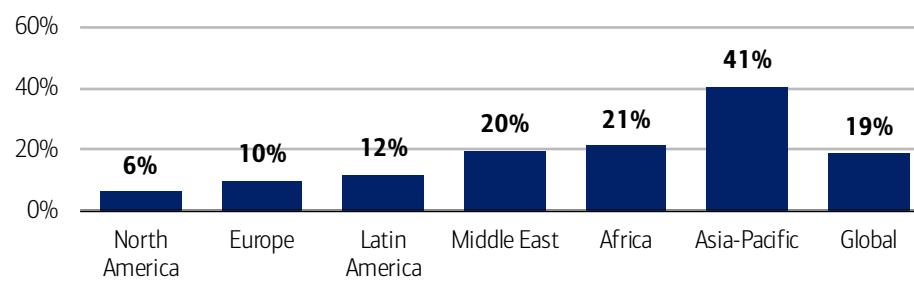
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Global Commercial cycles improved across all regions YoY

Total Global commercial cycles in 2023 improved by +19% YoY driven by strong growth in APAC cycles of +41% YoY. Africa, Middle East, Latam, Europe & North America flight cycles also improved by +21%, +20%, +12%, +10% and +6% YoY in 2023 respectively.

Exhibit 2: Total Global Commercial flight cycles across regions in 2023 vs 2022

Global Commercial flight cycles improved across all regions YoY in 2023 vs 2022



Source: BofA Global Research, Flightradar24

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Global dedicated freighters cycle on the flip side fell by -5% YoY driven by -8% and -4% YoY decline in total narrowbody and widebody dedicated freighter cycles in 2023.

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WoW: Week over Week

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Refer to important disclosures on page 84 to 85.

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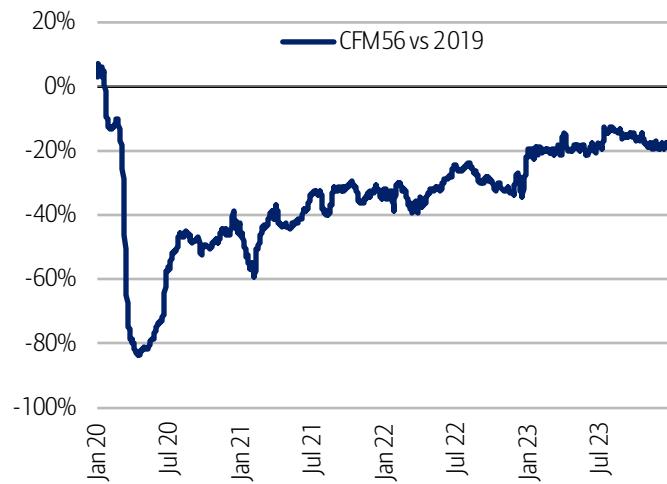
Engine cycles tracker

Engine cycles historically have tended to be better indicators for engine aftermarket trends than flight hours, as take offs & landings are where most stress is placed on engine components.

- CFM56 family** 7 day rolling avg. daily flights declined to 18.9% YoY and improved to -18.6% vs 2019 this week, a -1.1 pts fall and 0.5 pts improvement vs 20.1% and -19.1% respectively last week.

Exhibit 3: CFM56 family 7-day avg. daily flights tracked YoY %

The CFM56 family made gradual progress through FY23

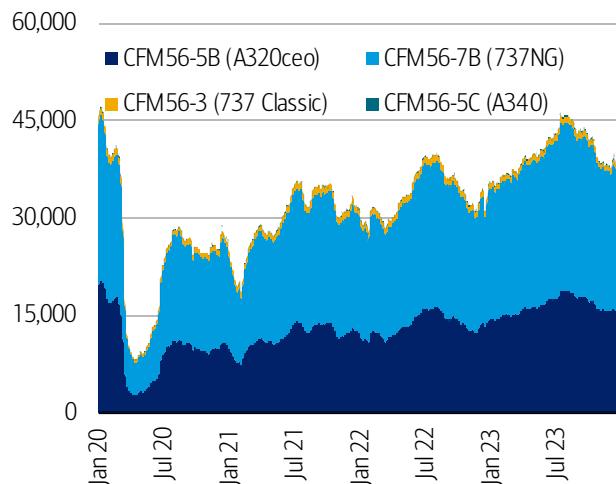


Source: BofA Global Research, Flightradar24

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Exhibit 4: CFM56 family 7-day avg. daily flights total

5B and 7B have the largest share of fleet on Boeing/Airbus narrowbody



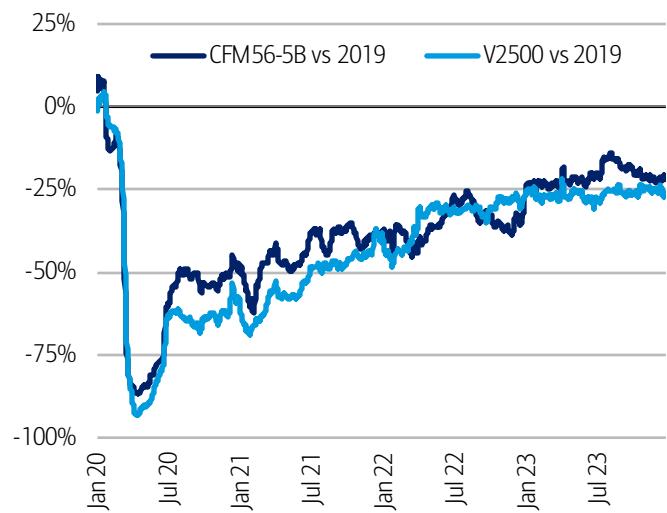
Source: BofA Global Research, Flightradar24

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- CFM56-5B (A320ceo)** 7 day rolling avg. daily flights declined to 16.8% YoY and improved to -21.9% vs 2019 this week, a -3.6 pts fall and 0.6 pts improvement vs 20.3% and -22.6% respectively last week. This compares to **V2500 (A320ceo)**, which declined to 3.2% YoY and improved to -26.8% vs 2019 this week, a -0.9 pts fall and 0.1 pts improvement vs 4.1% and -26.9% respectively last week.

Exhibit 5: CFM56-5B (A320ceo) vs V2500(A320ceo) – 7 day avg. YoY

CFM56-5B and the V2500 are now broadly in line

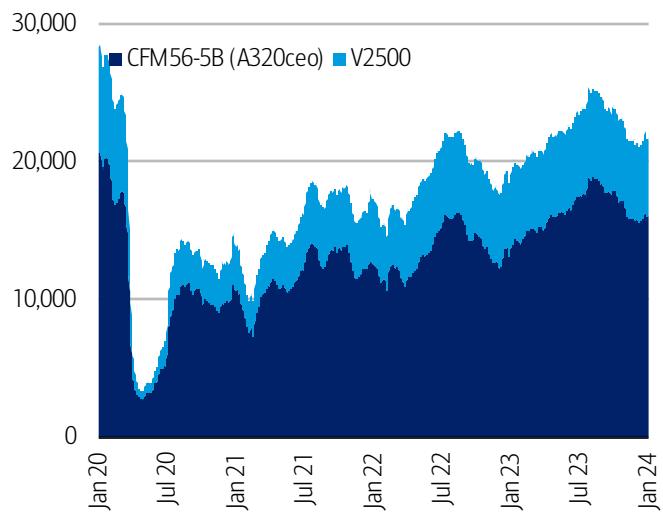


Source: BofA Global Research, Flightradar24

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Exhibit 6: CFM56-5B (A320ceo) vs V2500(A320ceo) – 7 day avg. daily flights total

CFM56 has higher market share vs V2500 on the A320ceo



Source: BofA Global Research, Flightradar24

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- CFM56-7B (737 NG)** 7 day rolling avg. daily flights improved to 22.6% YoY and improved to -15.6% vs 2019 this week, a 0.6 pts improvement and 0.4 ppts improvement vs 22% and -16% respectively last week.

Exhibit 7: CFM56-7B (737NG) 7 day avg. daily flights tracked YoY %

CFM56-7B shown gradual improvement through 2023

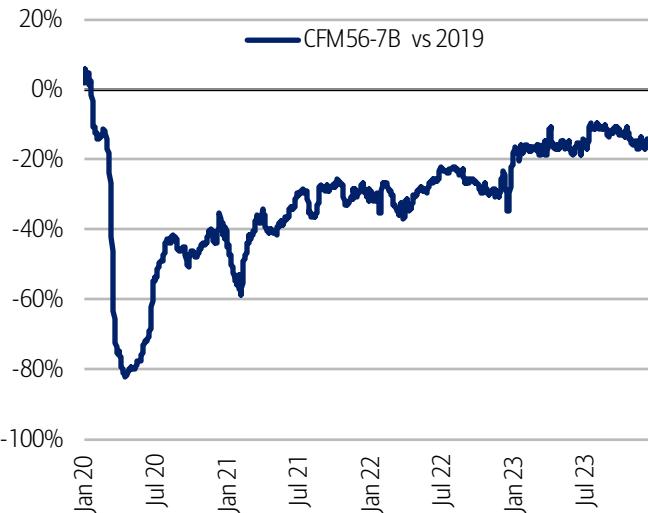
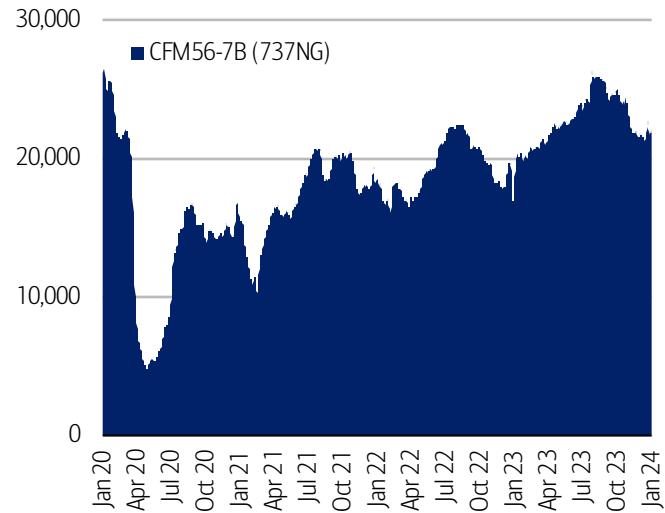


Exhibit 8: CFM56-7B (737NG) 7 day avg. daily flights total

CFM56-7B cycles are almost back at pre COVID levels



- CFM LEAP-1A (A320neo)** 7 day rolling avg. daily flights declined to 26.7% YoY and declined to 73% vs 2019 this week, a -2.1 pts fall and -4.5 ppts fall vs 28.8% and 77.4% respectively last week. This compares to **PW1100G (A320neo)**, which declined to 0.5% YoY and declined to 81.9% vs 2019 this week, a -5.9 pts fall and -7.2 ppts fall vs 6.3% and 89.1% respectively last week.

Exhibit 9: CFM LEAP-1A (A320neo) vs PW1100G 'GTF' (A320neo) 7 day avg. daily flights tracked YoY %

PW1100G 'GTF' cycles have been higher than LEAP 1-A on A320neo

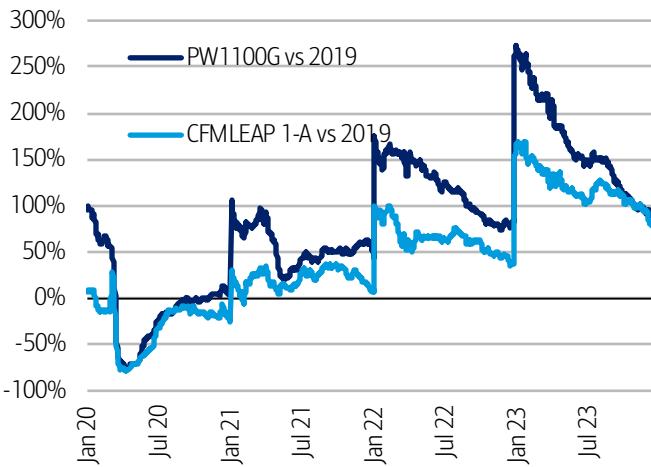
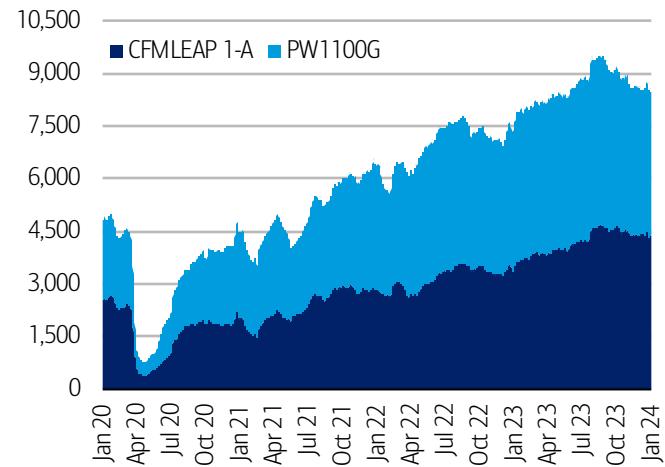


Exhibit 10: CFM LEAP-1A(A320neo) vs PW1100G 'GTF' (A320neo) 7 day avg. daily flights total

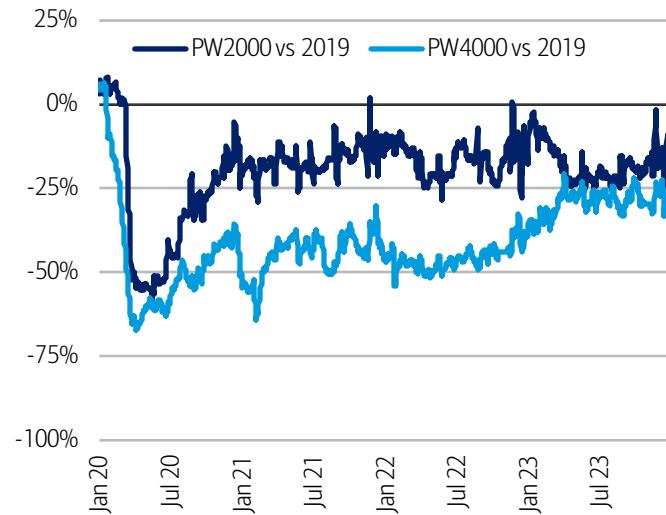
LEAP1-A fleet is slightly smaller than the GTF



- PW2000 (757)** 7 day rolling avg. daily flights declined to -3.8% YoY and improved to -10.5% vs 2019 this week, a -8.5 pts fall and 9.1 ppts improvement vs 4.7% and -19.6% respectively last week. This compares to **PW4000 (A300, A330, 747, 767, 777, MD-11)**, which declined to 21.5% YoY and improved to -27.2% vs 2019 this week, a -1.1 pts fall and 3.5 ppts improvement vs 22.5% and -30.7% respectively last week.

Exhibit 11: PW2000 (757) vs PW4000 (A300, A330, 747, 767, 777, MD-11) 7 day avg. daily flights tracked YoY %

PW2000 has large freight/military exposure, driving resilience

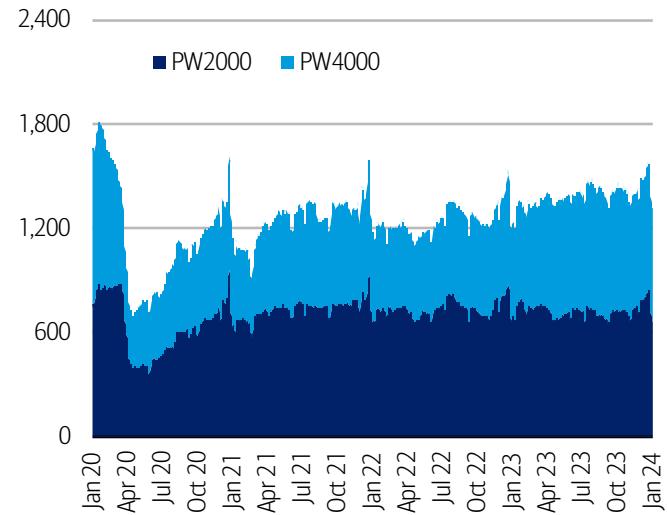


Source: BofA Global Research, Flightradar24

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Exhibit 12: PW2000 (757) vs PW4000 (A300, A330, 747, 767, 777, MD-11) 7 day avg. daily flights total

Pre-COVID, PW2000 cycles were c.800 per day vs c.600 in Nov-22



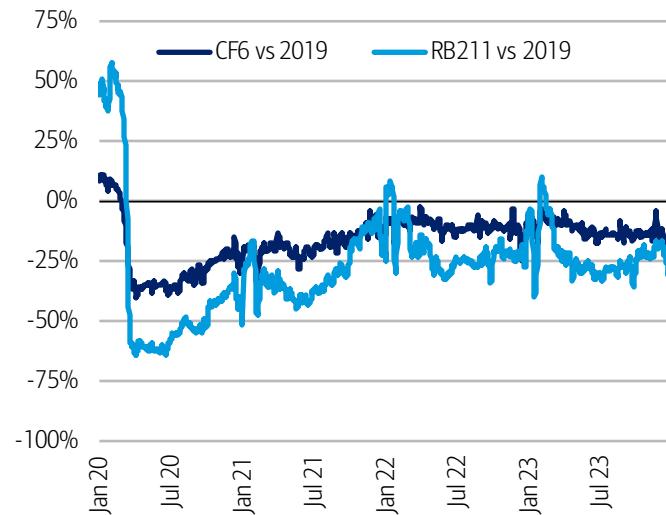
Source: BofA Global Research, Flightradar24

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- CF6 (A300, A310, A330, 747, 767)** 7 day rolling avg. daily flights declined to -5.5% YoY and declined to -20.8% vs 2019 this week, a -7.7 pts fall and -0.7 ppts fall vs 2.2% and -20.1% respectively last week. This compares to **RB211 (747, 757, 767)**, which declined to -6.8% YoY and declined to -31.2% vs 2019 this week, a -8.1 pts fall and -12 ppts fall vs 1.2% and -19.2% respectively last week.

Exhibit 13: CF6 (A300, A310, A330, 747, 767) vs RB211 (747, 757, 767) 7 day avg. daily flights tracked YoY %

CF6 and RB211 have shared freight exposure on 747 and 767

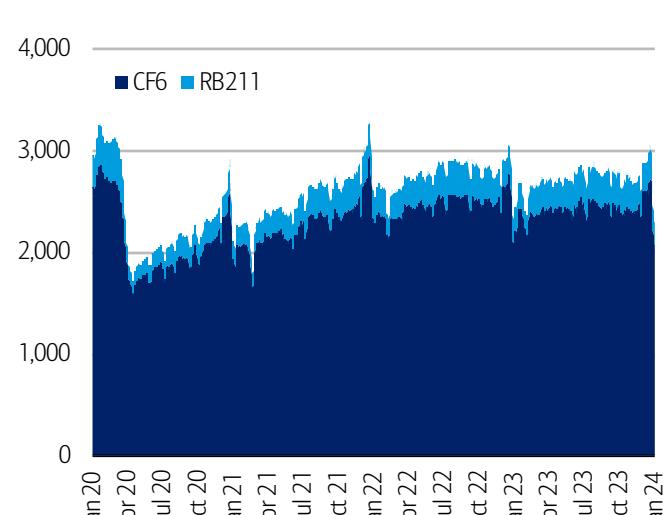


Source: BofA Global Research, Flightradar24

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Exhibit 14: CF6 (A300, A310, A330, 747, 767) vs RB211 (747, 757, 767) 7 day avg. daily flights total

CF6 has a substantially larger fleet than RB211



Source: BofA Global Research, Flightradar24

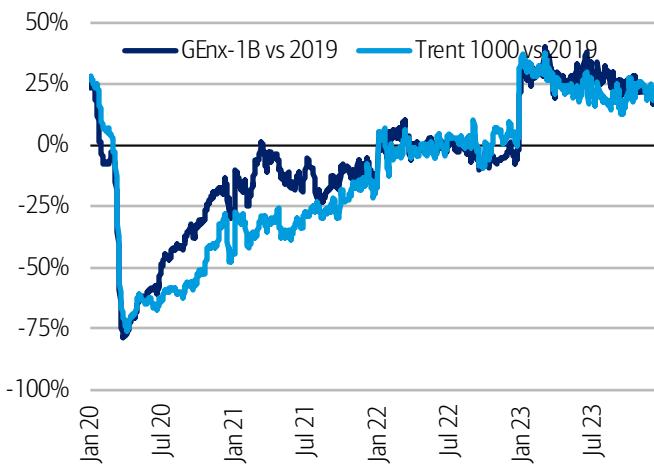
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- GENX (787)** 7 day rolling avg. daily flights improved to 21.7% YoY and declined to 14.1% vs 2019 this week, a 0.8 pts improvement and -1.5 pts fall vs 20.8% and 15.6% respectively last week. This compares to **Trent 1000 (787)**, which declined to 10.1% YoY and declined to 10.4% vs 2019 this week, a -1.5 pts fall and -6.9 pts fall vs 11.5% and 17.3% respectively last week.

Exhibit 15: GENX (787) vs Trent 1000 (787) 7 day avg.

Trent 1000 cycles had been weaker than GEnx-1B but now inline

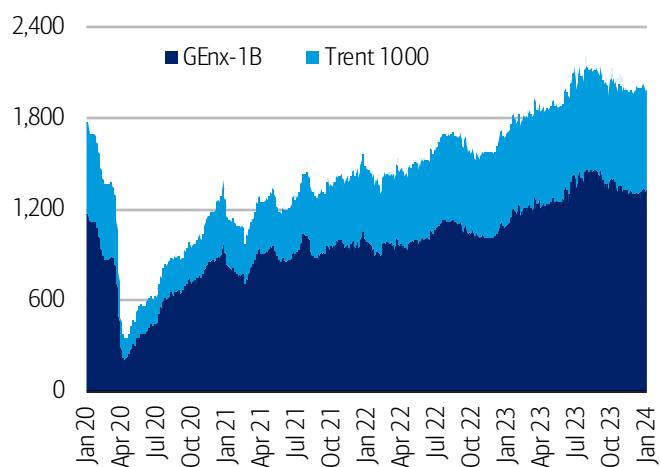


Source: BofA Global Research, Flightradar24

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Exhibit 16: GENX (787) vs Trent 1000 (787) 7 day avg. daily flights total

Trent 1000 has smaller exposure than GEnx-1B on 787



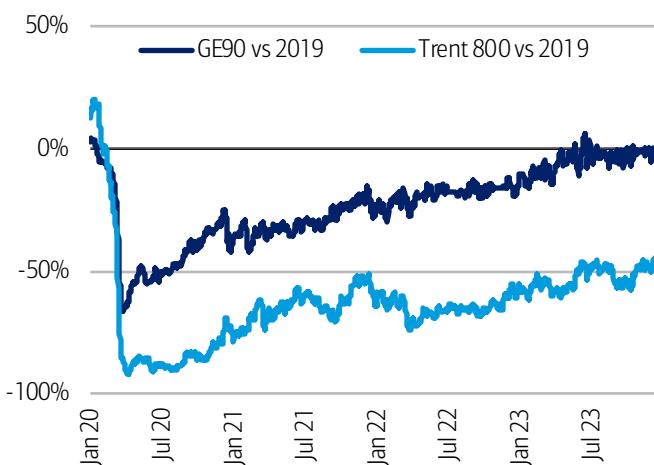
Source: BofA Global Research, Flightradar24

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- GE90 (777)** 7 day rolling avg. daily flights declined to 12.7% YoY and declined to -9.1% vs 2019 this week, a -0.5 pts fall and -4.3 pts fall vs 13.3% and -4.7% respectively last week. This compares to **Trent 800 (777)**, which improved to 36.5% YoY and declined to -47% vs 2019 this week, a 11.3 pts improvement and -2.5 pts fall vs 25.1% and -44.5% respectively last week.

Exhibit 17: GE90 (777) vs Trent 800 (777) 7 day avg. daily flights tracked YoY %

GE90 historically competed with the Trent 800 and PW4000 on 777

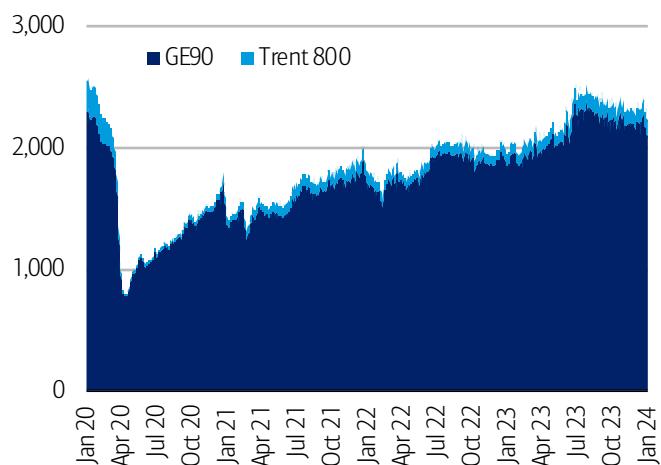


Source: BofA Global Research, Flightradar24

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Exhibit 18: GE90 (777) vs Trent 800 (777) 7 day avg. daily flights total

GE has sole position on later 777 variants (e.g. -300ER, -200LR)



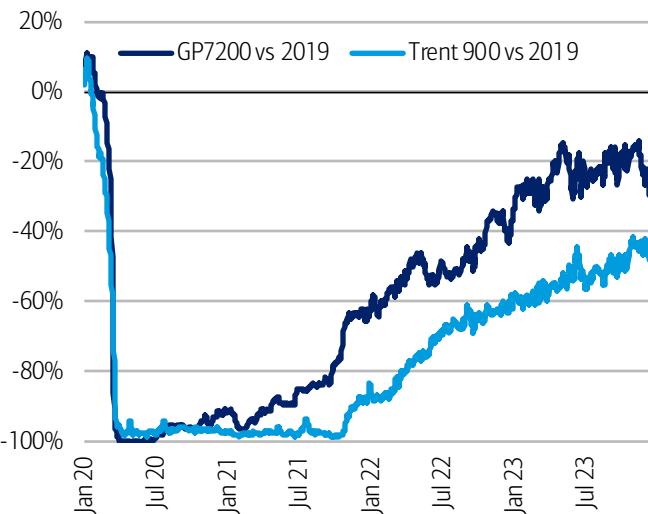
Source: BofA Global Research, Flightradar24

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- GP7200 (A380)** 7 day rolling avg. daily flights declined to 16.1% YoY and declined to -32.4% vs 2019 this week, a -1.3 pts fall and -3.1 ppts fall vs 17.4% and -29.3% respectively last week. This compares to **Trent 900(A380)**, which declined to 32.2% YoY and declined to -49.8% vs 2019 this week, a -4.5 pts fall and -2.2 ppts fall vs 36.7% and -47.6% respectively last week.

Exhibit 19: GP7200 (A380) vs Trent 900 (A380) 7 day avg. daily flights tracked YoY %

The A380 has recovered strongly since 2022 but is still well below pre COVID levels



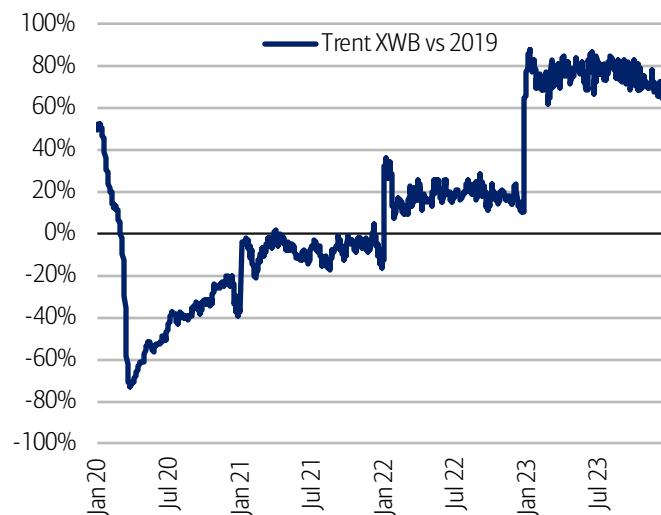
Source: BofA Global Research, Flightradar24

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- Trent XWB (A350)** 7 day rolling avg. daily flights declined to 43.5% YoY and declined to 58.1% vs 2019 this week, a -2.8 pts fall and -8.3 ppts fall vs 46.3% and 66.5% respectively last week.

Exhibit 21: Trent XWB(A350) 7 day avg. daily flights YoY %

Trent XWB has strongly recovered driven in part by new deliveries



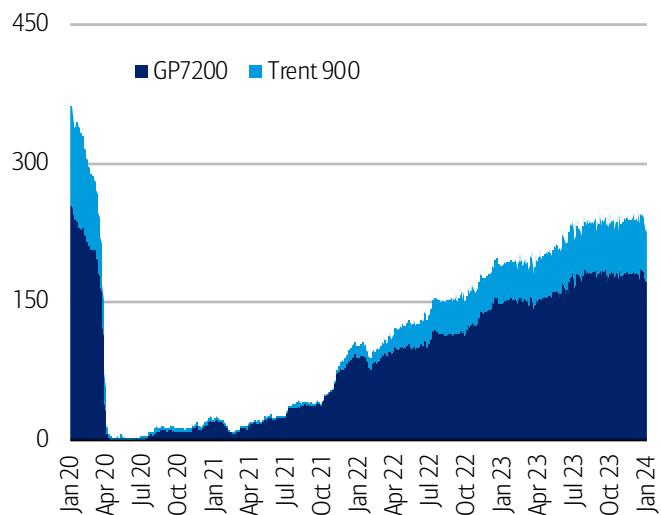
Source: BofA Global Research, Flightradar24

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- Trent 700 (A330)** 7 day rolling avg. daily flights declined to 47.8% YoY and improved to -31.7% vs 2019 this week, a -4.1 pts fall and 0.6 ppts improvement vs 51.9% and -32.3% respectively last week.

Exhibit 20: GP7200 (A380) vs Trent 900 (A380) 7 day avg. daily flights total

GP7200 cycles have led Trent 900 during the limited recovery of A380

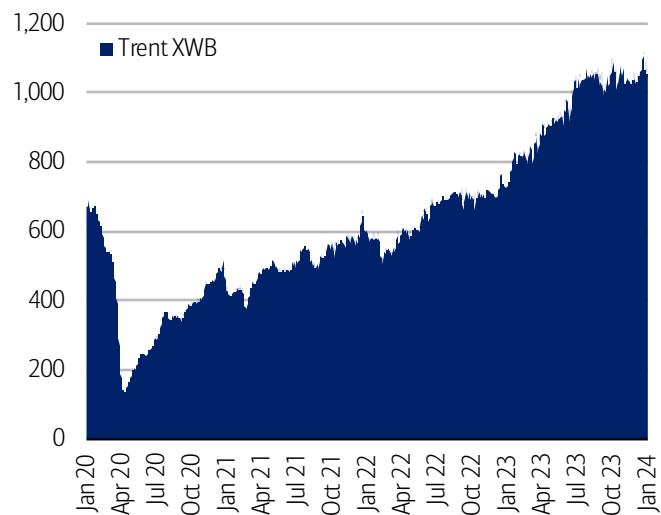


Source: BofA Global Research, Flightradar24

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Exhibit 22: Trent XWB (A350) 7 day avg. daily flights total

Pre COVID, Trent XWB daily cycles peaked at c.630



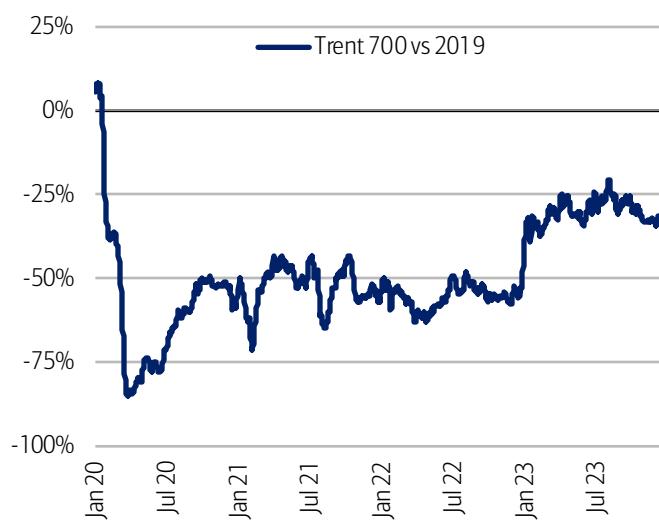
Source: BofA Global Research, Flightradar24

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Exhibit 23: Trent 700 (A330ceo) 7 day avg. daily flights tracked**YoY %**

Trent 700 is the market leader on A330ceo (c.65% of total fleet)

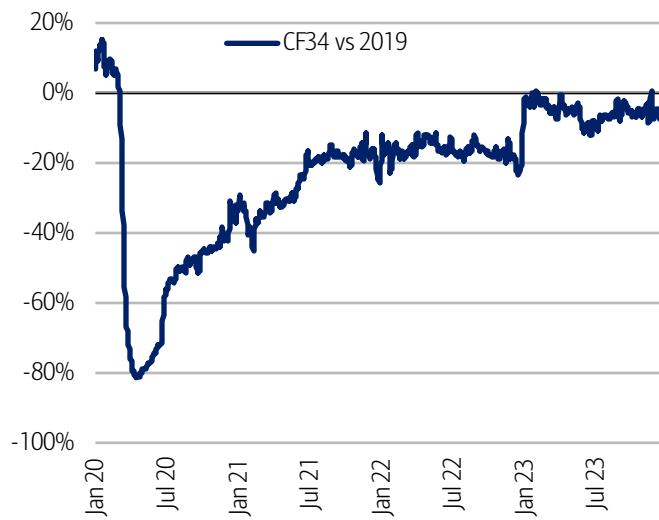


Source: BofA Global Research, Flightradar24

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Exhibit 25: GE CF34 (E-Jet) 7 day avg. daily flights YoY %

The CF34 available on Embraer E-170 and E-190 family aircraft

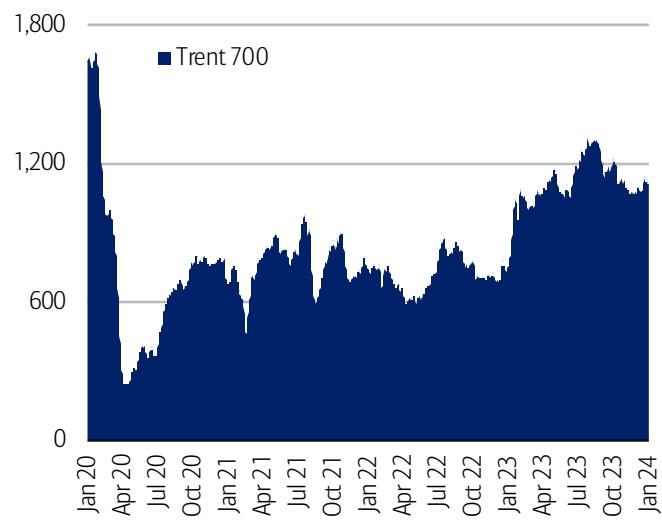


Source: BofA Global Research, Flightradar24

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Exhibit 24: Trent 700 (A330ceo) 7 day avg. daily flights total

Trent 700 daily cycles were c.1600 before COVID-19 pandemic

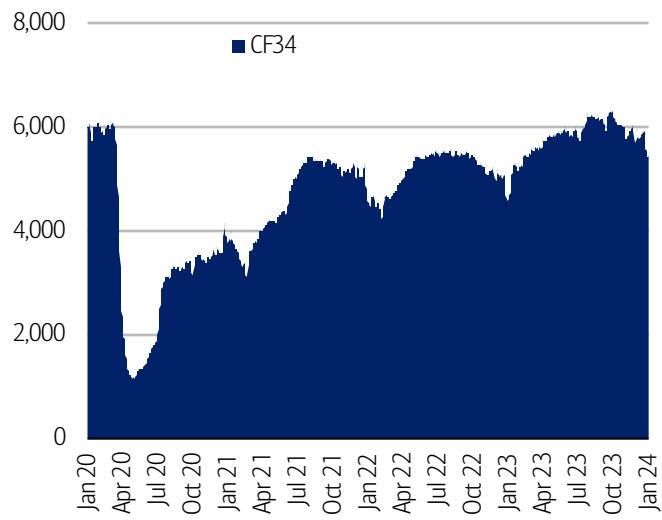


Source: BofA Global Research, Flightradar24

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Exhibit 26: GE CF34 (E-Jet) 7 day avg. daily flights total

CF34 is back at pre-COVID levels



Source: BofA Global Research, Flightradar24

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Airbus: Airframe flight cycles

- Airbus A320neo** 7 day avg. daily flights were 22.2% YoY and 124.8% vs 2019 declining -3.9 ppts YoY and declining -6.7 ppts over 2019 vs 26% YoY and 131.5% over 2019 last week and comparing to a 2020 low of -76.5%.
- Airbus A320ceo** 7 day avg. daily flights were 13.8% YoY and -19 % vs 2019 declining -2.5 ppts YoY and improving 0.3 ppts over 2019 vs 16.3% YoY and -19.4% over 2019 last week and comparing to a 2020 low of -88.9%.

Exhibit 27: Airbus A320neo – 7 day avg. daily flights YoY %

A320neo fleet is much larger vs 2019 levels

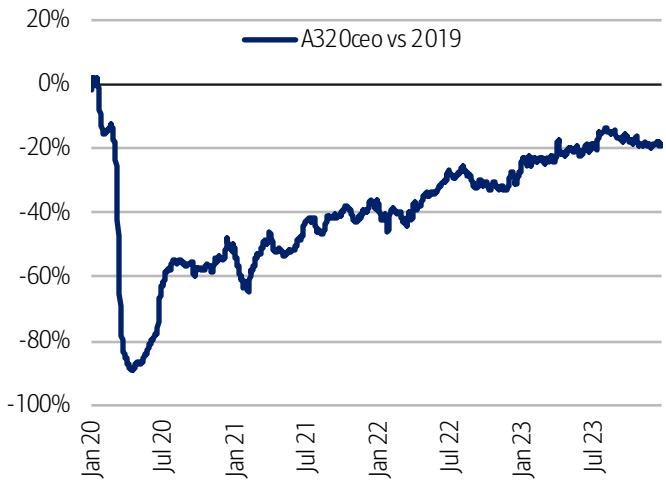


Source: BofA Global Research, Flightradar24

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Exhibit 28: Airbus A320ceo – 7 day avg. daily flights YoY %

A320ceo cycles have been gradually recovering



Source: BofA Global Research, Flightradar24

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- Airbus A330 family** 7 day avg. daily flights were 35.1% YoY and -20.9 % vs 2019 declining -2 ppts YoY and declining -0.4 ppts over 2019 vs 37.2% YoY and -20.5% over 2019 last week and comparing to a 2020 low of -84.9%.
- Airbus A340 family** 7 day avg. daily flights were 30.2% YoY and -37.8 % vs 2019 declining -17.2 ppts YoY and declining -8.1 ppts over 2019 vs 47.4% YoY and -29.7% over 2019 last week and comparing to a 2020 low of -89.5%.

Exhibit 29: Airbus A330 family – 7 day avg. daily flights YoY %

A330 family cycles have stabilized at c.-20% vs 2019 levels



Source: BofA Global Research, Flightradar24

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Exhibit 30: Airbus A340 family – 7 day avg. daily flights YoY %

A340 has four engines – we expect platform to face high retirements



Source: BofA Global Research, Flightradar24

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- Airbus A350** 7 day avg. daily flights were 43.5% YoY and 58.1 % vs 2019 declining -2.8 ppts YoY and declining -8.3 ppts over 2019 vs 46.3% YoY and 66.5% over 2019 last week and comparing to a 2020 low of -73.2%.
- Airbus A380 family** 7 day avg. daily flights were 19.6% YoY and -37.6 % vs 2019 declining -2 ppts YoY and declining -2.8 ppts over 2019 vs 21.6% YoY and -34.8% over 2019 last week and comparing to a 2020 low of -99.4%.

Exhibit 31: Airbus A350 family – 7 day avg. daily flights YoY %

A350 is a ‘next gen’ widebody and has outperformed older platforms

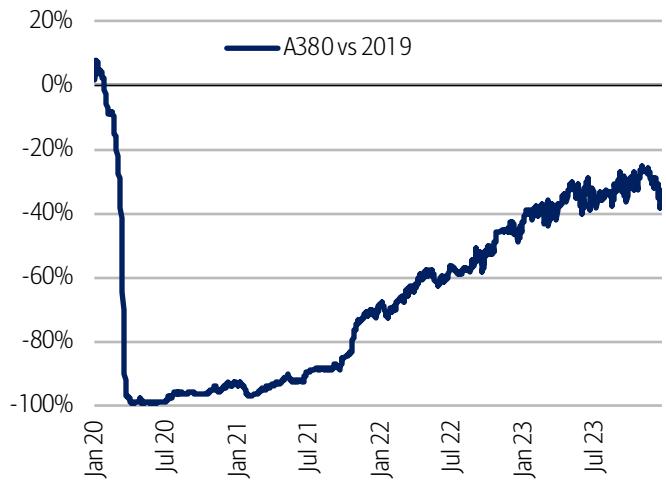


Source: BofA Global Research, Flightradar24

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Exhibit 32: Airbus A380 family – 7 day avg. daily flights YoY %

A380 is still very weak but we see a progressive recovery trend



Source: BofA Global Research, Flightradar24

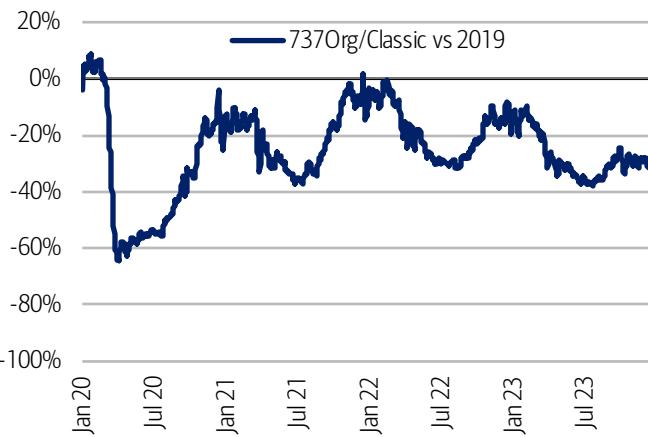
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Boeing: Airframe flight cycles

- Boeing 737 Original/Classic** 7 day avg. daily flights were -22.7% YoY and -30.4 % vs 2019 declining -2.4 ppts YoY and declining -2.4 ppts over 2019 vs -20.3% YoY and -28% over 2019 last week and comparing to a 2020 low of -64.4%.
- Boeing 737 NG** 7 day avg. daily flights were 22.6% YoY and -15.6 % vs 2019 improving 0.6 ppts YoY and improving 0.4 ppts over 2019 vs 22% YoY and -16% over 2019 last week and comparing to a 2020 low of -82%.

Exhibit 33: Boeing 737 Original/classic – 7 day avg. flights YoY %

Older 737s and 737 Classics have a large freight concentration

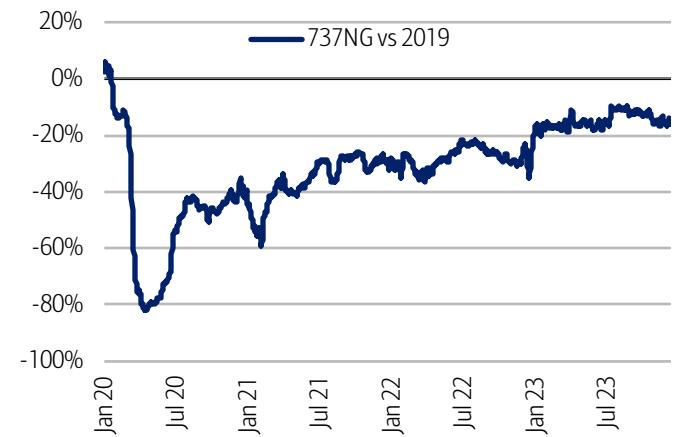


Source: BofA Global Research, Flightradar24

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Exhibit 34: Boeing 737NG– 7 day avg. daily flights YoY %

737NG recovery has gradually recovered



Source: BofA Global Research, Flightradar24

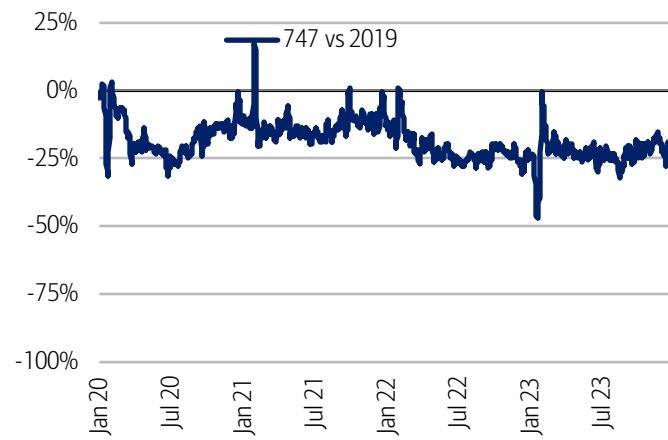
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- Boeing 747** 7 day avg. daily flights were 1% YoY and -22.3 % vs 2019 declining -4.6 ppts YoY and improving 3.2 ppts over 2019 vs 5.6% YoY and -25.4% over 2019 last week and comparing to a 2020 low of -31.7%.
- Boeing 757** 7 day avg. daily flights were -6.2% YoY and -19.3 % vs 2019 declining -8.1 ppts YoY and improving 1.6 ppts over 2019 vs 2% YoY and -21% over 2019 last week and comparing to a 2020 low of -65.6%.
- Boeing 767** 7 day avg. daily flights were -0.5% YoY and -14.6 % vs 2019 declining -9.6 ppts YoY and declining -6 ppts over 2019 vs 9.2% YoY and -8.6% over 2019 last week and comparing to a 2020 low of -46%.



Exhibit 35: Boeing 747 – 7 day avg. daily flights YoY %

747 has been stronger than A380 due to high freight usage in fleet

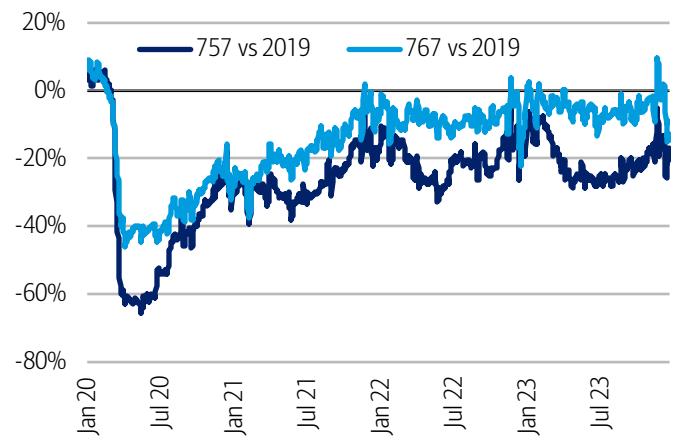


Source: BofA Global Research, Flightradar24

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Exhibit 36: Boeing 757/767 – 7 day avg. flights YoY %

757/767 are both legacy pax platforms with high freight utilisation



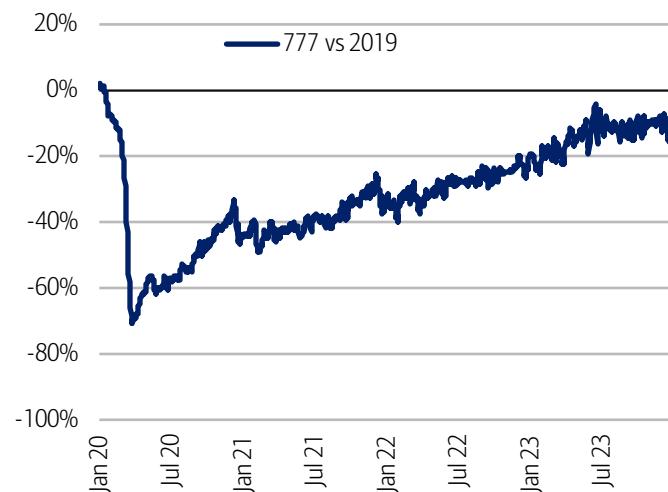
Source: BofA Global Research, Flightradar24

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- Boeing 777** 7 day avg. daily flights were 14.4% YoY and -15.8 % vs 2019 improving 0.2 ppts YoY and declining -4.3 ppts over 2019 vs 14.2% YoY and -11.5% over 2019 last week and comparing to a 2020 low of -70.7%.
- Boeing 787** 7 day avg. daily flights were 17.7% YoY and 15.4 % vs 2019 declining -0.2 ppts YoY and declining -3.4 ppts over 2019 vs 17.9% YoY and 18.8% over 2019 last week and comparing to a 2020 low of -76.3%.

Exhibit 37: Boeing 777 – 7 day avg. daily flights YoY %

Newer models (e.g. -300ER, -200LR) have been driving a steady recovery of flight cycles

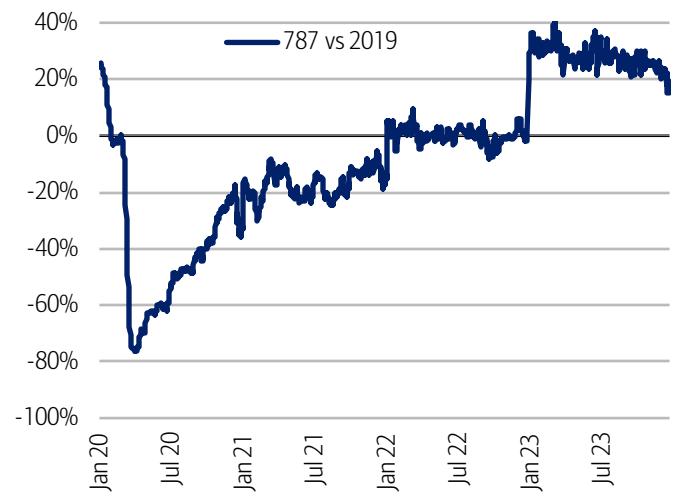


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 38: Boeing 787 – 7 day avg. daily flights YoY %

787 is already exhibiting >2019 levels through 2023

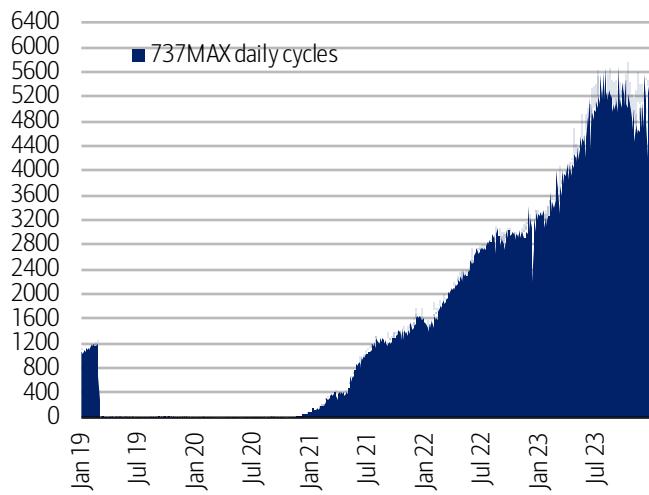


Source: BofA Global Research, Flightradar24

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Exhibit 39: Boeing 737 MAX daily flight cycles

MAX daily cycles have seen a very strong recovery

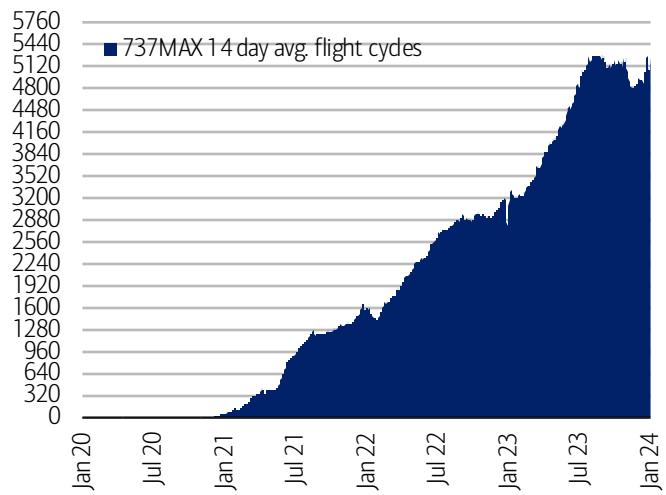


Source: BofA Global Research estimates, Flightradar24

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Exhibit 40: Boeing 737 – 14 day avg. daily flight cycles

Cycles have started to resume as regulators approve aircraft for service



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

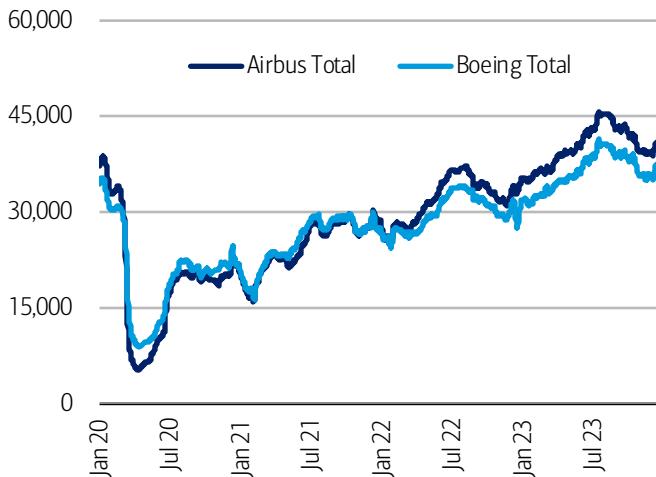


Airbus vs Boeing: Airframe flight cycles

- Airbus** total fleet 7 day avg. daily flights were 39,950, improving 0.6 ppts vs 39,724 last week. **Boeing** total fleet 7 day avg. daily flights were 35,649, declining -0.1 ppts vs 35,690 last week.

Exhibit 41: Airbus vs Boeing total daily flights 7 day avg.

Airbus vs Boeing cycles have been similar through the pandemic

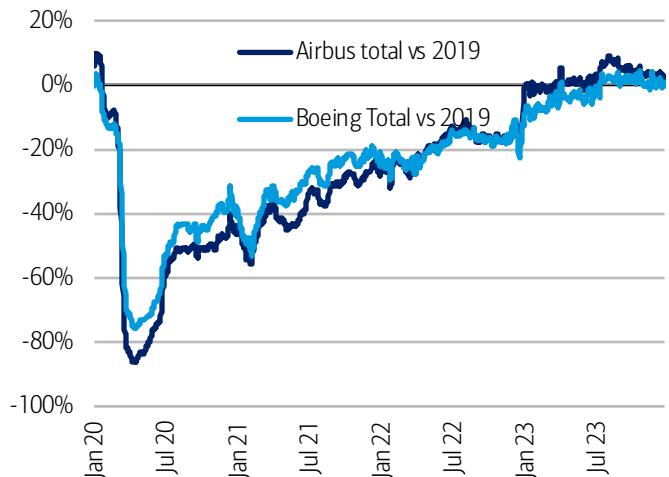


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 42: Airbus vs Boeing total daily flights 7 day avg % YoY

Airbus vs Boeing cycles have been similar through the pandemic



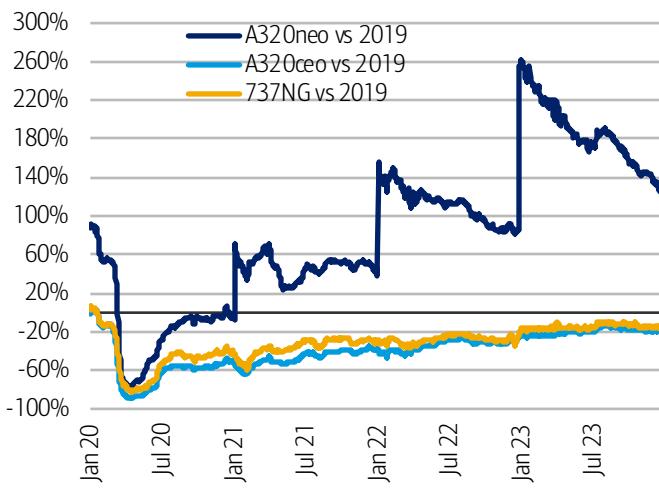
Source: BofA Global Research, Flightradar24

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- A320neo** 7 day rolling avg. daily flights declined to 13.8% YoY and improved to -19 % vs 2019 this week and **A320neo** declined to 22.2% YoY and declined to 124.8 % vs 2019 this week whereas **737 NG** improved to 22.6% YoY and improved to - 15.6 % vs 2019 this week.
- A330** 7 day rolling avg. daily flights declined to 35.1% YoY and declined to -20.9 % vs 2019 this week whereas **777** improved to 14.4% YoY and declined to -15.8% vs 2019 respectively.

Exhibit 43: A320 vs 737NG – 7 day avg. daily flights YoY %

737NG has outperformed A320ceo due to MAX grounding impact on 737 family operators. A320neo strongest due efficiency, new production

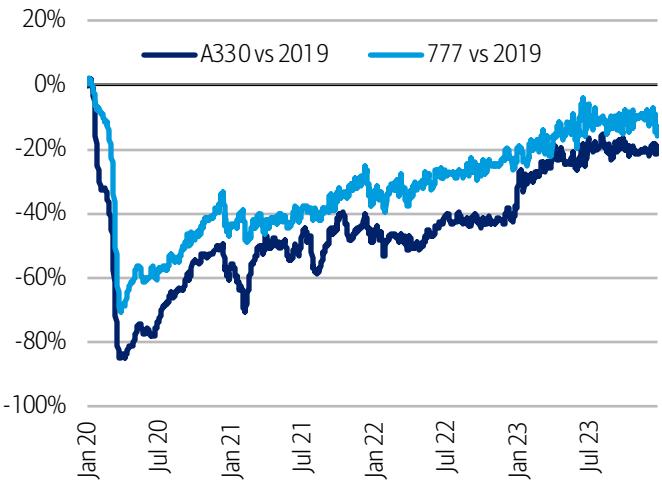


Source: BofA Global Research, Flightradar24

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Exhibit 44: A330 family vs 777 – 7 day avg. daily flights YoY %

777 has outperformed A330 throughout the COVID-19 crisis



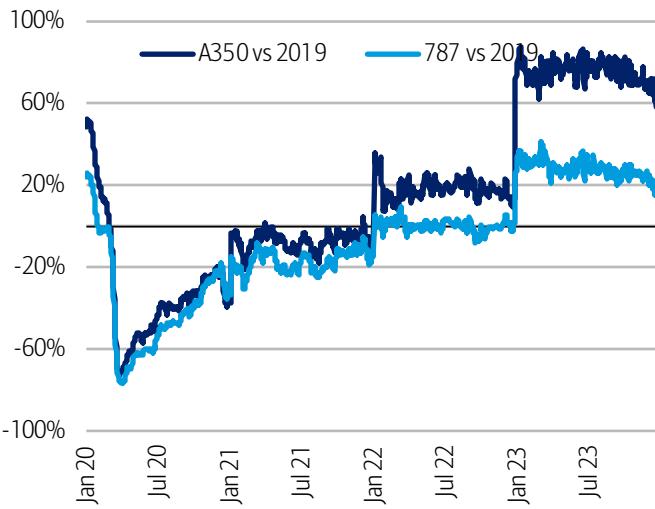
Source: BofA Global Research, Flightradar24

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- A350** 7 day rolling avg. daily flights declined to 43.5% YoY and declined to 58.1 % vs 2019 this week whereas **787** declined to 17.7% YoY and declined to 15.4% vs 2019 respectively.
- A380** 7 day rolling avg. daily flights declined to 19.6% YoY and declined to -37.6 % vs 2019 this week whereas **747** declined to 1% YoY and improved to -22.3% vs 2019 respectively.

Exhibit 45: A350 vs 787 – 7 day avg. daily flights YoY %

A350 and 787 YoY cycles have diverged from Jan 22 onwards

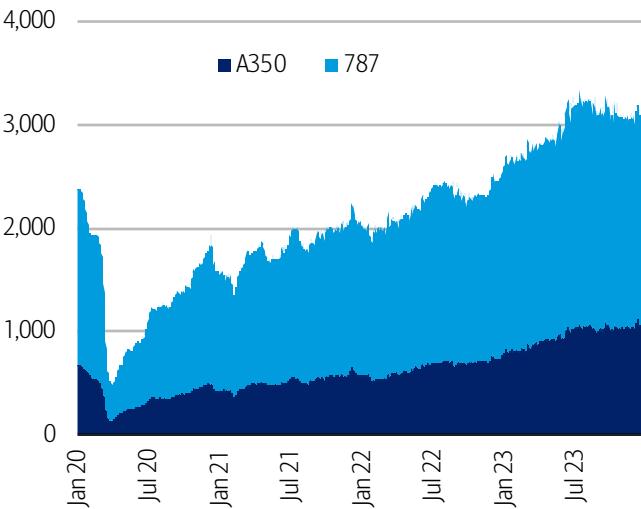


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 46: A350 vs 787 total daily flights 7 day avg. total

787 is the market leader in the next gen large widebody segment



Source: BofA Global Research, Flightradar24

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Exhibit 47: A320ceo vs 737NG total daily flights 7 day avg.

A320ceo and 737 NG YoY cycles have tailed off in the last quarter

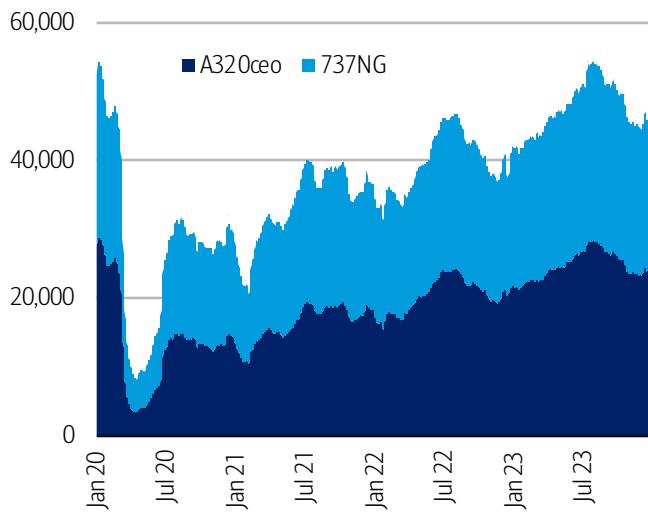


Source: BofA Global Research, Flightradar24

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Exhibit 48: A320ceo vs 737NG total daily flights 7 day avg. total

Total share of cycles between A320ceo/737NG has been close to 50/50



Source: BofA Global Research, Flightradar24

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Exhibit 49: A380 vs 747 – 7 day avg. daily flights YoY %

A380 has no dedicated freight use (long-haul pax only) whereas 747 has large freighter utilisation (e.g. UPS, Atlas Air)

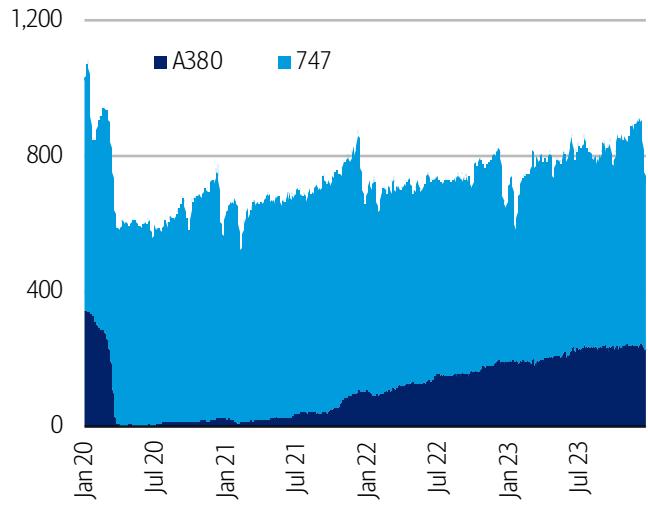


Source: BofA Global Research, Flightradar24

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Exhibit 50: A380 vs 747 total daily flights 7 day avg. total

A380 daily cycles are progressively recovering but slow vs. 747



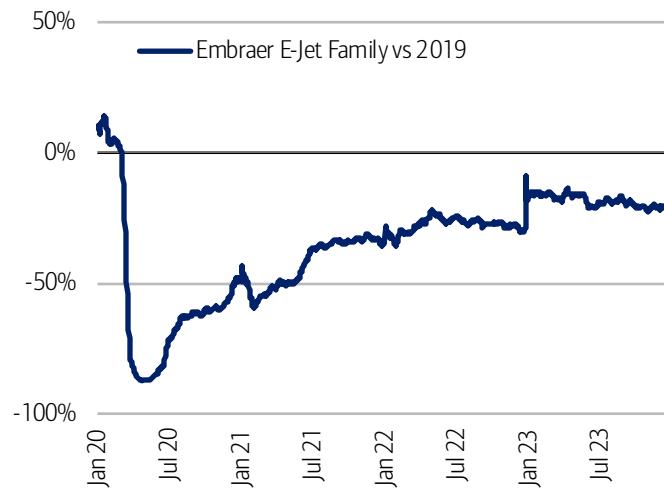
Source: BofA Global Research, Flightradar24

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Other: Airframe flight cycles

- Embraer E-Jet** 7 day avg. daily flights were 13.2% YoY and -21 % vs 2019 improving 1 ppts YoY and improving 0.2 ppts over 2019 vs 12.3% YoY and -21.2% over 2019 last week and comparing to a 2020 low of -87.4%.
- Airbus A220** 7 day avg. daily flights were 28.7% YoY and 141.9 % vs 2019 declining -2.8 ppts YoY and declining -1.9 ppts over 2019 vs 31.5% YoY and 143.8% over 2019 last week and comparing to a 2020 low of -73.4%.

Exhibit 51: Embraer E-Jet– 7 day avg. daily flights YoY %
E-Jet (regional jet) has not outperformed narrowbody in recovery



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 52: Airbus A220– 7 day avg. daily flights YoY %
A220 is Airbus' regional single aisle programme

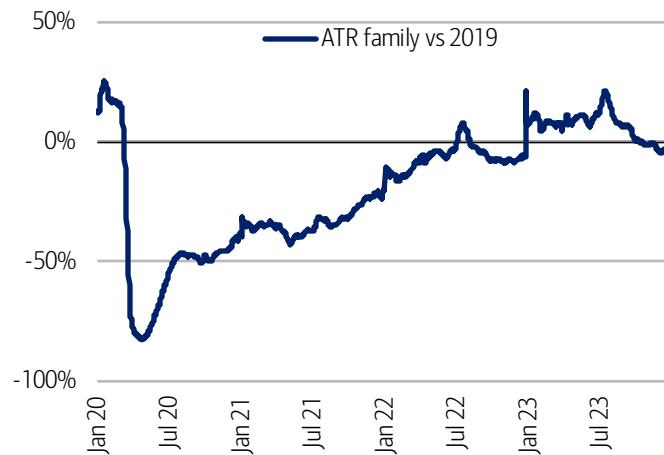


Source: BofA Global Research, Flightradar24

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- ATR Family** 7 day avg. daily flights were 3.4% YoY and -2.9 % vs 2019 improving 0.7 ppts YoY and improving 0.5 ppts over 2019 vs 2.7% YoY and -3.5% over 2019 last week and comparing to a 2020 low of -82.6%.
- Embraer 135/145** 7 day avg. daily flights were 1.2% YoY and -53.9 % vs 2019 declining -2.4 ppts YoY and improving 0.2 ppts over 2019 vs 3.6% YoY and -54.1% over 2019 last week and comparing to a 2020 low of -79.8%.

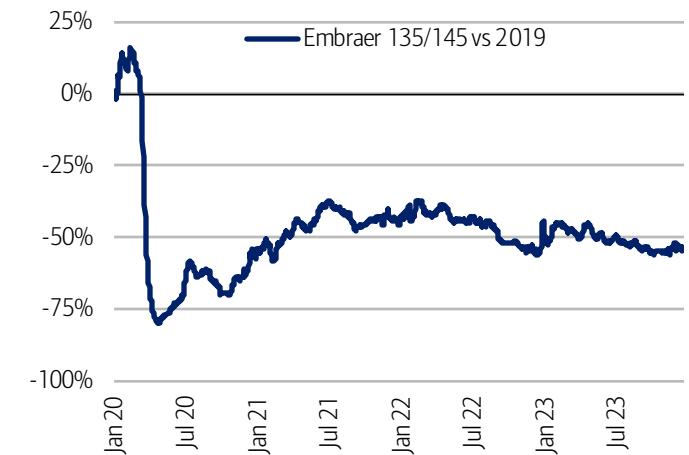
Exhibit 53: ATR Family– 7 day avg. daily flights YoY %
ATR is a 48-70 seat turboprop regional aircraft



Source: BofA Global Research, Flightradar24

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Exhibit 54: Embraer 135/145– 7 day avg. daily flights YoY %
ERJ is a 37-50 seat regional aircraft



Source: BofA Global Research, Flightradar24

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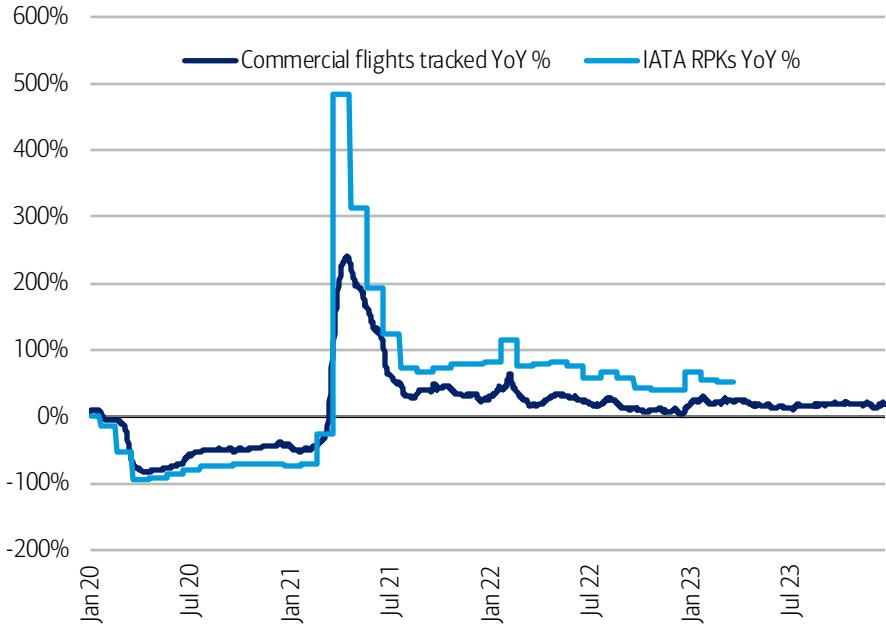


Global commercial flight cycles

- Global commercial** 7 day avg. daily flights were 17.8% YoY and -6.8% vs 2019 declining -1.1 ppts and improving 0.2 ppts vs 18.8% and -7% respectively last week and comparing to a 2020 low of -82.5%.

Exhibit 55: Global commercial flights tracked 7 day daily moving average YoY %

IATA RPKs have broadly followed Global commercial flight cycles

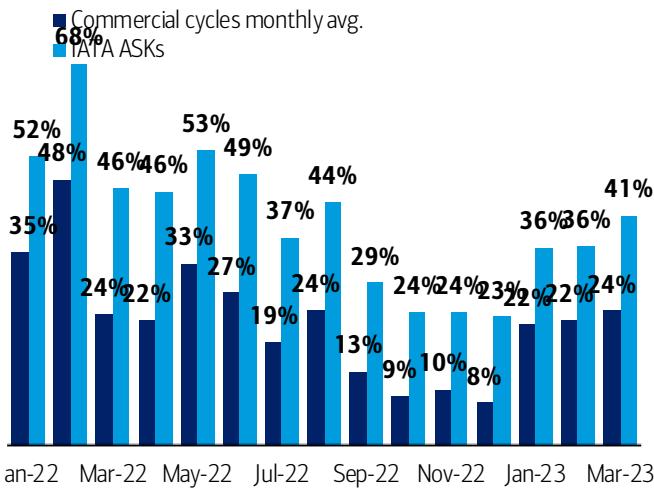


Source: BofA Global Research, Flightradar24

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Exhibit 56: Commercial aircraft monthly daily cycles avg. YoY % vs IATA ASKs

Monthly flight cycles were similar to IATA Available Seat Kilometers ...

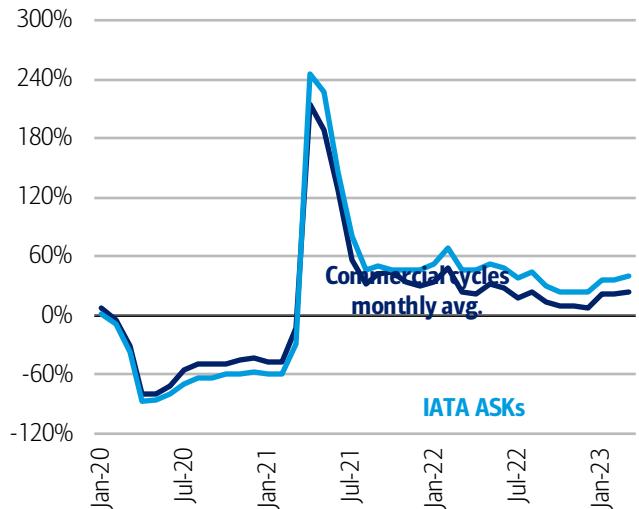


Source: BofA Global Research, Flightradar24

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Exhibit 57: Commercial aircraft monthly daily cycles avg. YoY % vs IATA ASKs

ASKs cycles remain above commercial ones after converging in Apr-21



Source: BofA Global Research, Flightradar24

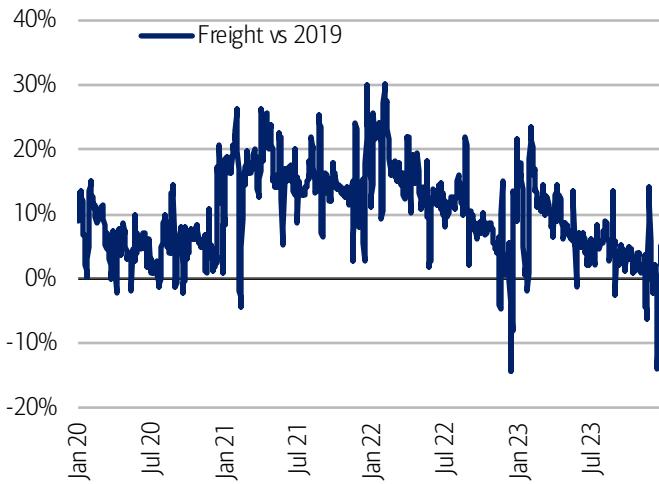
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Global freighter cycles

- Global dedicated freighter** 7 day avg. daily flights were -8.5% YoY and 2.1% vs 2019 declining -10.6 ppts and improving 9.6 ppts vs 2% and -7.5% respectively last week and comparing to a 2020 low of -2.3%.

Exhibit 58: Global dedicated freighter flights tracked 7 day avg. YoY %

This excludes commercial aircraft used as freighter. It has become progressively weaker through 2022-23

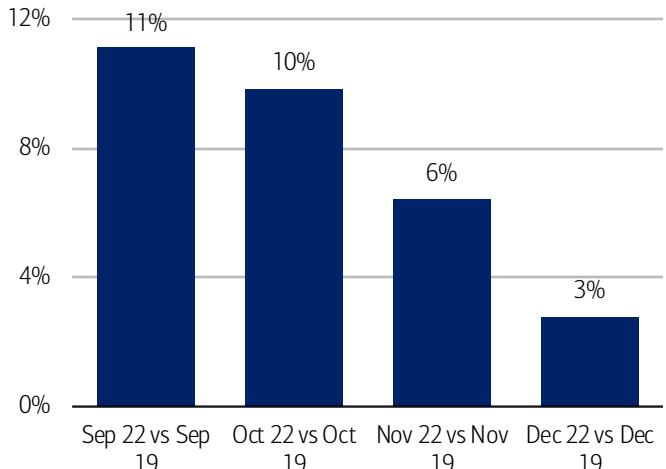


Source: BofA Global Research, Flightradar24

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Exhibit 59: Freight landings Sep – Dec 2022 vs 2019

Monthly average number of landings vs 2019 levels have cooled off since September 2022

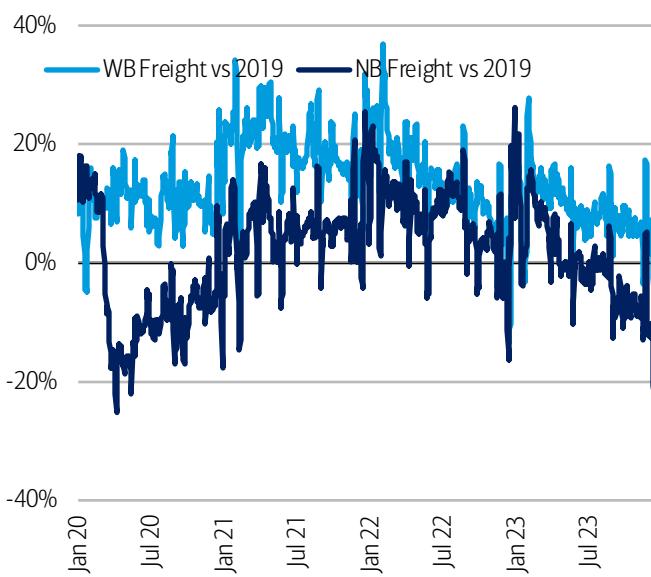


Source: BofA Global Research, Flightradar24

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Exhibit 60: Narrowbody vs Widebody dedicated freighter flights tracked 7 day avg. YoY %

Narrowbody and Widebody freight have converged through 3Q22

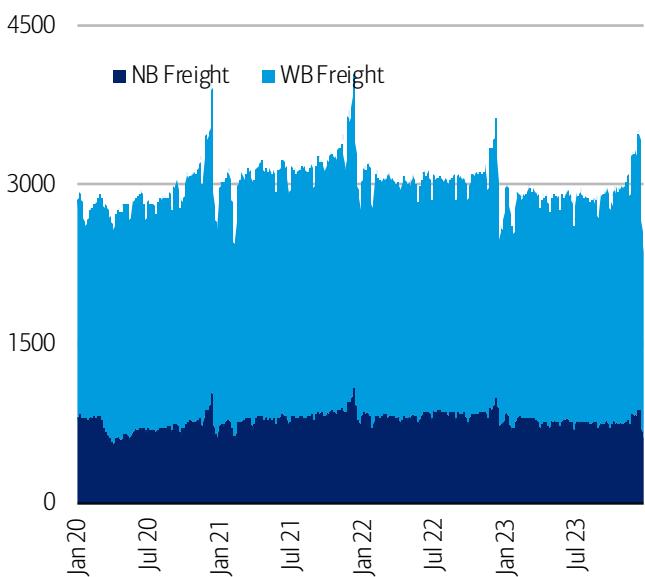


Source: BofA Global Research, Flightradar24

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Exhibit 61: Narrowbody vs Widebody dedicated freighter flights daily

Freight cycles typically peak around the holiday period in December



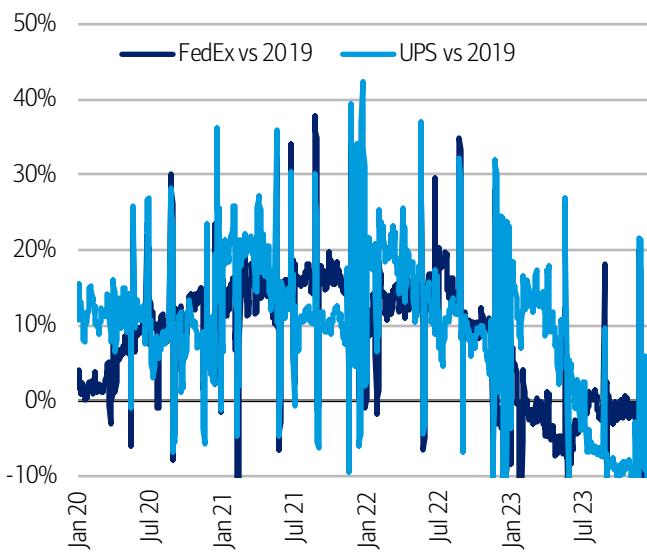
Source: BofA Global Research, Flightradar24

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Cargo airline cycles

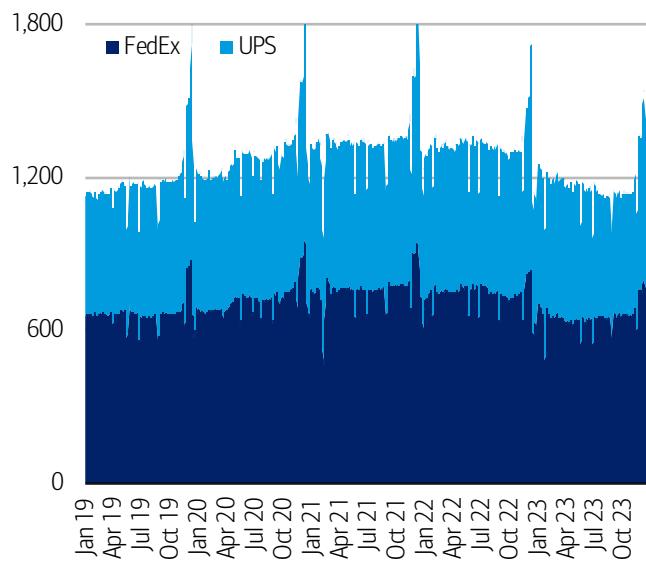
Exhibit 62: FedEx & UPS 7 day avg. daily flights vs 2019
Fedex and UPS were the 1st and 2nd largest global cargo airlines in 2019



Source: BofA Global Research, Flightradar24

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Exhibit 63: FedEx & UPS 7 day avg. daily flights total
Freight cycles have reduced slightly through FY22-23



Source: BofA Global Research, Flightradar24

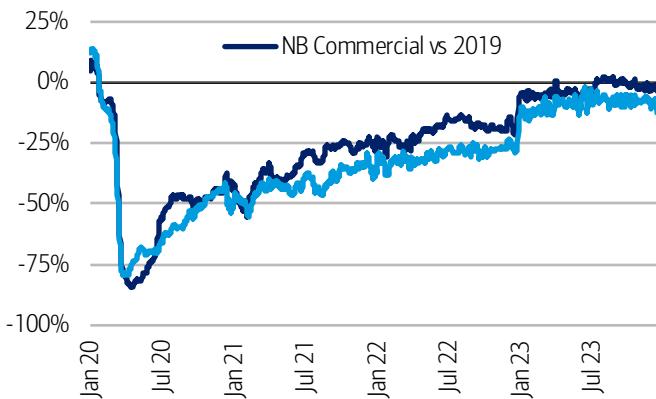
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Narrowbody vs widebody cycles

- Global commercial narrowbody** 7 day rolling avg. daily flights declined to 20.5 % YoY and improved to -3.2% vs 2019 this week whereas **commercial widebody** declined to 16.6 % YoY and declined to -12.4% vs 2019.

Exhibit 64: Narrowbody vs widebody 7-day avg. flights vs 2019

Narrowbody has led the recovery, largely as expected, but widebody traffic is catching up

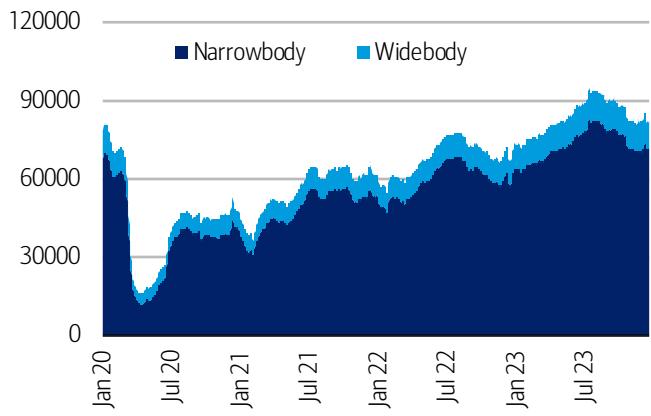


Source: BofA Global Research, Flightradar24

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Exhibit 65: Narrowbody vs widebody 7-day avg. flights total

Both narrowbody and widebody cycles have continued the recovery through FY23



Source: BofA Global Research, Flightradar24

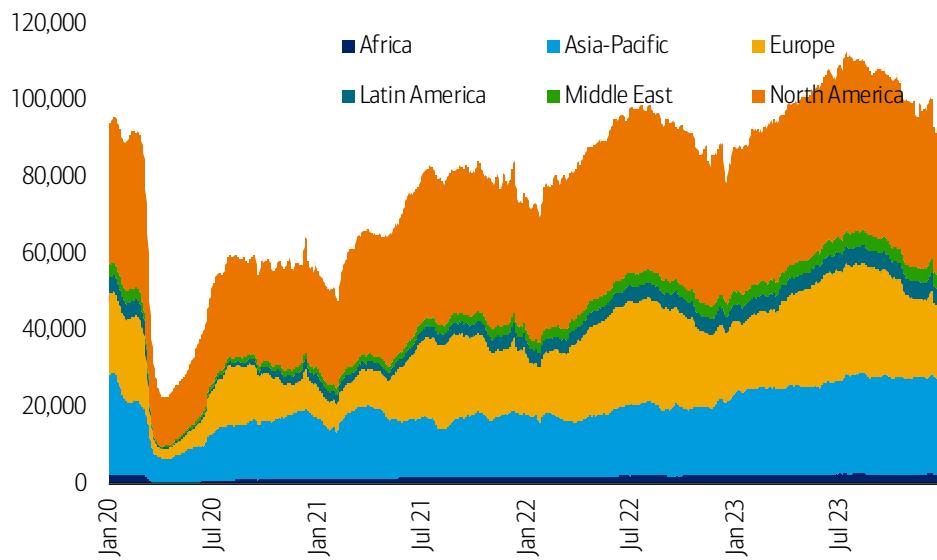
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Commercial flights regional split

Exhibit 66: Global commercial flights daily tracked 7 day avg. by region

North America is the largest region globally for daily flight cycles tracked

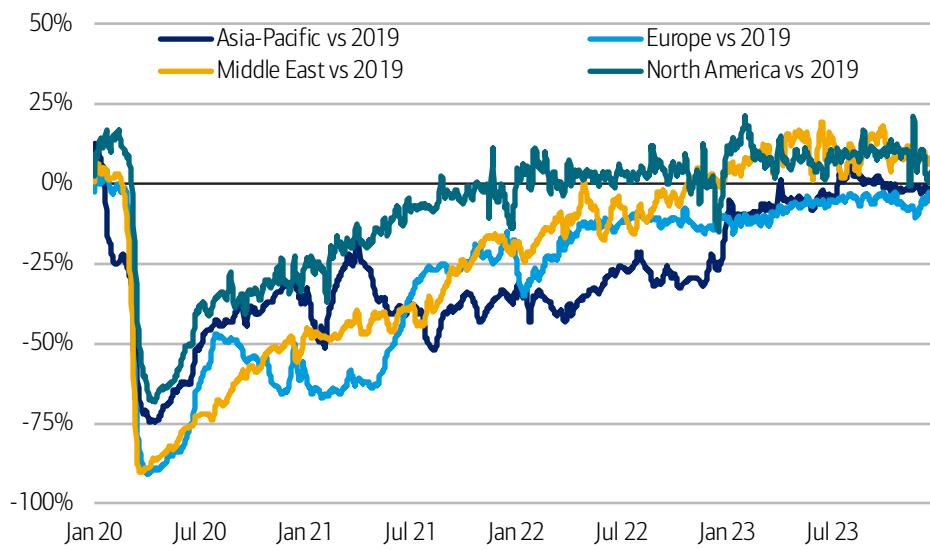


Source: BofA Global Research, Flightradar24

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Exhibit 67: Global commercial flights daily tracked 7 day avg. vs 2019

North America have been the most resilient region throughout 2022-23, but all regions have continued to recover



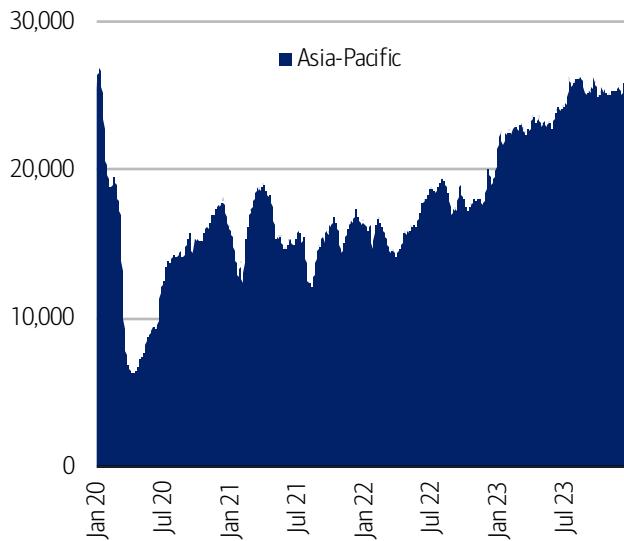
Source: BofA Global Research, Flightradar24

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- **Asia Pacific** 7 day avg. daily flights were 28.3% YoY and -4.5 % vs 2019 declining -4.5 ppts YoY and declining -1.5 ppts over 2019 vs 32.8% YoY and -3% over 2019 last week and comparing to a 2020 low of -74.7%.

Exhibit 68: Asia-Pacific commercial daily flights 7 day avg.

APAC cycles have improved through 2023

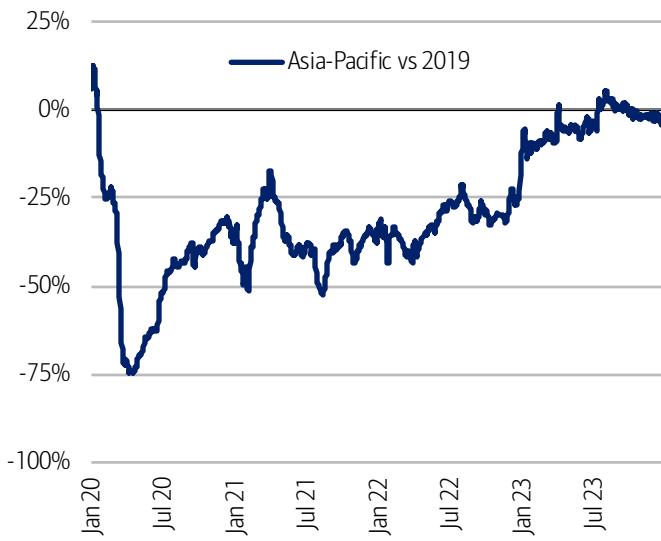


Source: BofA Global Research, Flightradar24

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Exhibit 69: APAC commercial flights daily tracked 7 day avg. YoY %

APAC cycles have improved through FY23



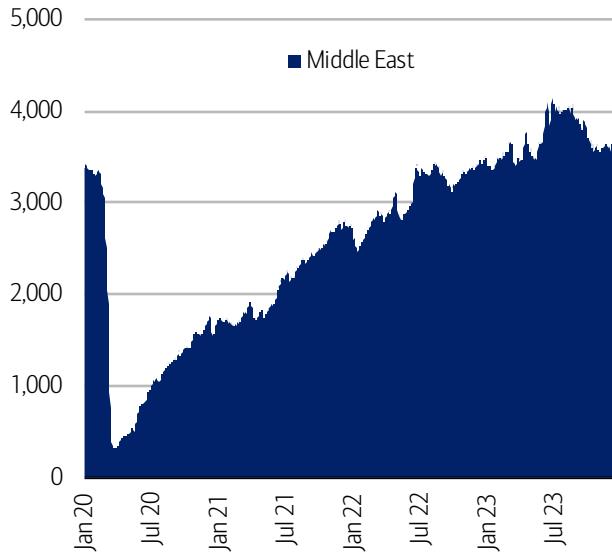
Source: BofA Global Research, Flightradar24

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- **Middle East** 7 day avg. daily flights were 7.3% YoY and 6.1 % vs 2019 improving 2.2 ppts YoY and declining -0.3 ppts over 2019 vs 5.1% YoY and 6.4% over 2019 last week and comparing to a 2020 low of -90.4%.

Exhibit 70: Middle East commercial daily flights 7 day avg.

Middle East has already recovered pre-pandemic levels....

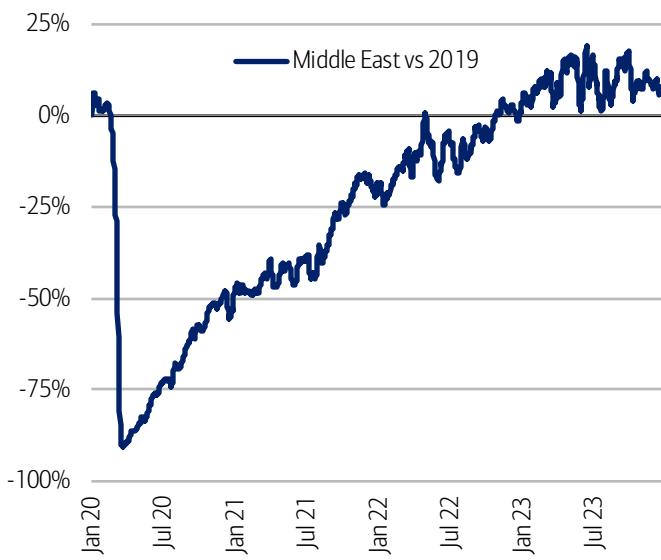


Source: BofA Global Research, Flightradar24

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Exhibit 71: Middle East commercial flights daily tracked 7 day avg. YoY %

...and has seen an acceleration in recent months



Source: BofA Global Research, Flightradar24

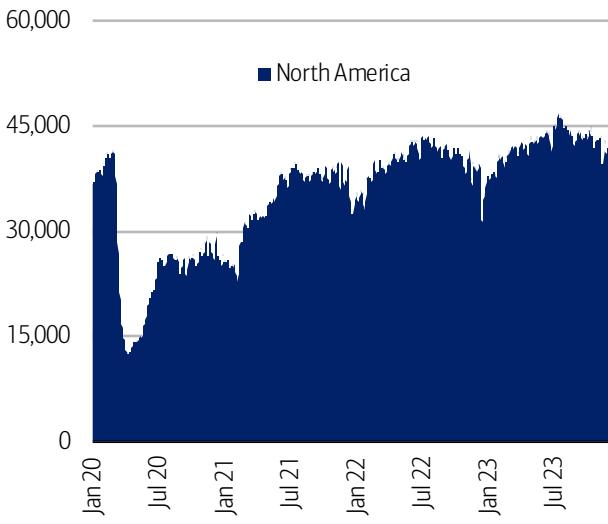
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- North America** 7 day avg. daily flights were 10.3% YoY and 2.6 % vs 2019 declining -5.7 ppts YoY and improving 0.8 ppts over 2019 vs 16.1% YoY and 1.7% over 2019 last week and comparing to a 2020 low of -68.2%.

Exhibit 72: North America commercial daily flights 7 day avg.

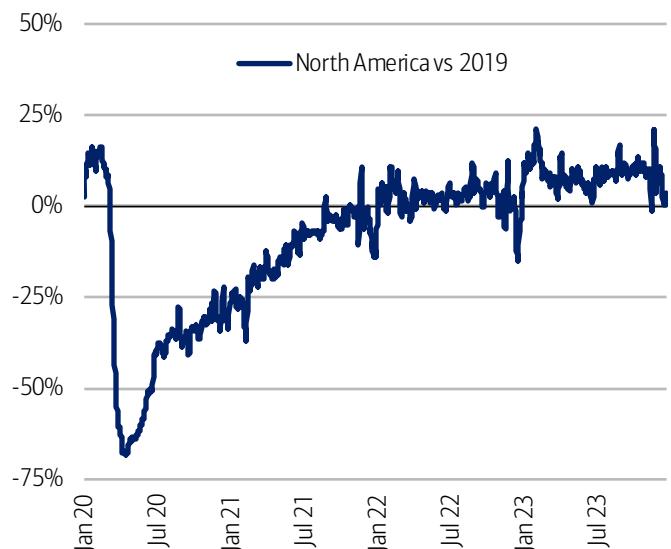
North America cycles have seen some improvement in 2023



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Exhibit 73: North America commercial flights daily tracked 7 day avg. YoY %

North America cycles have seen some improvement in 2023

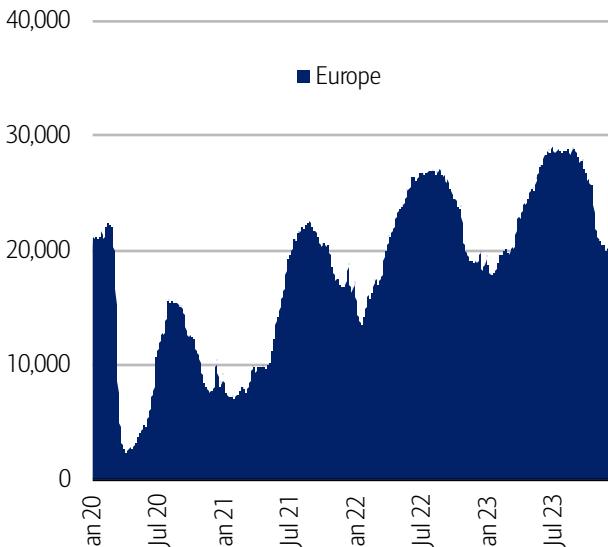


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- Europe** 7 day avg. daily flights were 8.2% YoY and -3.5 % vs 2019 improving 2.2 ppts YoY and improving 1.4 ppts over 2019 vs 6.1% YoY and -4.9% over 2019 last week and comparing to a 2020 low of -90.8%.

Exhibit 74: Europe commercial daily flights 7 day avg.

Europe cycles are the most volatile with the summer period



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Exhibit 75: Europe commercial flights daily tracked 7 day avg. YoY %

European commercial flights are still below 2019 levels



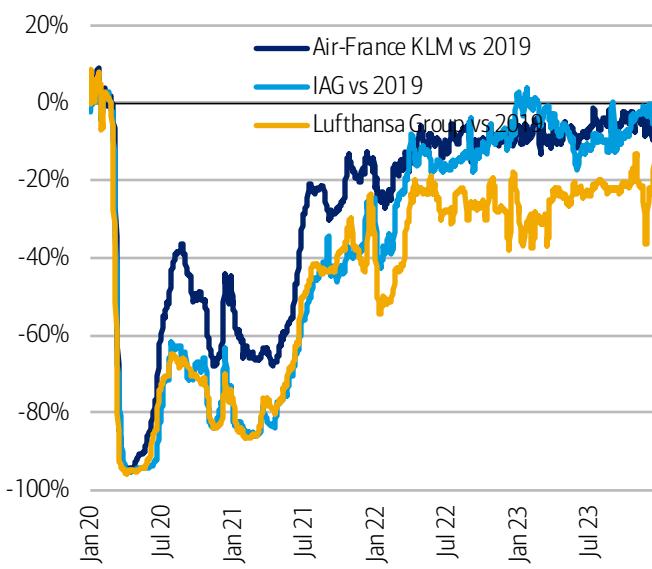
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Global airline flight cycles

European airline flight cycles

Exhibit 76: EU Legacy carrier groups 7 day avg. daily flights vs 2019

Air-France KLM and IAG are largely recovered

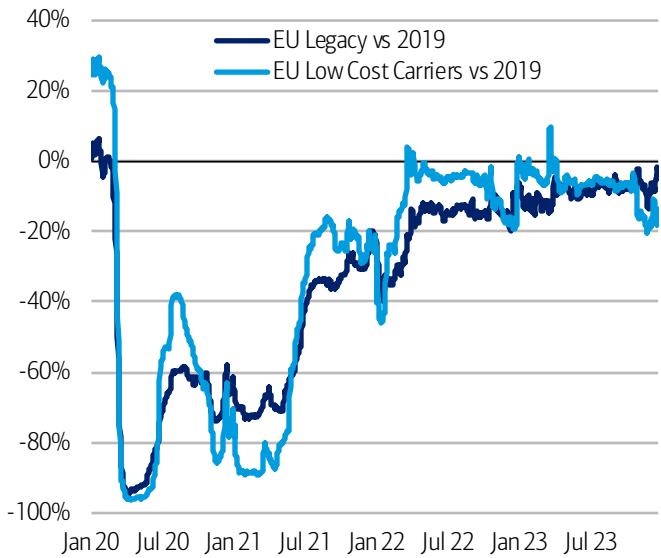


Source: BofA Global Research, Flightradar24

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Exhibit 77: EU LCCs 7 day avg. daily flights vs 2019

Low-cost carriers recovery has slowed down in the last couple of months

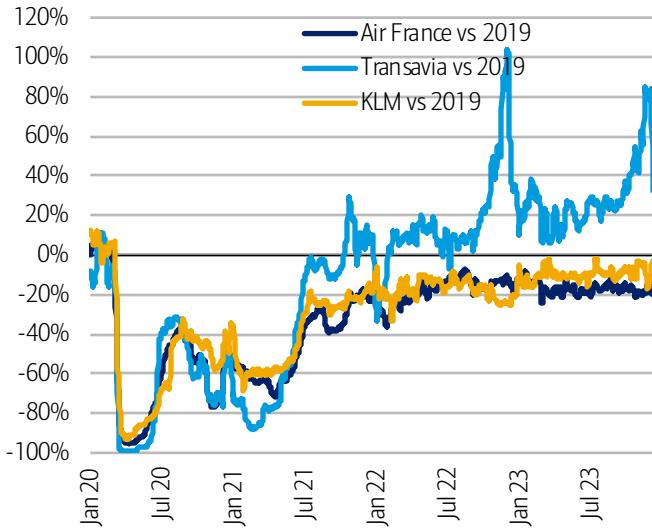


Source: BofA Global Research, Flightradar24

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Exhibit 78: Air France – KLM 7 day avg. daily flights vs 2019

Transavia exhibited the strongest performance YTD

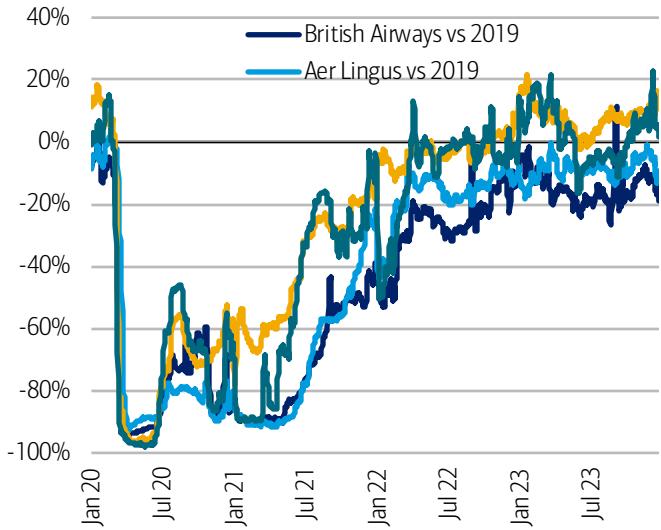


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 79: IAG Group 7 day avg. daily flights vs 2019

Iberia and Vueling have outperformed British Airways and Aer Lingus



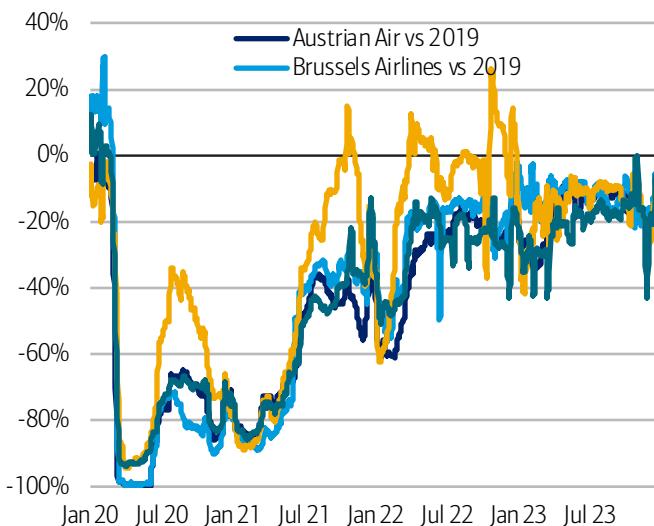
Source: BofA Global Research, Flightradar24

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Exhibit 80: Lufthansa Group 7 day avg. daily flights vs 2019

Eurowings (LCC) has recovered back to 2019 levels.

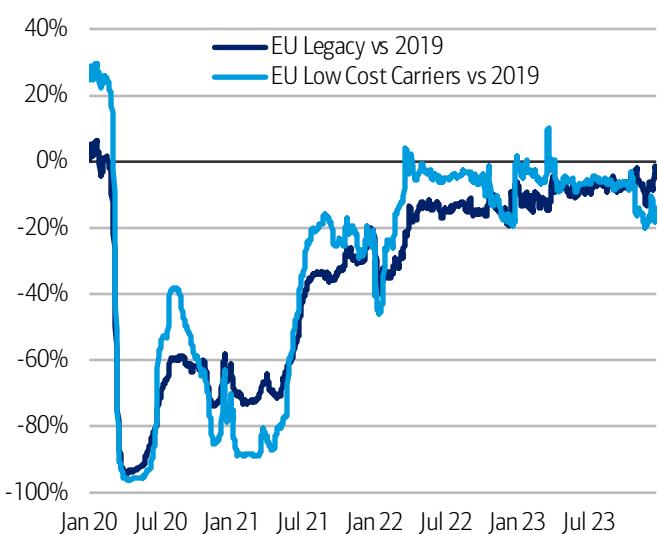


Source: BofA Global Research, Flightradar24

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Exhibit 81: Legacy vs Low Cost Carriers 7 day avg. daily flights vs 2019

Low-cost carriers have outperformed legacy carriers during 2nd/3rd 2022



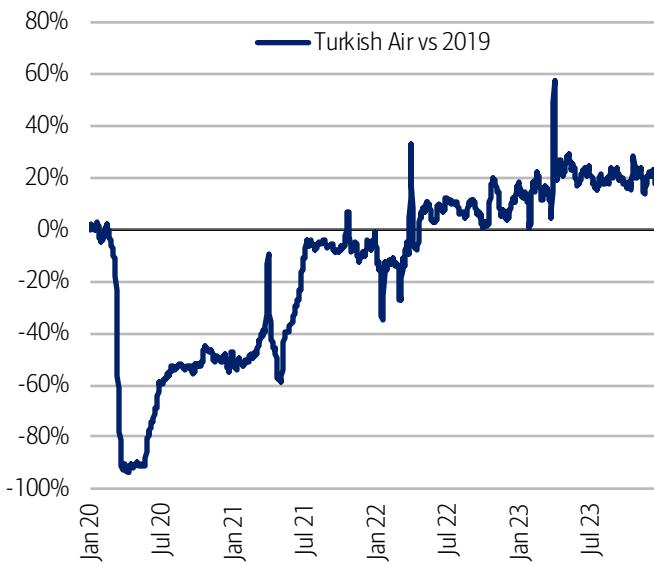
Source: BofA Global Research, Flightradar24

Note: Legacy carriers include Aer Lingus, Air France, Austrian Airlines, Brussels Airlines, British Airways, Iberia, KLM, Lufthansa, SWISS, Turkish Airlines. Low Cost Carriers include Ryanair, Easyjet, Eurowings, Vueling, Wizz Air

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Other European airlines**Exhibit 82: Turkish Airlines 7 day avg. daily flights YoY %**

Turkish Airlines is already above 2019 levels



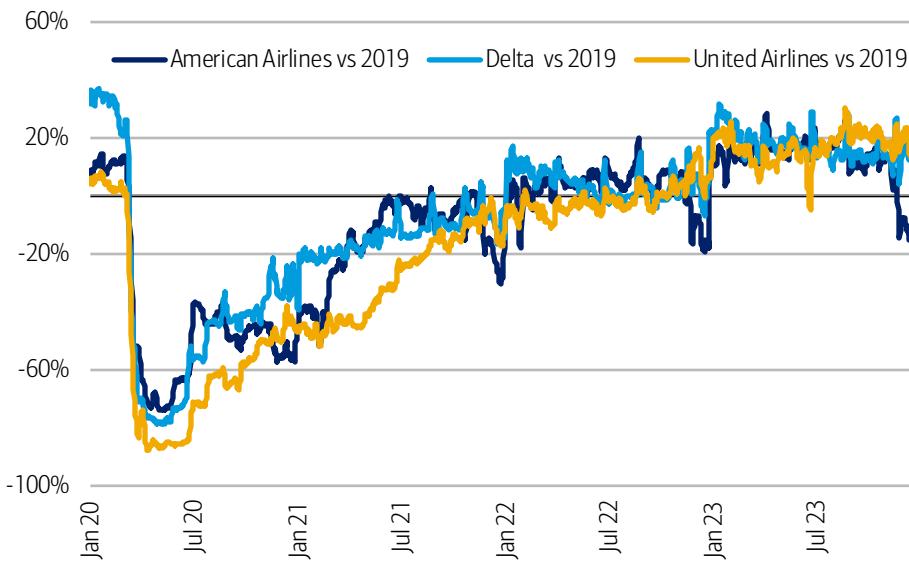
Source: BofA Global Research, Flightradar24

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North American airline flight cycles

Exhibit 83: US Big 3 Airlines 7 day avg. daily flights vs 2019

US Airlines have largely performed in line with each other through 2022

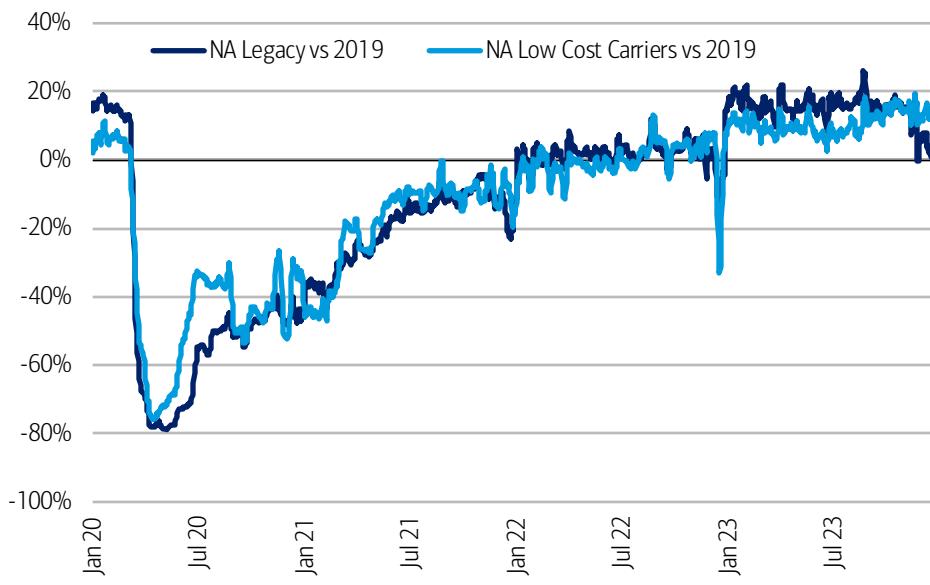


Source: BofA Global Research, Flightradar24

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Exhibit 84: NA Legacy vs NA Low cost carriers 7 day rolling avg. daily flights YoY

Legacy carriers are slightly outperforming Low Cost Carriers YTD in North America



Source: BofA Global Research, Flightradar24

Note: Note: Legacy carriers include Air Canada, Alaska Airlines, American Airlines, Delta, United Airlines. Low-Cost Carriers include Allegiant, Frontier Airlines, JetBlue, Southwest Airlines, Spirit

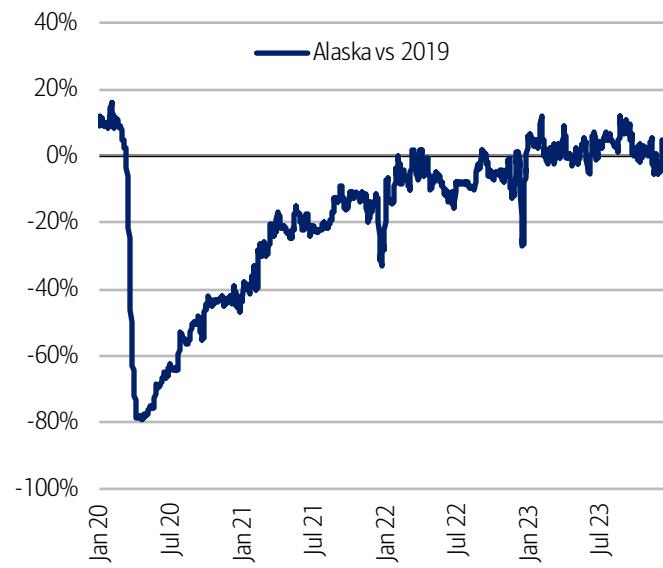
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NA other airlines

Exhibit 85: Alaska Airlines 7 day avg. daily flights YoY

Alaska Airlines has recovered to above pre COVID levels

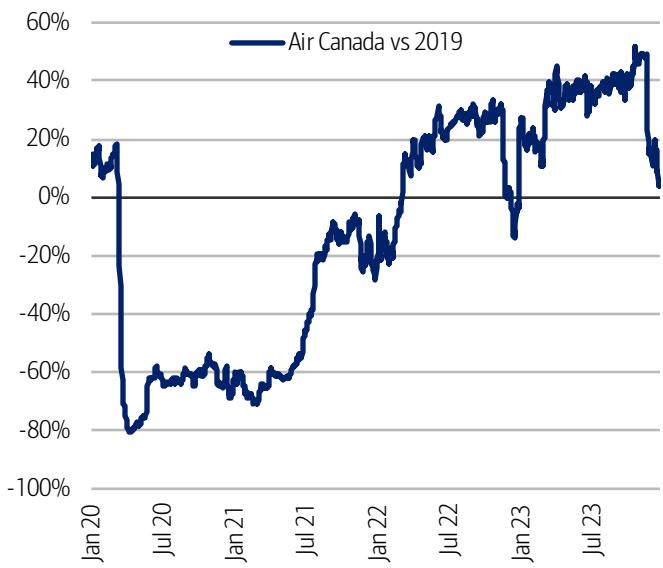


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 86: Air Canada Airlines 7 day avg. daily flights YoY

Air Canada has been above 2019 levels since Feb-22

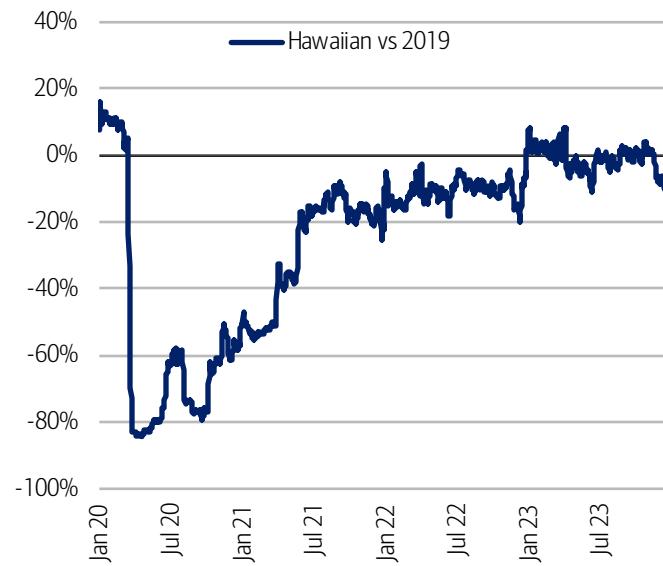


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 87: Hawaiian Airlines 7 day avg. daily flights YoY

Hawaiian has recovered to above pre COVID levels



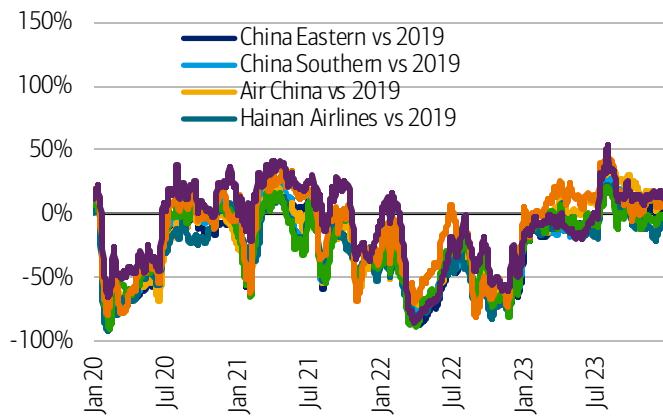
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Asia-Pacific airline flight cycles

Exhibit 88: Chinese Airlines 7 day avg. daily flights vs 2019

Volatility in cycles reflects the COVID restrictions through 2020-23

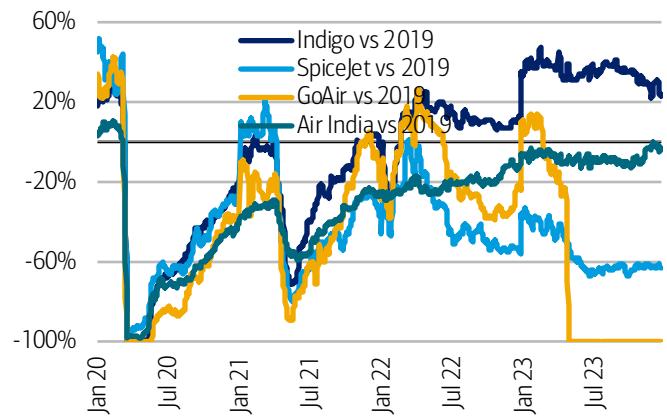


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 89: Indian Airlines 7 day avg. daily flights vs 2019

Indigo is the only Indian Airline above 2019 levels

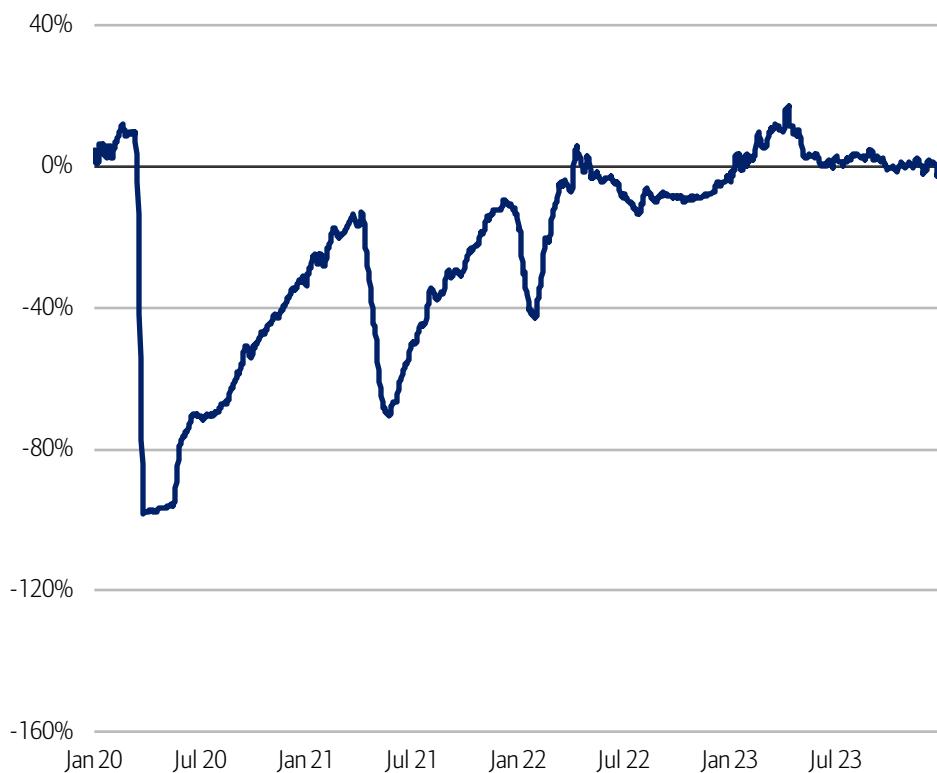


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 90: India 7 day average flights

Indian flights are now ahead of Pre-COVID levels



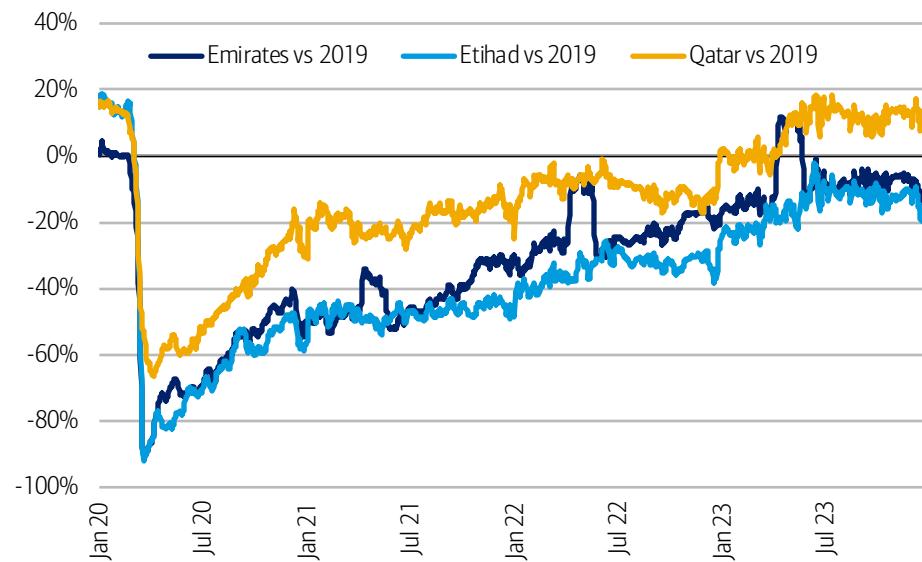
Source: BofA Global Research, Flightradar24

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Exhibit 91: Middle East Airlines 7 day avg. daily flights vs 2019

The big-three gulf carriers are heavily reliant on long-haul international travel with a hub-and-spoke business model utilising large widebody aircraft (e.g. 787, 777, A380, A350) Qatar has performed the most resiliently throughout the COVID-19 crisis compared to 2019 levels

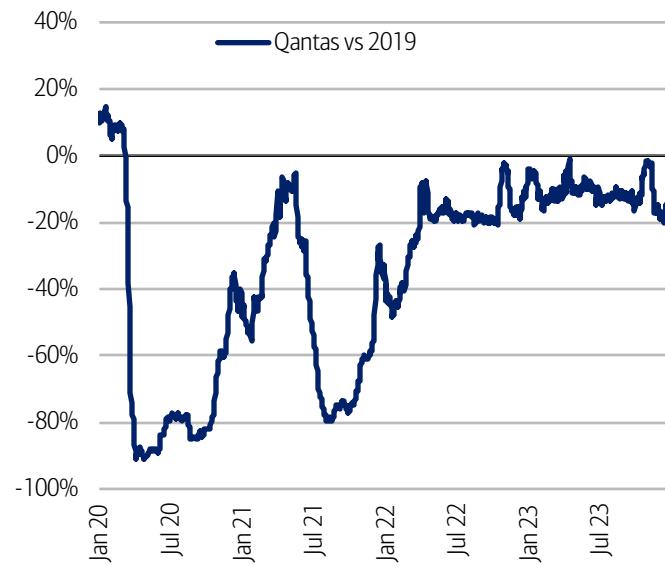


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APAC other airlines

Exhibit 92: Qantas Airlines 7 day avg. daily flights YoY

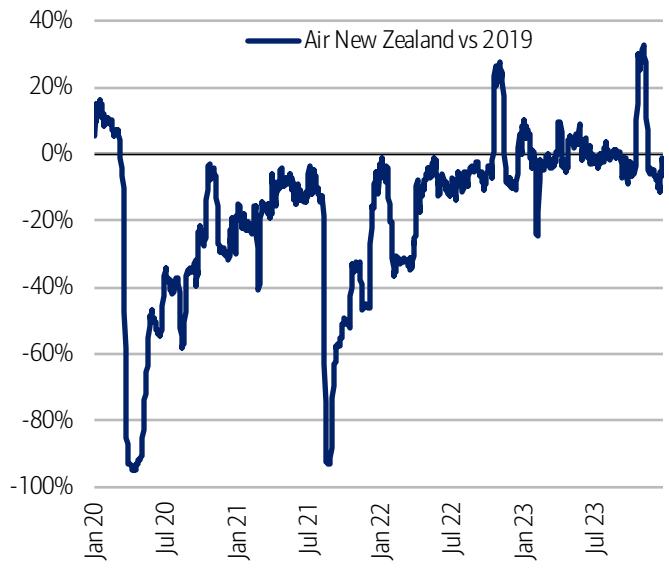
Qantas flights fell strongly over the summer 2021 but has rebounded back strongly through FY22 and plateaued in FY23



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Exhibit 93: Air New Zealand 7 day avg. daily flights YoY

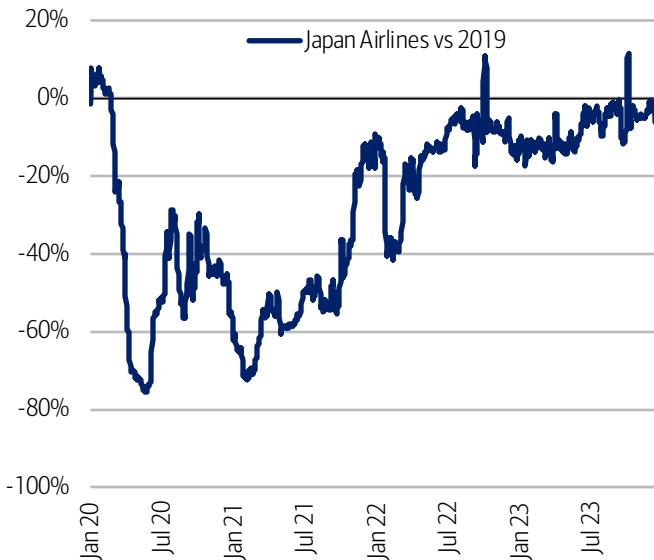
NZ flights have broadly recovered to pre-COVID levels



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Exhibit 94: Japan Airlines 7 day avg. daily flights YoY

JAL flights have largely recovered to pre-COVID levels



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 95: ANA 7 day avg. daily flights YoY

ANA flights are already above 2019 levels

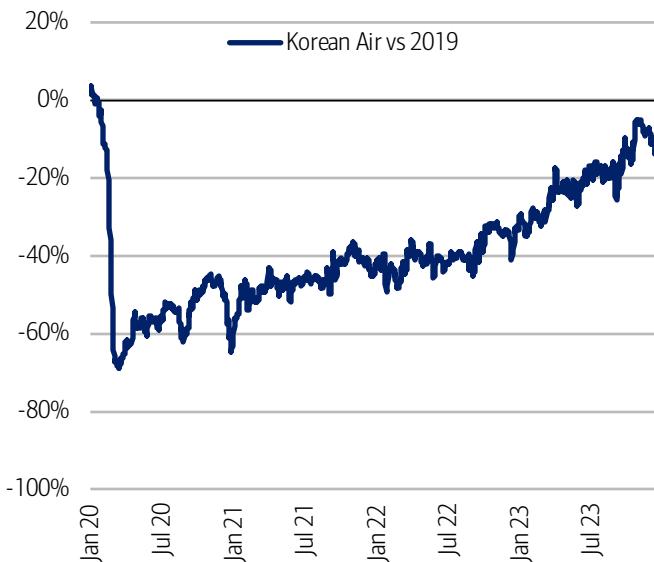


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 96: Korean Air 7 day avg. daily flights YoY

Korean Air cycles have started a gradual recovery since Jul-22

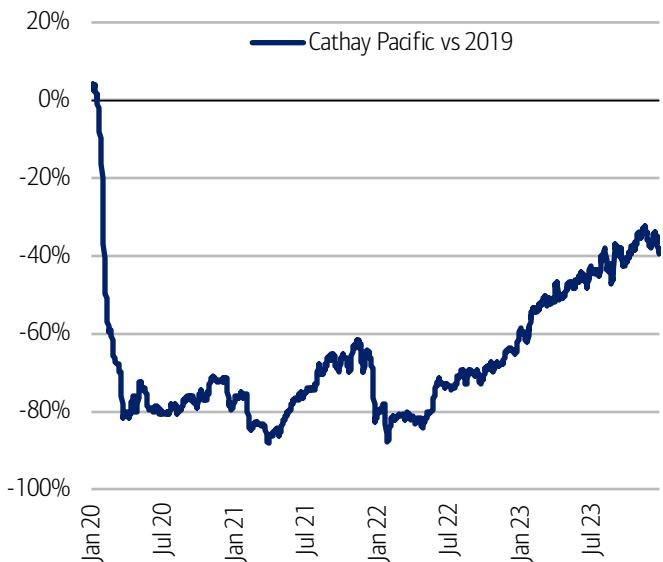


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 97: Cathay Pacific 7 day avg. daily flights YoY

Cathay Pacific remain significantly below 2019 levels



Source: BofA Global Research, Flightradar24

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Exhibit 98: Singapore Airlines 7 day avg. daily flights YoY

Singapore Airlines has been above 2022 levels since Feb-22

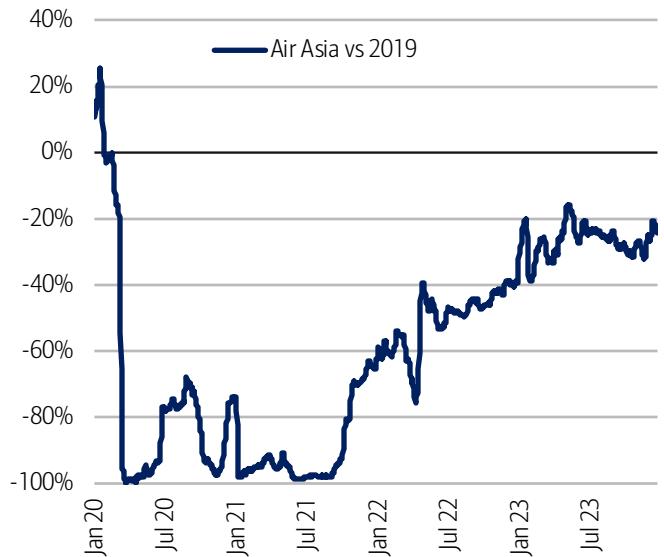


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 99: AirAsia 7 day avg. daily flights YoY

AirAsia cycles are -20% vs. FY19



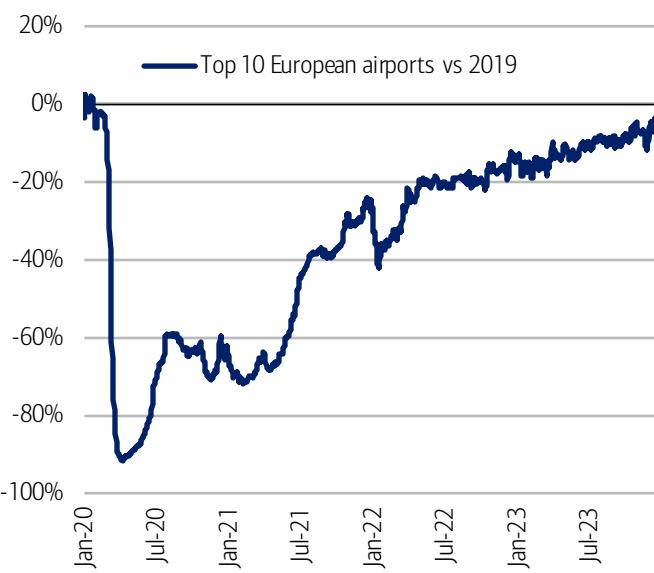
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Global airport cycles

Exhibit 100: Top 10 European airports 7 day avg. daily flights YoY %

European airports traffic has gradually recovered through FY23



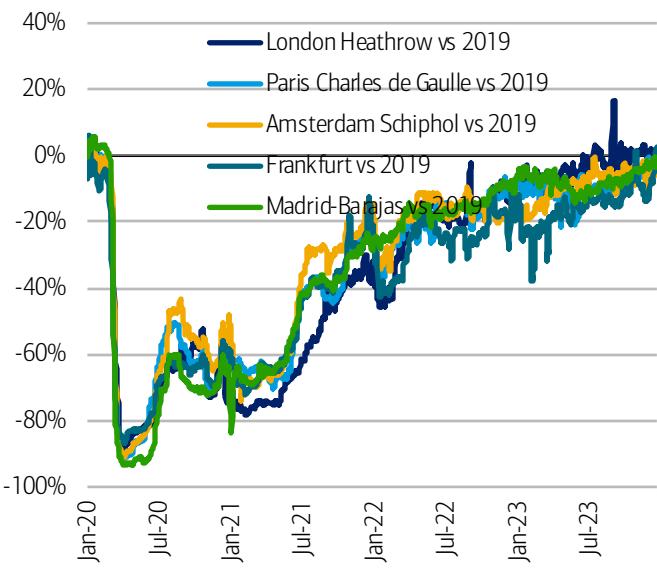
Source: BofA Global Research, Flightradar24

Note: Includes London Heathrow, Paris CDG, Amsterdam, Frankfurt, Madrid, Barcelona, Istanbul, Moscow, Munich, Rome Fiumicino

BofA GLOBAL RESEARCH

Exhibit 101: European airports 7 day avg. daily flights vs 2019

Heathrow is the most recovered airport through summer 2023

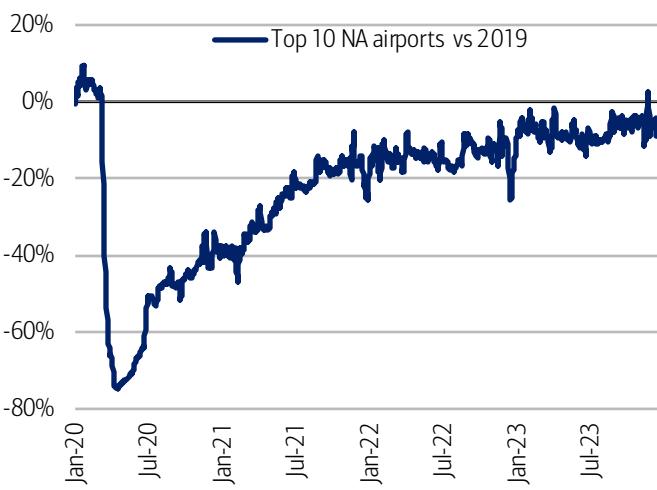


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 102: Top 10 NA airports 7 day avg. daily flights YoY %

NA cycles have been more resilient than Europe due to domestic mix



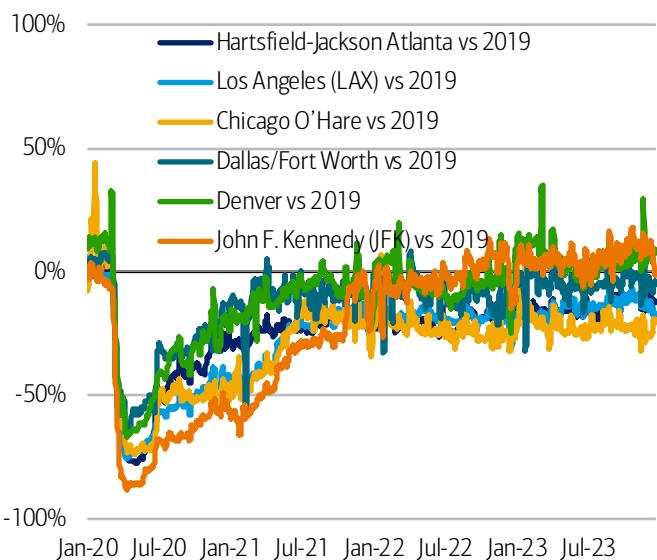
Source: BofA Global Research, Flightradar24

Note: Includes Hartsfield-Jackson Atlanta, Los Angeles (LAX), Chicago O'Hare, Dallas/Fort Worth, Denver, New York JFK, San Francisco, McCarran, Seattle-Tacoma, Toronto Pearson

BofA GLOBAL RESEARCH

Exhibit 103: NA airports 7 day avg. daily flights vs 2019

Once the recovery has taken place international airports (ie. JFK) have exhibited better performance than regional ones (ie. Chicago O'Hare)



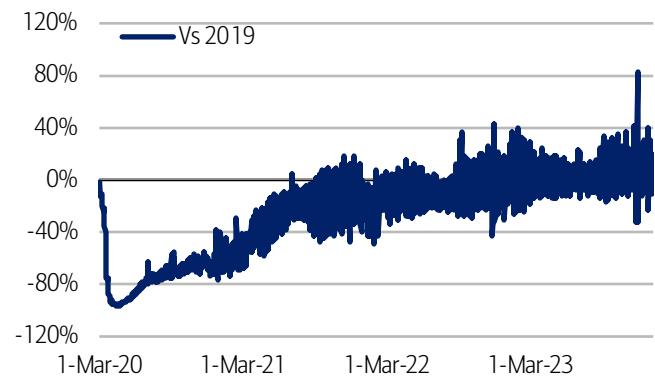
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 104: US TSA Security throughput vs 2019 levels

US TSA throughput has progressively improved through 2022

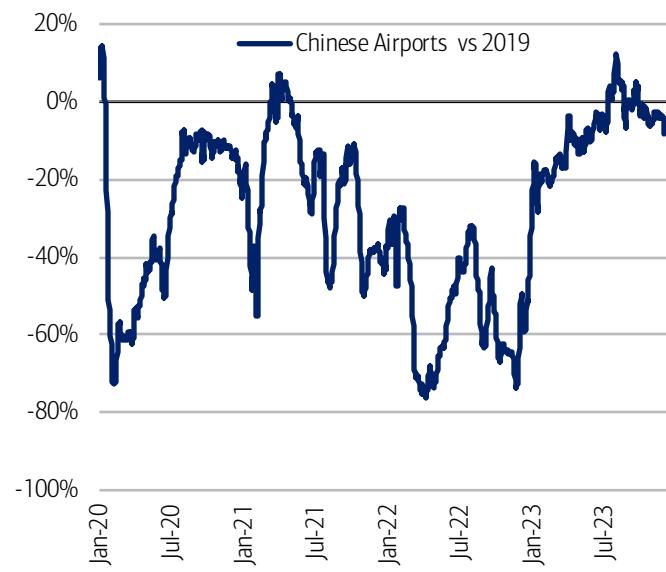


Source: TSA

BofA GLOBAL RESEARCH

Exhibit 105: Chinese airports 7 day avg. daily flights YoY

Airports in China have largely recovered back to 2019 levels



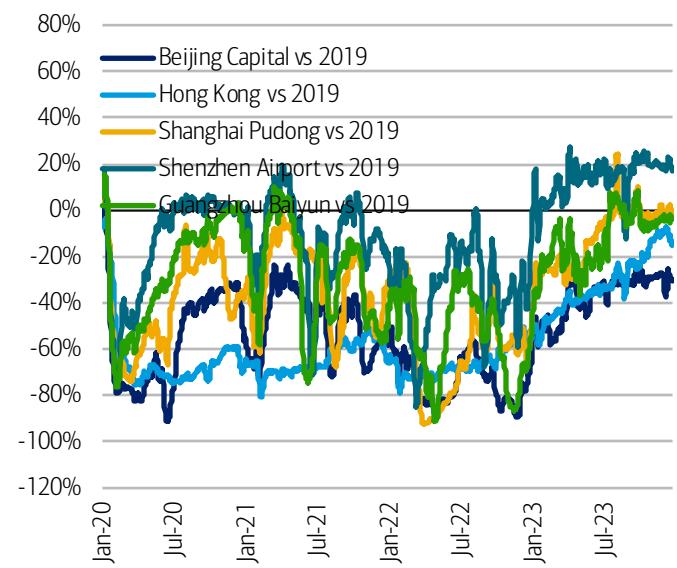
Source: BofA Global Research, Flightradar24

Note: Includes Beijing Capital, Beijing Daxing, Haikou Meilan, Hong Kong, Sanya Phoenix, Shanghai Hongqiao, Shanghai Pudong, Shenzhen, Guangzhou Baiyun, Chengdu Shuangliu, Xianyang, Chongqing Jianyei

BofA GLOBAL RESEARCH

Exhibit 106: Selected Chinese airports vs Hong Kong 7 day avg. daily flights vs 2019

Flights in China have largely recovered back to pre-COVID levels

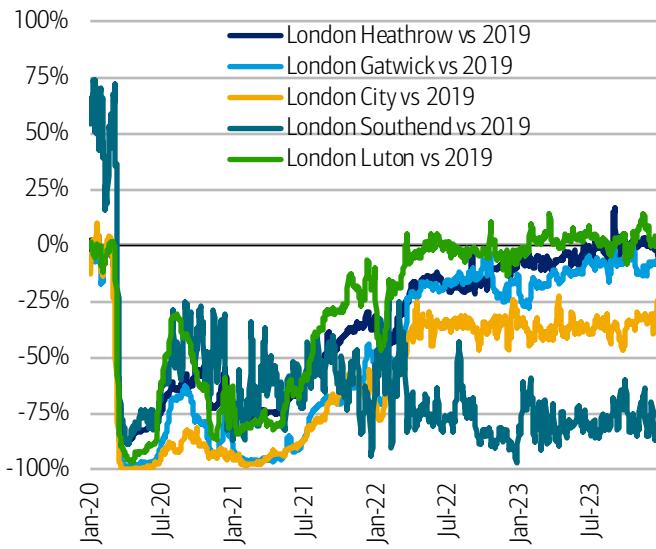


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 107: London airports 7 day avg. daily flights vs 2019

London Southend currently has the lowest level of flight activity when compared to 2019

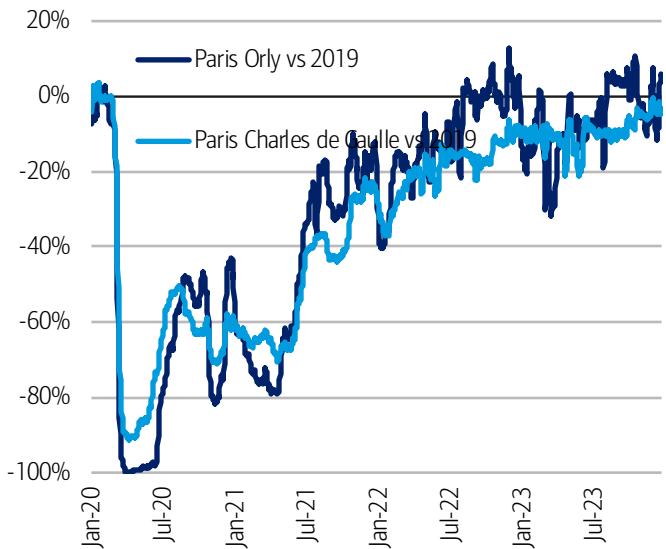


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 108: Paris airports 7 day avg. daily flights YoY %

Paris Orly cycles were stronger than CDG compared to 2019 throughout the market recovery

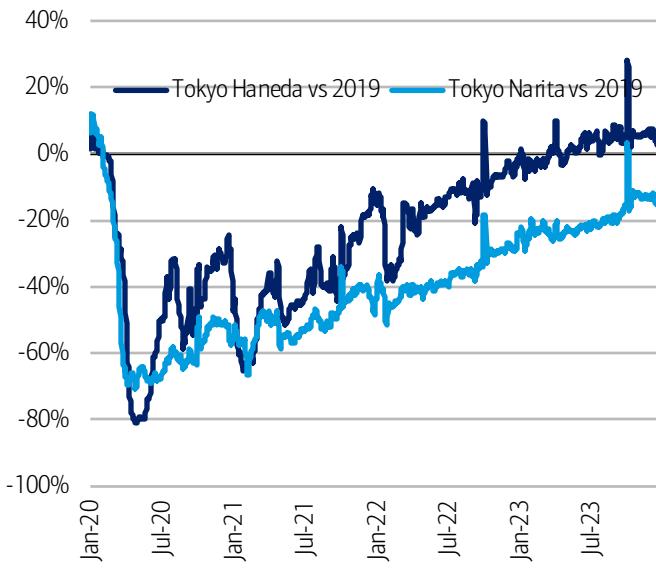


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 109: Japan airports 7 day avg. daily flights YoY %

Haneda cycles have been more resilient than Narita since Jan 21

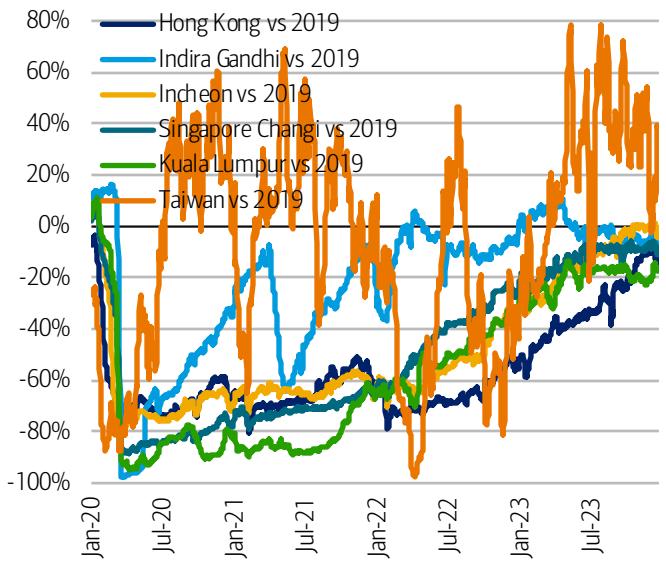


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 110: APAC ex China 7 day avg. daily flights vs 2019

Most of Asia airports now are on the way to recovery



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Global airport pairs cycles

Exhibit 111: London Heathrow to New York JFK 7 day avg. daily flights YoY %
 LHR-JFK is a major business travel route and key revenue generator for legacy carriers

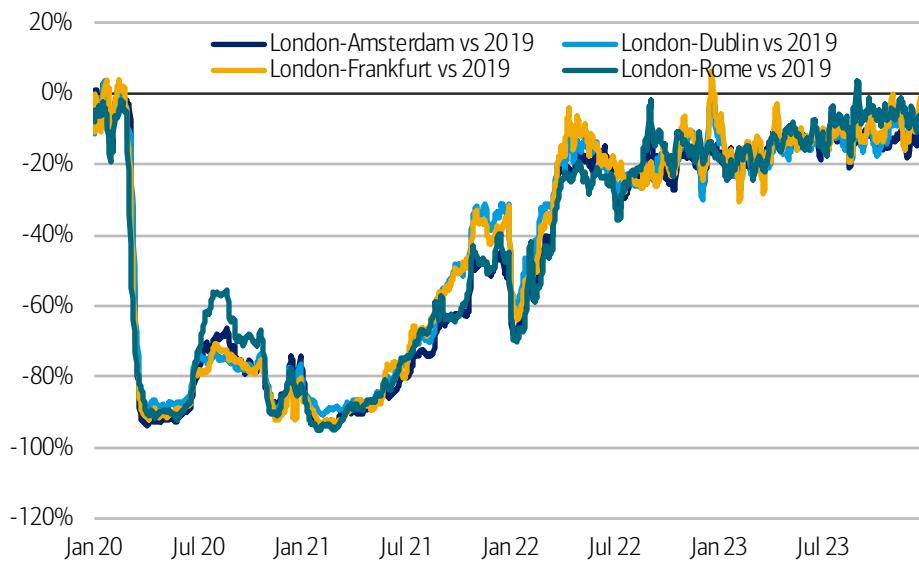


Source: BofA Global Research, FlightRadar24

BofA GLOBAL RESEARCH

Exhibit 112: London key short-haul routes 7 day avg. daily flights vs 2019

Most key London routes have almost fully recovered

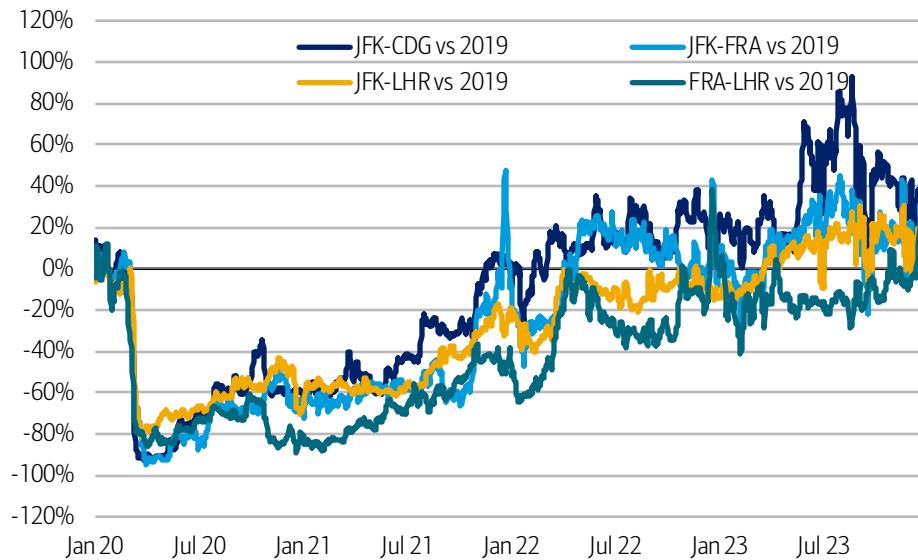


Source: BofA Global Research, Flightradar24 Note: London Airports include Heathrow, Gatwick, Stansted, Luton, City, Southend

BofA GLOBAL RESEARCH

Exhibit 113: Europe Inter-national 7 day avg. daily flights vs 2019

JFK-FRA & JFK-CDG are already above 2019 levels



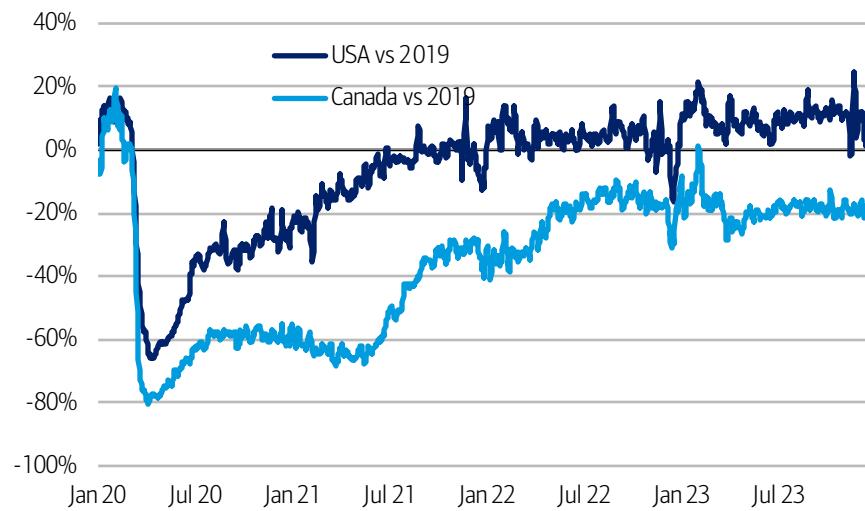
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

North America key route pairs

Exhibit 114: USA and Canada 14. Day avg. flights vs 2019

US domestic flights have supported total US flights



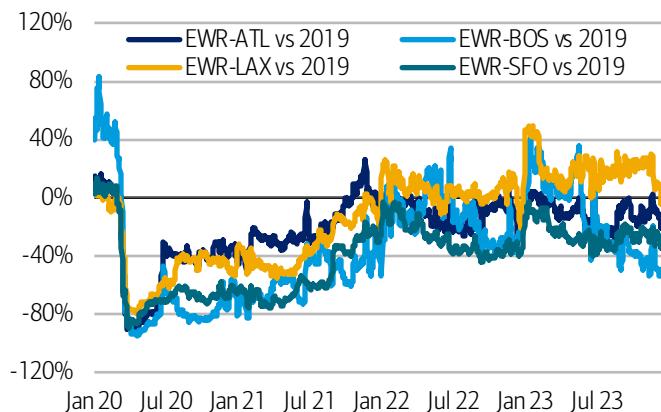
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 115: Newark airport pairs 7 day avg. daily flights vs 2019

EWR-LAX has been the most resilient US pair

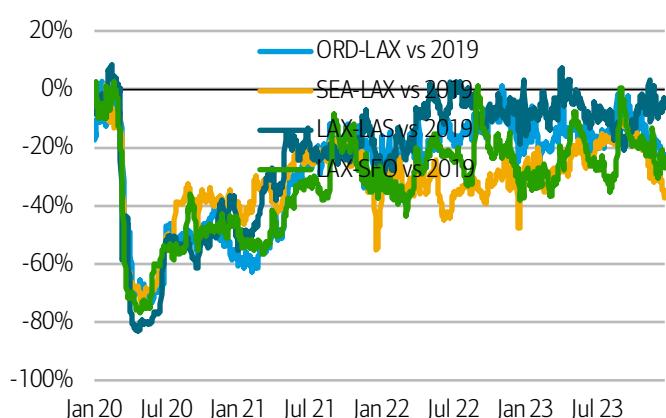
**Source:** BofA Global Research, Flightradar24

EWR = Newark, ATL = Atlanta, BOS = Boston, SFO = San Francisco

BofA GLOBAL RESEARCH

Exhibit 116: Los Angeles airport pairs 7 day avg. daily flights vs 2019

LA airport pairs have been relatively volatile

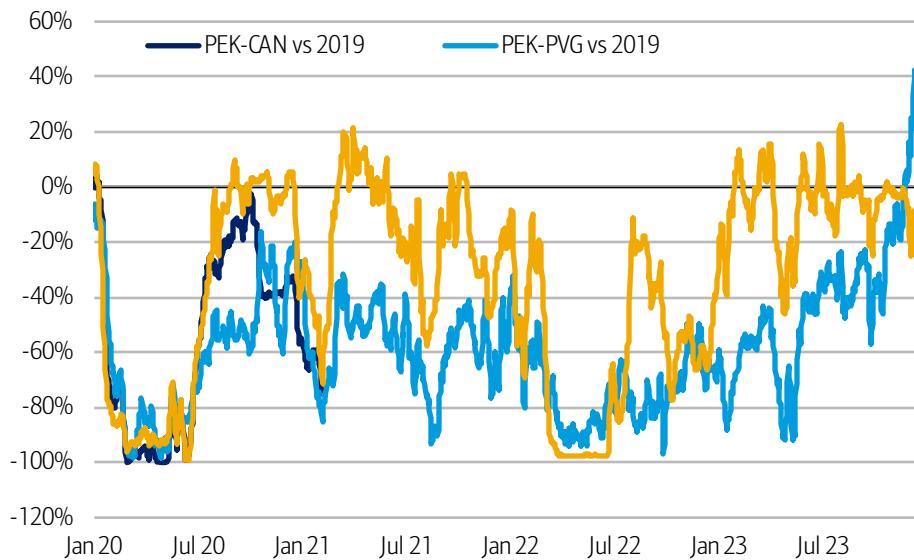
**Source:** BofA Global Research, Flightradar24

LAX = Los Angeles, ORD = Orlando, LAS = Las Vegas, SFO = San Francisco

BofA GLOBAL RESEARCH

Asia-Pacific key route pairs**Exhibit 117: Beijing airport pairs 7 day avg. daily flights vs 2019**

Internal Chinese flights have been volatile due to Zero Covid policies

**Source:** BofA Global Research, Flightradar24

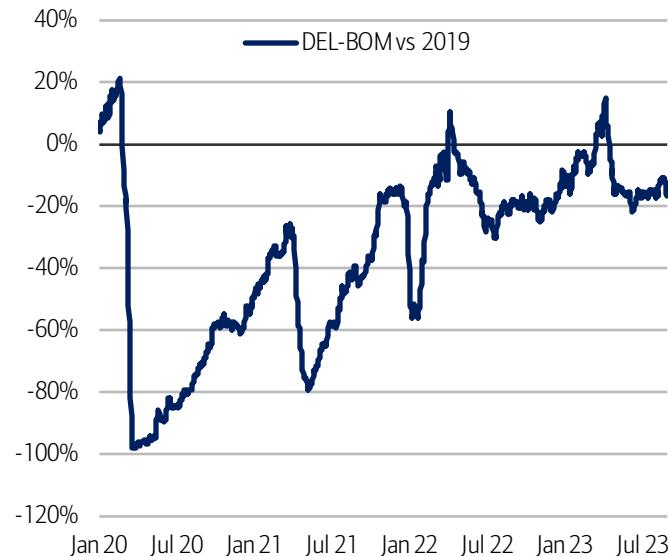
PEK = Beijing, CAN = Guangzhou, PVG = Shanghai Pudong, Shanghai Hongqiao

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Exhibit 118: Delhi-Bombay 7 day avg. daily flights YoY %

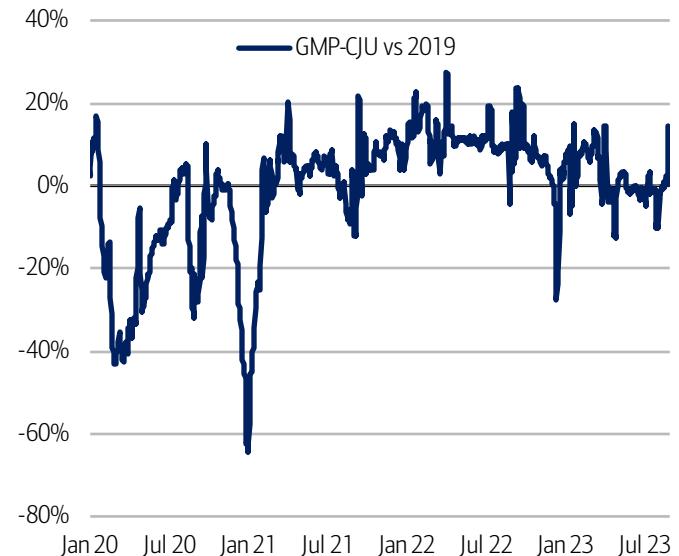
Delhi-Bombay is still below 2019 levels

**Source:** BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 119: Gimpo Seoul to Jeju 7 day avg. daily flights YoY %

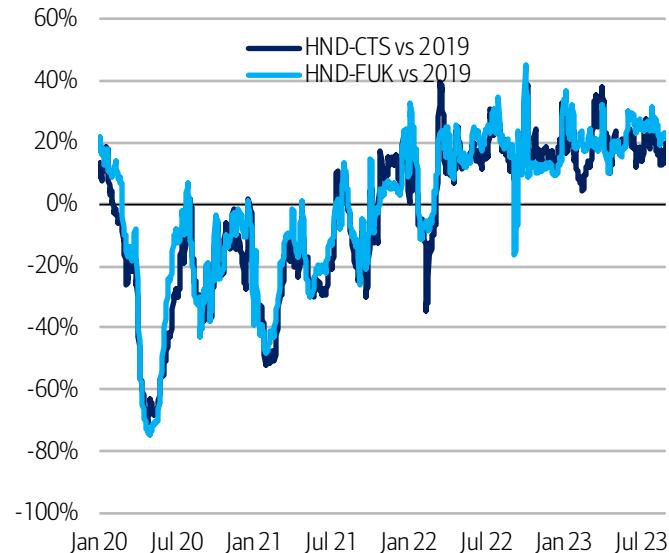
Seoul to Jeju Island has been consistently above 2019 levels YTD

**Source:** BofA Global Research, Flightradar24 GMP = Gimpo Airport Seoul CJU = Jeju International Airport

BofA GLOBAL RESEARCH

Exhibit 120: Tokyo Haneda airport pairs 7 day avg. daily flights YoY %

Haneda to Chitose and Haneda to Fukuoka are already above 2019 levels

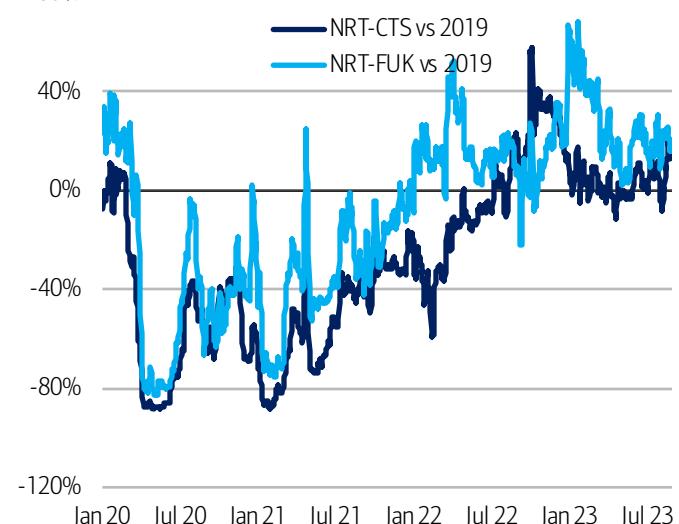
**Source:** BofA Global Research, Flightradar24

Note: CTS = New Chitose Airport FUK = Fukuoka Airport

BofA GLOBAL RESEARCH

Exhibit 121: Narita airport pairs 7 day avg. daily flights YoY %

Narita main routes are already above 2019 levels

**Source:** BofA Global Research, Flightradar24 Note: CTS = New Chitose Airport FUK = Fukuoka Airport

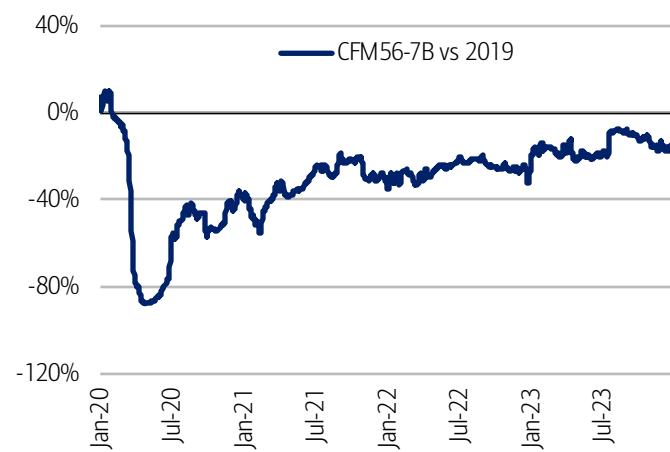
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Engine Flight Hours

Exhibit 122: Engine Flight Hours 7 day avg. vs 2019% – CFM56-7B

CFM56-7B engine hours have seen a steady recovery

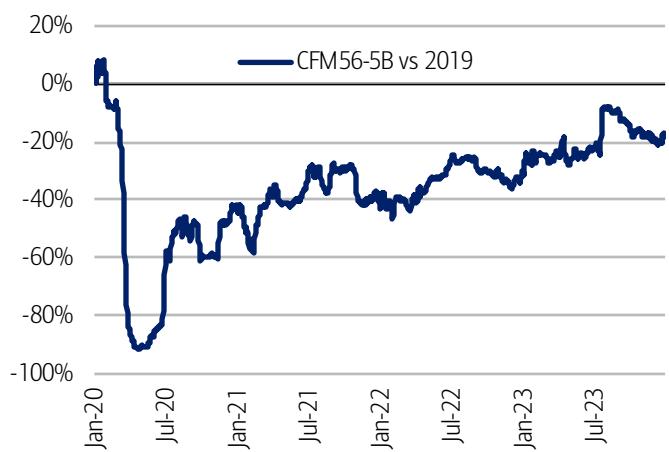


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 123: Engine Flight Hours 7 day avg. vs 2019% – CFM56-5B

CFM56-5B engine hours have seen a steady recovery

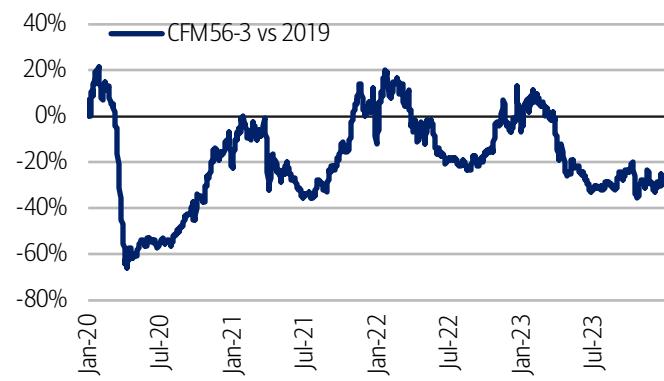


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 124: Engine Flight Hours 7 day avg. vs 2019% – CFM56-3

CFM56-3 engine hours have been weak recently

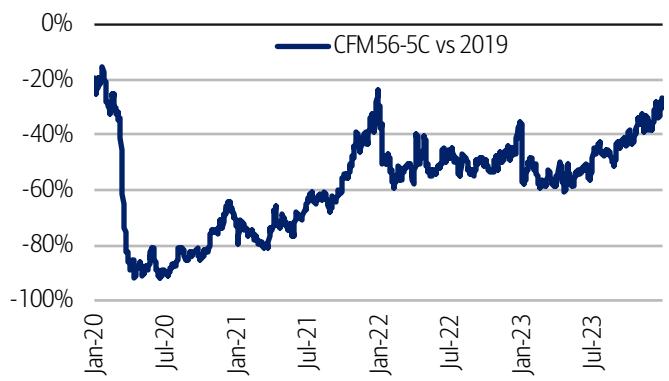


Source: BofA Global Research, Flightradar24

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Exhibit 125: Engine Flight Hours 7 day avg. vs 2019% – CFM56-5C

CFM56-5C engine hours have plateaued in the last months

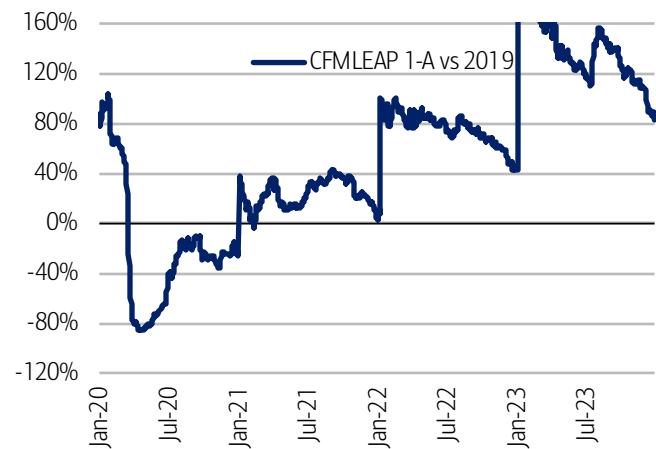


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 126: Engine Flight Hours 7 day avg. vs 2019% – CFMLEAP 1-A

CFMLEAP 1-A engine hours have been significantly above 2019 levels since Jan-22

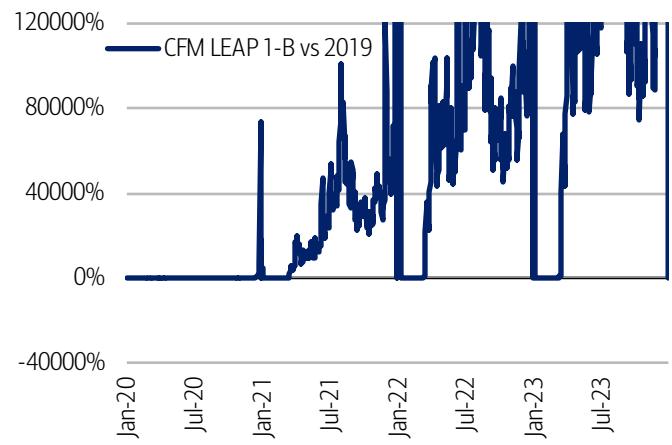


Source: BofA Global Research, Flightradar24

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Exhibit 127: Engine Flight Hours 7 day avg. vs 2019% – CFMLEAP 1-B

CFMLEAP 1-B engine hours growth has been extremely volatile driven by the recovery of the 737MAX

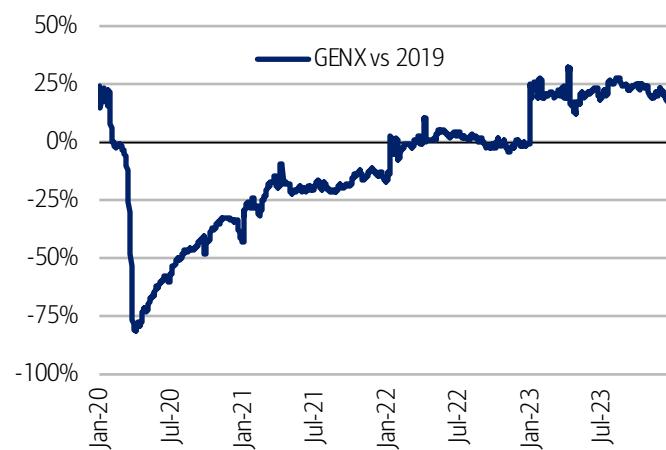


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 128: Engine Flight Hours 7 day avg. vs 2019% – GENX

GENX engine hours have continued to recover in FY23

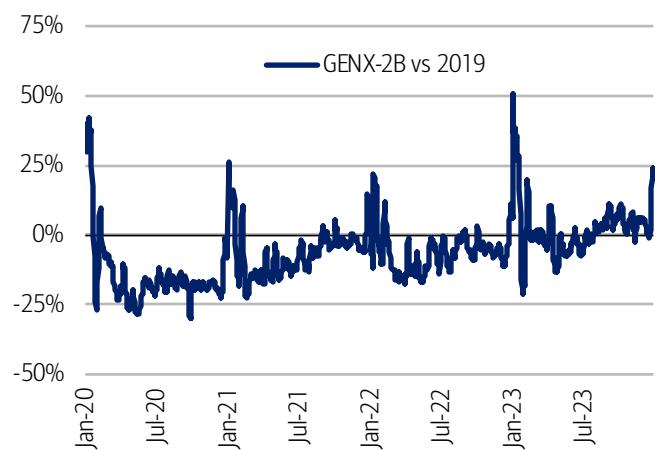


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 129: Engine Flight Hours 7 day avg. vs 2019% – GENX-2B

GENX-2B engine hours have steadily improved in 2023



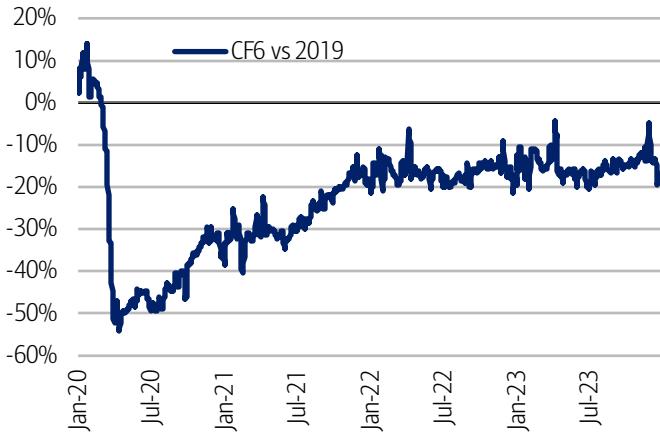
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 130: Engine Flight Hours 7 day avg. vs 2019% – CF6

CF6 engine hours have plateaued since 2022

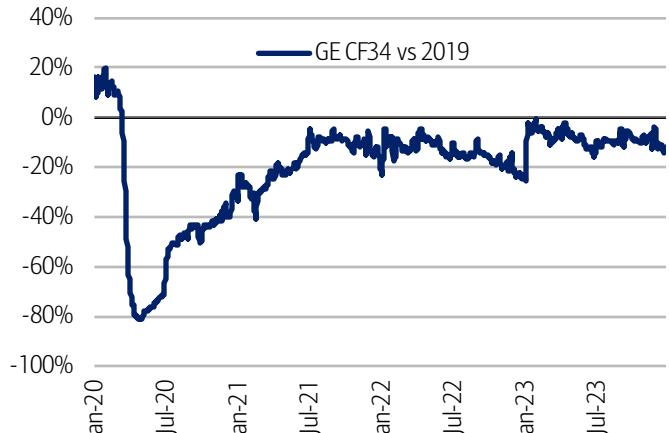


Source: BofA Global Research, Flightradar24

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Exhibit 131: Engine Flight Hours 7 day avg. vs 2019% – GE CF34

GE CF34 engine hours have gradually recovered through 2023



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 132: Engine Flight Hours 7 day avg. vs 2019% – PW2000

PW2000 engine hours have remained weak through 2023

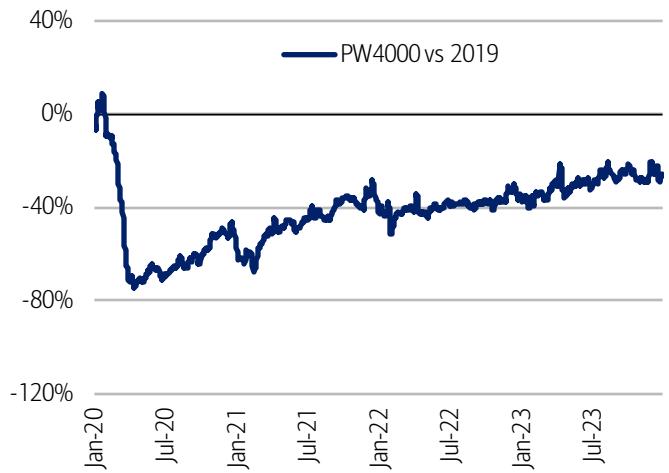


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 133: Engine Flight Hours 7 day avg. vs 2019% – PW4000

PW4000 engine hours have gradually recovered but are still well below pre COVID

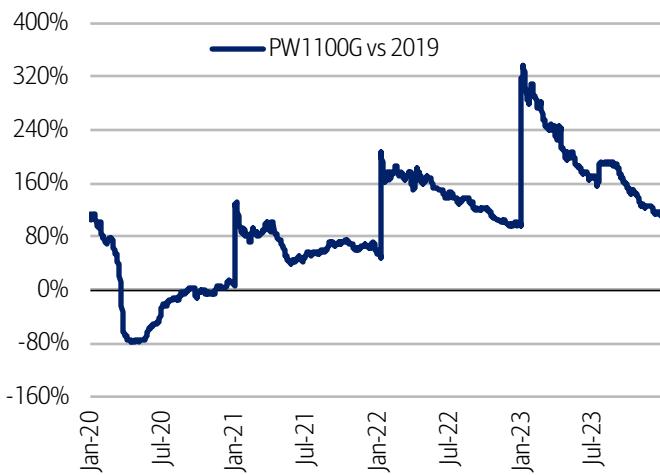


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 134: Engine Flight Hours 7 day avg. vs 2019% – PW1100G

PW1100G engine hours growth is ahead of 2019 levels because of growth in the installed fleet



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 135: Engine Flight Hours 7 day avg. vs 2019% – PW1500G

PW1500G engine hours have decreased through 2023 as a result of durability issues



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 136: Engine Flight Hours 7 day avg. vs 2019% – PW1900G

PW1900G engine hours have grown with the installed fleet

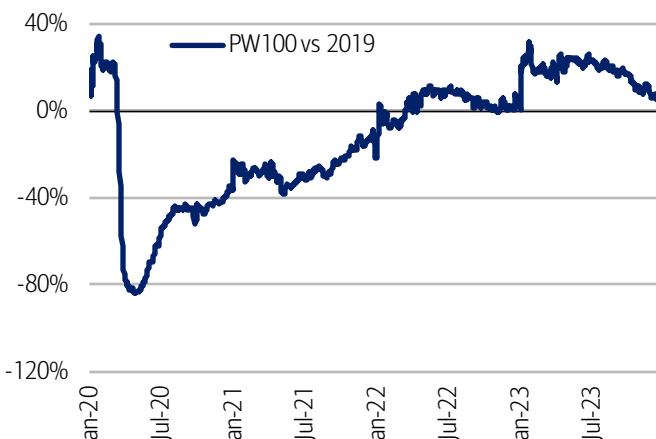


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 137: Engine Flight Hours 7 day avg. vs 2019% – PW100

PW100 engine hours are ahead of 2019 levels



Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 138: Engine Flight Hours 7 day avg. vs 2019% – PW4000

PW4000 engine hours have gradually improved but are below pre COVID

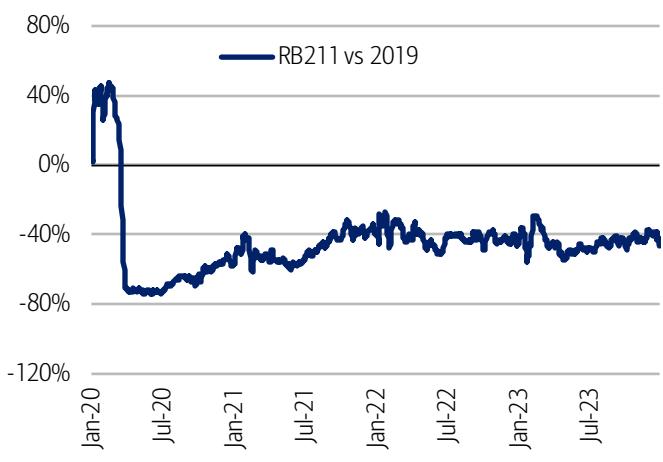


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 139: Engine Flight Hours 7 day avg. vs 2019% – RB211

RB211 engine hours gradually improved from its lows in Apr-2020 but still remain very weak vs 2019 levels

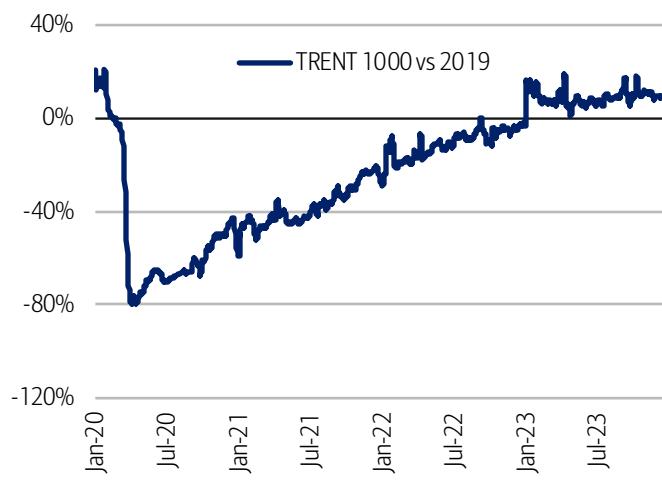


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 140: Engine Flight Hours 7 day avg. vs 2019% – TREN 1000

Trent 1000 engine hours are slightly ahead 2019 levels

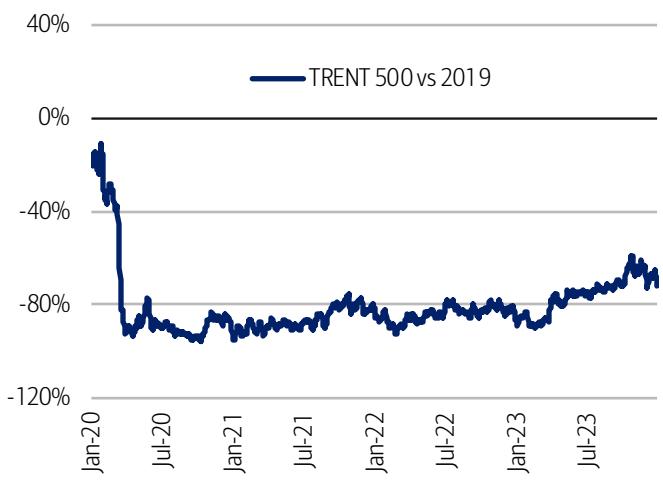


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 141: Engine Flight Hours 7 day avg. vs 2019% – TREN 500

Trent 500 engine hours growth remained broadly in range through 2022-23

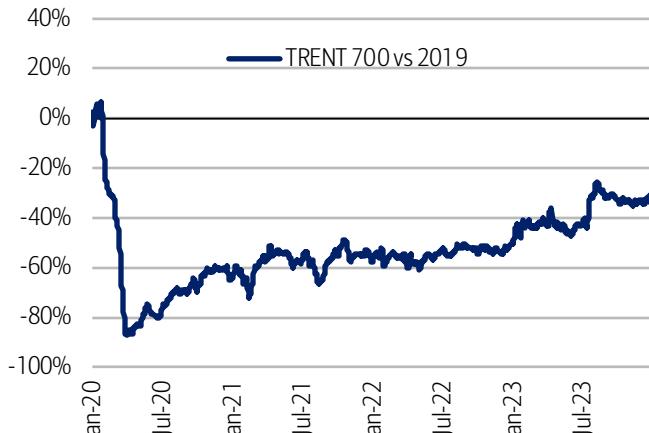


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 142: Engine Flight Hours 7 day avg. vs 2019% – TRENt 700

Trent 700 engine hours have started to recover through 2023

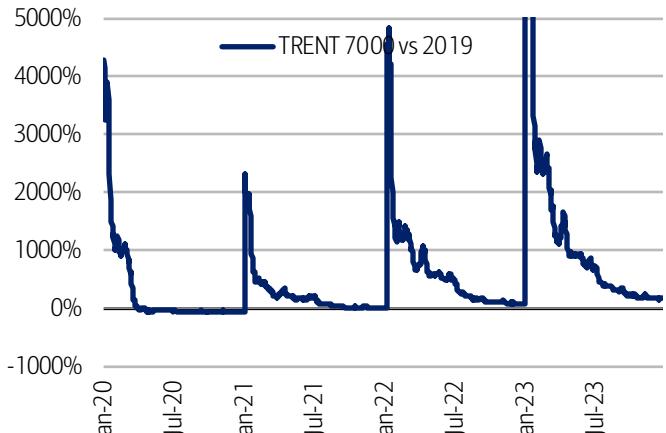


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 143: Engine Flight Hours 7 day avg. vs 2019% – TRENt 7000

Trent 7000 engine hours remain above 2019 levels in 2023

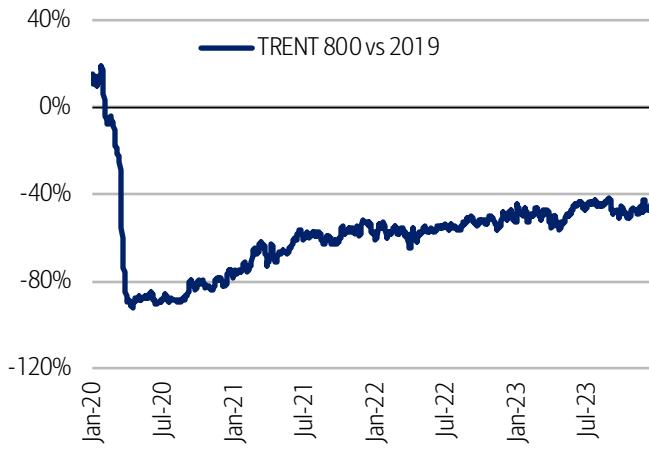


Source: BofA Global Research, Flightradar24

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Exhibit 144: Engine Flight Hours 7 day avg. vs 2019% – TRENt 800

Trent 800 engine hours have plateaued in the last months

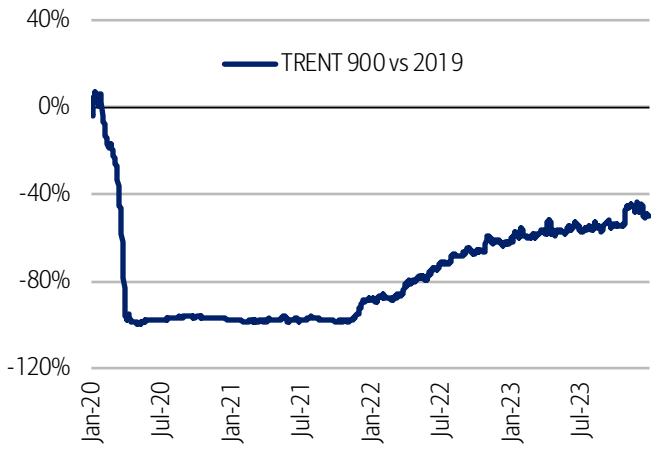


Source: BofA Global Research, Flightradar24

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Exhibit 145: Engine Flight Hours 7 day avg. vs 2019% – TRENt 900

Trent 900 engine hours have been progressively improving 2022-23



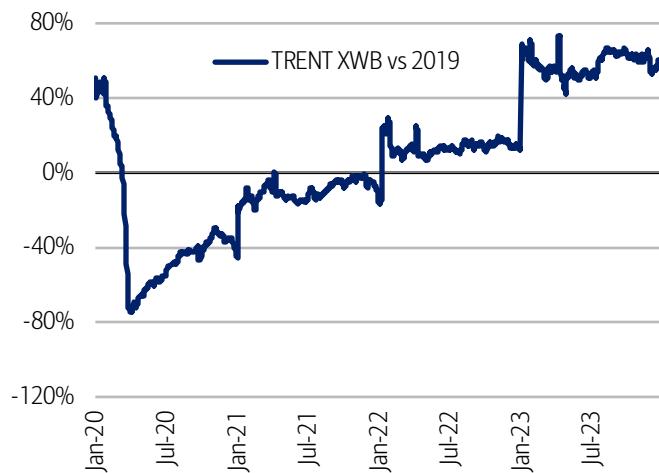
Source: BofA Global Research, Flightradar24

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Exhibit 146: Engine Flight Hours 7 day avg. vs 2019% – TRENt XWB

Trent XWB engine hours have been above 2019 levels since Jan-22



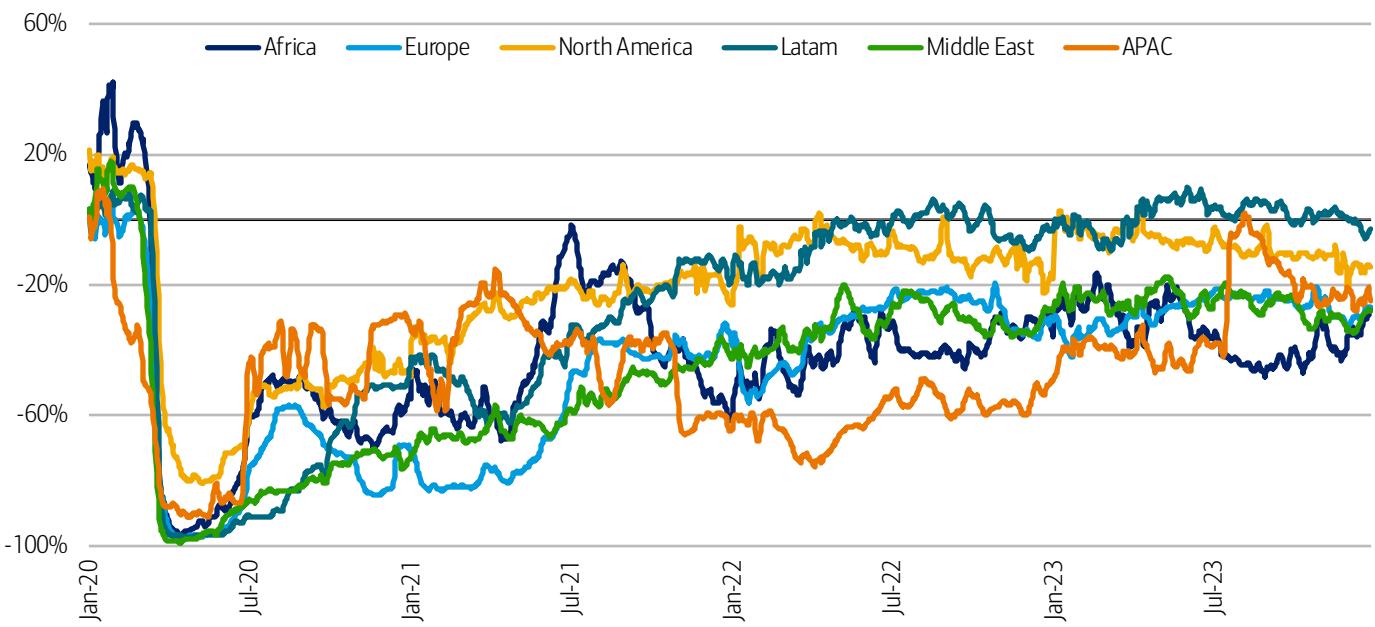
Source: BofA Global Research, Flightradar24

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Engine flight hours – regionally

Exhibit 147: CFM56-5B regional Engine Flight Hours 7 day avg. vs 2019%

APAC saw a strong recovery YTD for CFM56-5B engines

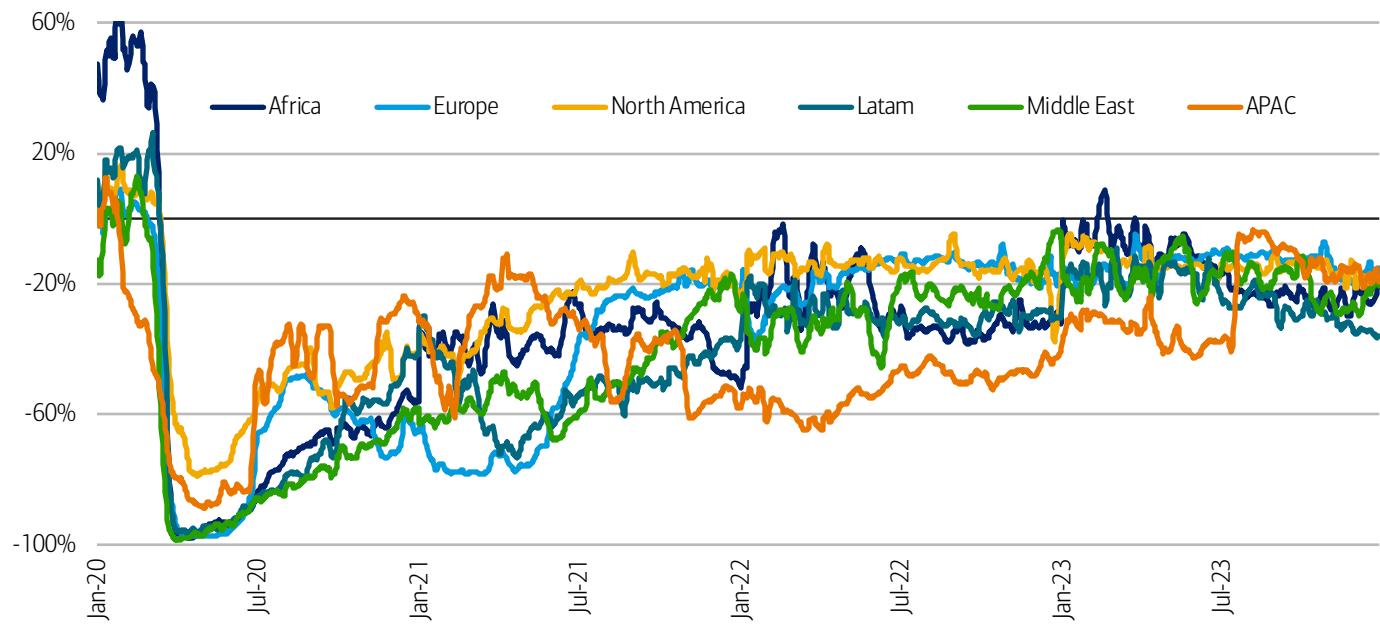


Source: BofA Global Research, Flightradar24

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Exhibit 148: CFM56-7B regional Engine Flight Hours 7 day avg. vs 2019%

CFM56-7B engine flight hours have broadly recovered for many regions



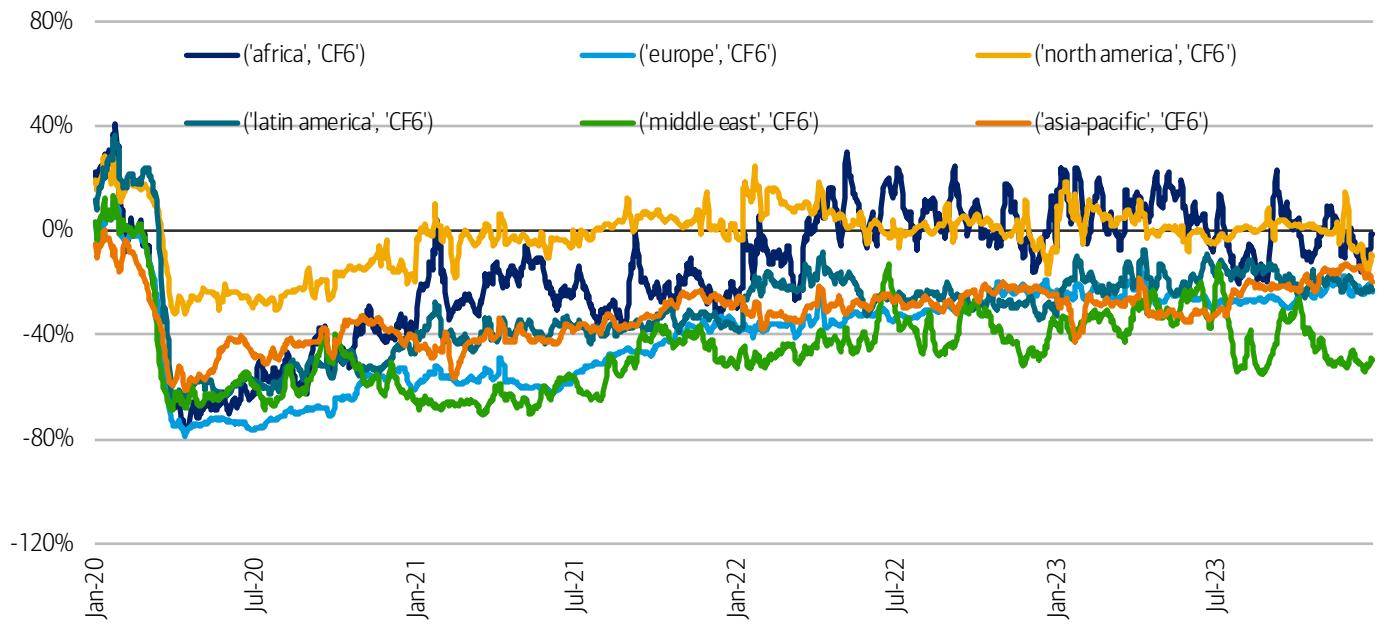
Source: BofA Global Research, Flightradar24

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Exhibit 149: CF6 regional Engine Flight Hours 7 day avg. vs 2019%

CF6 engine flight hours are back at pre COVID levels for North America



Source: BofA Global Research, Flightradar24

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Monthly flight cycles data tables

Exhibit 150: Major engine families monthly average flight cycles yoy growth

Most major engine cycles tracked in our data remained below vs 2019 in Dec-23

	CFM56 -5B (A320ceo)	CFM56 -7B (737NG)	CFM56 family	V2500	CFMLEAP	GTF family	Rolls-Royce commercial	P&W	GE	Total
Jan-20	6%	3%	4%	2%	7%	93%	19%	13%	10%	8%
Feb-20	-11%	-12%	-12%	-6%	-12%	68%	-8%	5%	3%	-5%
Mar-20	-40%	-35%	-37%	-37%	-17%	15%	-39%	-26%	-21%	-32%
Apr-20	-85%	-79%	-81%	-90%	-76%	-72%	-77%	-82%	-64%	-80%
May-20	-84%	-79%	-81%	-90%	-69%	-66%	-71%	-81%	-62%	-79%
Jun-20	-77%	-72%	-74%	-81%	-56%	-41%	-71%	-71%	-59%	-72%
Jul-20	-57%	-52%	-54%	-63%	-28%	-19%	-64%	-55%	-49%	-56%
Aug-20	-50%	-43%	-46%	-63%	-13%	-12%	-60%	-52%	-45%	-49%
Sep-20	-52%	-46%	-49%	-66%	-12%	-7%	-57%	-52%	-42%	-49%
Oct-20	-54%	-47%	-50%	-63%	-13%	-7%	-51%	-49%	-38%	-49%
Nov-20	-53%	-43%	-47%	-63%	-17%	-4%	-48%	-47%	-35%	-46%
Dec-20	-49%	-41%	-44%	-59%	-16%	0%	-47%	-42%	-31%	-43%
Vs 2019										
Jan '21 vs '19	-51%	-47%	-48%	-64%	-24%	79%	-44%	-41%	-28%	-44%
Feb '21 vs '19	-57%	-53%	-54%	-66%	-32%	62%	-51%	-44%	-33%	-49%
Mar '21 vs '19	-46%	-40%	-42%	-60%	14%	71%	-42%	-38%	-28%	-40%
Apr '21 vs '19	-46%	-38%	-41%	-56%	45%	63%	-38%	-36%	-26%	-38%
May '21 vs '19	-48%	-40%	-43%	-57%	38%	30%	-41%	-42%	-27%	-40%
Jun '21 vs '19	-46%	-35%	-40%	-55%	54%	29%	-43%	-40%	-25%	-37%
Jul '21 vs '19	-38%	-29%	-33%	-48%	77%	46%	-38%	-34%	-20%	-30%
Aug '21 vs '19	-43%	-35%	-38%	-49%	83%	47%	-46%	-33%	-21%	-33%
Sep '21 vs '19	-37%	-28%	-32%	-48%	91%	54%	-39%	-29%	-18%	-28%
Oct '21 vs '19	-36%	-27%	-31%	-46%	93%	54%	-35%	-26%	-18%	-26%
Nov '21 vs '19	-42%	-31%	-35%	-45%	87%	54%	-37%	-23%	-16%	-28%
Dec '21 vs '19	-39%	-29%	-32%	-41%	83%	61%	-34%	-19%	-15%	-25%
Jan '22 vs '19	-38%	-30%	-33%	-43%	72%	172%	-28%	-16%	-14%	-24%
Feb '22 vs '19	-38%	-29%	-32%	-45%	73%	159%	-34%	-17%	-15%	-25%
Mar '22 vs '19	-42%	-33%	-36%	-41%	123%	157%	-32%	-14%	-13%	-26%
Apr '22 vs '19	-41%	-33%	-36%	-33%	177%	152%	-35%	-9%	-13%	-24%
May '22 vs '19	-36%	-29%	-32%	-30%	191%	144%	-34%	-7%	-13%	-21%
Jun '22 vs '19	-33%	-26%	-29%	-31%	192%	132%	-32%	-8%	-13%	-20%
Jul '22 vs '19	-28%	-23%	-26%	-31%	195%	125%	-29%	-8%	-14%	-18%
Aug '22 vs '19	-28%	-23%	-25%	-31%	208%	119%	-29%	-7%	-15%	-17%
Sep '22 vs '19	-33%	-26%	-29%	-32%	195%	104%	-29%	-8%	-13%	-19%
Oct '22 vs '19	-34%	-28%	-30%	-30%	190%	94%	-31%	-8%	-15%	-20%
Nov '22 vs '19	-37%	-29%	-32%	-28%	179%	87%	-29%	-6%	-14%	-20%
Dec '22 vs '19	-34%	-28%	-31%	-28%	170%	86%	-28%	-5%	-16%	-20%
Jan '23 vs '19	-24%	-18%	-21%	-26%	183%	266%	-8%	9%	-5%	-8%
Feb '23 vs '19	-23%	-17%	-20%	-27%	170%	250%	-6%	6%	-2%	-8%
Mar '23 vs '19	-24%	-17%	-20%	-27%	262%	228%	-4%	6%	-2%	-8%
Apr '23 vs '19	-22%	-16%	-19%	-26%	354%	205%	-3%	5%	-4%	-7%
May '23 vs '19	-22%	-16%	-19%	-26%	350%	184%	-5%	5%	-4%	-7%
Jun '23 vs '19	-22%	-17%	-19%	-28%	347%	168%	-4%	2%	-5%	-8%
Jul '23 vs '19	-19%	-14%	-17%	-27%	353%	163%	-3%	2%	-6%	-6%
Aug '23 vs '19	-16%	-11%	-14%	-26%	376%	162%	-2%	4%	-5%	-3%
Sep '23 vs '19	-18%	-12%	-15%	-26%	352%	145%	-4%	4%	-3%	-4%
Oct '23 vs '19	-20%	-12%	-16%	-25%	341%	128%	-2%	2%	-4%	-4%
Nov '23 vs '19	-21%	-15%	-18%	-25%	315%	114%	-4%	2%	-3%	-5%
Dec '23 vs '19	-22%	-15%	-18%	-25%	294%	106%	-3%	0%	-6%	-6%

Source: BofA Global Research, Flightradar24

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Exhibit 151: P&W engine monthly average flight cycles yoy growth

PW1900G has been the best P&W engine through Dec-23

	GP7200	V2500	PW100	PW1100G	PW1500G	PW1900G	PW2000	PW4000	JT8D	JT9D	Total P&W
Jan-20	9%	2%	19%	94%	67%	379%	4%	3%	-45%	38%	13%
Feb-20	1%	-6%	17%	65%	62%	411%	4%	-15%	-47%	-79%	5%
Mar-20	-39%	-37%	-15%	16%	-6%	228%	-12%	-44%	-58%	-69%	-26%
Apr-20	-99%	-90%	-80%	-72%	-71%	-39%	-52%	-64%	-81%	-69%	-82%
May-20	-100%	-90%	-80%	-67%	-68%	52%	-57%	-61%	-77%	-56%	-81%
Jun-20	-100%	-81%	-67%	-42%	-44%	64%	-51%	-61%	-86%	-92%	-71%
Jul-20	-99%	-63%	-54%	-21%	-19%	120%	-43%	-55%	-85%	-94%	-55%
Aug-20	-96%	-63%	-49%	-13%	-18%	79%	-36%	-51%	-81%	-92%	-52%
Sep-20	-96%	-66%	-50%	-4%	-26%	75%	-26%	-51%	-73%	-52%	-52%
Oct-20	-96%	-63%	-49%	-2%	-41%	80%	-27%	-45%	-69%	0%	-49%
Nov-20	-94%	-63%	-46%	2%	-41%	24%	-22%	-43%	-58%	-83%	-47%
Dec-20	-92%	-59%	-43%	8%	-41%	-2%	-13%	-39%	-48%	-93%	-42%
Vs 2019											
Jan '21 vs '19	-92%	-64%	-34%	95%	-12%	321%	-21%	-54%	-73%	167%	-41%
Feb '21 vs '19	-96%	-66%	-36%	74%	-17%	271%	-21%	-57%	-71%	-39%	-44%
Mar '21 vs '19	-94%	-60%	-35%	85%	-14%	293%	-16%	-46%	-73%	-7%	-38%
Apr '21 vs '19	-91%	-56%	-37%	76%	-11%	240%	-15%	-42%	-77%	42%	-36%
May '21 vs '19	-88%	-57%	-44%	33%	-5%	322%	-21%	-41%	-78%	119%	-42%
Jun '21 vs '19	-89%	-55%	-40%	28%	10%	276%	-17%	-43%	-75%	-40%	-40%
Jul '21 vs '19	-85%	-48%	-40%	44%	29%	471%	-19%	-41%	-77%	-71%	-34%
Aug '21 vs '19	-84%	-49%	-38%	42%	40%	368%	-19%	-49%	-73%	-71%	-33%
Sep '21 vs '19	-83%	-48%	-34%	52%	38%	354%	-11%	-42%	-65%	-87%	-29%
Oct '21 vs '19	-77%	-46%	-31%	52%	37%	337%	-18%	-39%	-59%	-77%	-26%
Nov '21 vs '19	-65%	-45%	-25%	51%	48%	217%	-11%	-44%	-58%	-31%	-23%
Dec '21 vs '19	-63%	-41%	-22%	61%	46%	140%	-12%	-36%	-55%	-63%	-19%
Jan '22 vs '19	-61%	-43%	-13%	171%	136%	824%	-15%	-46%	-77%	-29%	-16%
Feb '22 vs '19	-59%	-45%	-16%	157%	120%	836%	-12%	-48%	-76%	-83%	-17%
Mar '22 vs '19	-56%	-41%	-11%	156%	119%	865%	-11%	-47%	-76%	-78%	-14%
Apr '22 vs '19	-51%	-33%	-9%	147%	125%	839%	-22%	-49%	-77%	-56%	-9%
May '22 vs '19	-48%	-30%	-7%	140%	114%	849%	-24%	-50%	-77%	-37%	-7%
Jun '22 vs '19	-54%	-31%	-7%	128%	110%	632%	-18%	-47%	-77%	-79%	-8%
Jul '22 vs '19	-51%	-31%	-6%	120%	104%	770%	-15%	-47%	-80%	-78%	-8%
Aug '22 vs '19	-52%	-31%	-6%	114%	101%	531%	-16%	-45%	-75%	-90%	-7%
Sep '22 vs '19	-48%	-32%	-7%	97%	91%	550%	-13%	-45%	-67%	-65%	-8%
Oct '22 vs '19	-43%	-30%	-9%	87%	88%	515%	-26%	-45%	-64%	-62%	-8%
Nov '22 vs '19	-36%	-28%	-8%	78%	102%	309%	-11%	-43%	-63%	-86%	-6%
Dec '22 vs '19	-38%	-28%	-7%	81%	90%	232%	-14%	-38%	-60%	-96%	-5%
Jan '23 vs '19	-31%	-26%	9%	261%	218%	1340%	-10%	-37%	-80%	-95%	9%
Feb '23 vs '19	-28%	-27%	5%	238%	226%	1411%	-10%	-34%	-76%	-100%	6%
Mar '23 vs '19	-30%	-27%	7%	217%	204%	1477%	-11%	-31%	-78%	-100%	6%
Apr '23 vs '19	-24%	-26%	5%	193%	192%	1182%	-23%	-27%	-80%	-100%	5%
May '23 vs '19	-18%	-26%	7%	170%	179%	1227%	-23%	-27%	-79%	-96%	5%
Jun '23 vs '19	-24%	-28%	5%	152%	175%	1031%	-19%	-29%	-77%	-100%	2%
Jul '23 vs '19	-24%	-27%	4%	149%	157%	1237%	-23%	-28%	-79%	-99%	2%
Aug '23 vs '19	-23%	-26%	4%	149%	159%	922%	-22%	-28%	-77%	-100%	4%
Sep '23 vs '19	-20%	-26%	3%	130%	144%	925%	-16%	-29%	-69%	-94%	4%
Oct '23 vs '19	-19%	-25%	-1%	111%	143%	892%	-22%	-27%	-69%	-51%	2%
Nov '23 vs '19	-17%	-25%	-1%	98%	140%	563%	-14%	-29%	-70%	17%	2%
Dec '23 vs '19	-25%	-25%	-4%	91%	137%	421%	-17%	-27%	-63%	15%	0%

Source: BofA Global Research, Flightradar24

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Exhibit 152: GE engine monthly average flight cycles yoy growth

Genx-1B exhibited was the most resilient cycle in Dec-23

	CF34	CF6	GE90	Genx-1B	GEEnx-2B	Total GE
Jan-20	12%	9%	2%	20%	24%	10%
Feb-20	7%	6%	-6%	-4%	-2%	3%
Mar-20	-21%	-13%	-30%	-29%	-3%	-21%
Apr-20	-78%	-36%	-61%	-74%	-12%	-64%
May-20	-79%	-36%	-51%	-64%	-12%	-62%
Jun-20	-73%	-34%	-53%	-59%	-9%	-59%
Jul-20	-56%	-36%	-51%	-49%	-12%	-49%
Aug-20	-51%	-34%	-48%	-42%	-13%	-45%
Sep-20	-49%	-29%	-42%	-37%	-12%	-42%
Oct-20	-45%	-27%	-38%	-31%	-8%	-38%
Nov-20	-43%	-24%	-34%	-21%	-8%	-35%
Dec-20	-39%	-20%	-31%	-19%	-4%	-31%
Vs 2019						
Jan '21 vs '19	-31%	-22%	-36%	-14%	20%	-28%
Feb '21 vs '19	-40%	-24%	-36%	-19%	0%	-33%
Mar '21 vs '19	-34%	-19%	-34%	-5%	-4%	-28%
Apr '21 vs '19	-31%	-17%	-34%	-5%	-5%	-26%
May '21 vs '19	-31%	-23%	-33%	-12%	-3%	-27%
Jun '21 vs '19	-25%	-21%	-33%	-15%	-5%	-25%
Jul '21 vs '19	-19%	-20%	-30%	-10%	-3%	-20%
Aug '21 vs '19	-19%	-19%	-32%	-21%	-4%	-21%
Sep '21 vs '19	-17%	-15%	-28%	-17%	-1%	-18%
Oct '21 vs '19	-19%	-16%	-24%	-10%	3%	-18%
Nov '21 vs '19	-16%	-12%	-22%	-11%	0%	-16%
Dec '21 vs '19	-18%	-8%	-20%	-9%	4%	-15%
Jan '22 vs '19	-16%	-11%	-24%	1%	21%	-14%
Feb '22 vs '19	-18%	-10%	-24%	3%	5%	-15%
Mar '22 vs '19	-17%	-7%	-20%	5%	-8%	-13%
Apr '22 vs '19	-15%	-7%	-22%	-2%	-11%	-13%
May '22 vs '19	-13%	-12%	-18%	0%	-11%	-13%
Jun '22 vs '19	-16%	-10%	-18%	-1%	-6%	-13%
Jul '22 vs '19	-17%	-13%	-17%	0%	-11%	-14%
Aug '22 vs '19	-17%	-11%	-18%	-1%	-9%	-15%
Sep '22 vs '19	-15%	-9%	-17%	-5%	-10%	-13%
Oct '22 vs '19	-18%	-13%	-17%	-6%	-7%	-15%
Nov '22 vs '19	-17%	-10%	-16%	-6%	-11%	-14%
Dec '22 vs '19	-20%	-14%	-15%	-2%	-10%	-16%
Jan '23 vs '19	-4%	-11%	-13%	27%	12%	-5%
Feb '23 vs '19	-2%	-8%	-11%	29%	4%	-2%
Mar '23 vs '19	-4%	-7%	-9%	33%	0%	-2%
Apr '23 vs '19	-5%	-9%	-6%	26%	-5%	-4%
May '23 vs '19	-5%	-13%	-4%	26%	-5%	-4%
Jun '23 vs '19	-9%	-11%	-2%	31%	-1%	-5%
Jul '23 vs '19	-9%	-16%	-2%	29%	-4%	-6%
Aug '23 vs '19	-6%	-13%	-4%	27%	-5%	-5%
Sep '23 vs '19	-4%	-12%	-4%	23%	-4%	-3%
Oct '23 vs '19	-6%	-15%	-2%	25%	-2%	-4%
Nov '23 vs '19	-4%	-12%	-2%	22%	-5%	-3%
Dec '23 vs '19	-7%	-16%	-2%	19%	-3%	-6%

Source: BofA Global Research, Flightradar24

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Exhibit 153: Rolls-Royce engine monthly average flight cycles yoy growth

Rolls-Royce's newest commercial platforms (Trent 1000, Trent 7000 and Trent XWB) have outperformed the broader portfolio in Dec-23

	RB211	Trent 500	Trent 700	Trent 800	Trent 900	Trent 1000	Trent 7000	Trent XWB	Total Rolls-Royce commercial
Jan-20	37%	-20%	5%	15%	2%	25%	2622%	48%	19%
Feb-20	50%	-35%	-34%	0%	-14%	9%	1043%	20%	-8%
Mar-20	5%	-64%	-58%	-44%	-51%	-24%	423%	-23%	-39%
Apr-20	-60%	-87%	-83%	-89%	-97%	-72%	-14%	-68%	-77%
May-20	-61%	-75%	-76%	-86%	-97%	-64%	-33%	-56%	-71%
Jun-20	-62%	-86%	-77%	-88%	-98%	-65%	-48%	-52%	-71%
Jul-20	-56%	-85%	-68%	-89%	-97%	-61%	-55%	-42%	-64%
Aug-20	-52%	-88%	-61%	-90%	-97%	-59%	-53%	-40%	-60%
Sep-20	-53%	-90%	-57%	-85%	-96%	-58%	-47%	-37%	-57%
Oct-20	-46%	-89%	-50%	-85%	-96%	-52%	-34%	-32%	-51%
Nov-20	-41%	-79%	-52%	-82%	-97%	-42%	-33%	-26%	-48%
Dec-20	-36%	-82%	-54%	-75%	-97%	-34%	-31%	-25%	-47%
Vs 2019									
Jan '21 vs '19	-28%	-89%	-55%	-75%	-98%	-30%	1581%	-6%	-44%
Feb '21 vs '19	-33%	-86%	-64%	-72%	-98%	-36%	621%	-14%	-51%
Mar '21 vs '19	-32%	-86%	-51%	-67%	-98%	-33%	312%	-7%	-42%
Apr '21 vs '19	-34%	-82%	-46%	-68%	-97%	-31%	308%	-2%	-38%
May '21 vs '19	-42%	-79%	-47%	-65%	-97%	-35%	203%	-7%	-41%
Jun '21 vs '19	-40%	-84%	-51%	-61%	-98%	-34%	129%	-11%	-43%
Jul '21 vs '19	-37%	-83%	-47%	-60%	-96%	-28%	113%	-7%	-38%
Aug '21 vs '19	-35%	-81%	-62%	-64%	-97%	-27%	76%	-14%	-46%
Sep '21 vs '19	-28%	-76%	-51%	-68%	-98%	-26%	50%	-7%	-39%
Oct '21 vs '19	-21%	-70%	-46%	-63%	-98%	-22%	37%	-5%	-35%
Nov '21 vs '19	-13%	-67%	-56%	-56%	-93%	-17%	29%	-5%	-37%
Dec '21 vs '19	-10%	-72%	-53%	-54%	-88%	-13%	27%	-3%	-34%
Jan '22 vs '19	0%	-82%	-53%	-60%	-87%	3%	3259%	28%	-28%
Feb '22 vs '19	-12%	-82%	-54%	-62%	-87%	-6%	1297%	12%	-34%
Mar '22 vs '19	-15%	-81%	-57%	-65%	-83%	0%	948%	15%	-32%
Apr '22 vs '19	-18%	-77%	-61%	-72%	-79%	-3%	796%	18%	-35%
May '22 vs '19	-27%	-75%	-60%	-68%	-76%	-1%	541%	19%	-34%
Jun '22 vs '19	-29%	-78%	-56%	-67%	-72%	-1%	408%	19%	-32%
Jul '22 vs '19	-25%	-73%	-51%	-65%	-68%	3%	284%	18%	-29%
Aug '22 vs '19	-26%	-74%	-51%	-66%	-67%	1%	181%	21%	-29%
Sep '22 vs '19	-23%	-77%	-53%	-66%	-66%	-1%	143%	19%	-29%
Oct '22 vs '19	-24%	-72%	-55%	-66%	-65%	-3%	106%	18%	-31%
Nov '22 vs '19	-22%	-66%	-56%	-64%	-63%	4%	86%	17%	-29%
Dec '22 vs '19	-22%	-73%	-54%	-59%	-62%	5%	84%	17%	-28%
Jan '23 vs '19	-18%	-80%	-38%	-58%	-60%	32%	5327%	77%	-8%
Feb '23 vs '19	-1%	-84%	-35%	-56%	-59%	30%	2419%	72%	-6%
Mar '23 vs '19	-14%	-81%	-31%	-56%	-57%	31%	1491%	74%	-4%
Apr '23 vs '19	-25%	-71%	-28%	-59%	-57%	24%	1184%	78%	-3%
May '23 vs '19	-29%	-65%	-31%	-57%	-54%	23%	799%	77%	-5%
Jun '23 vs '19	-27%	-64%	-30%	-49%	-49%	24%	616%	78%	-4%
Jul '23 vs '19	-31%	-66%	-27%	-48%	-54%	22%	486%	77%	-3%
Aug '23 vs '19	-28%	-70%	-25%	-49%	-52%	18%	344%	79%	-2%
Sep '23 vs '19	-27%	-70%	-28%	-55%	-51%	18%	283%	76%	-4%
Oct '23 vs '19	-25%	-59%	-28%	-54%	-48%	23%	214%	76%	-2%
Nov '23 vs '19	-21%	-55%	-33%	-48%	-44%	23%	178%	71%	-4%
Dec '23 vs '19	-21%	-61%	-32%	-47%	-46%	20%	165%	69%	-3%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 154: Airbus aircraft monthly average flight cycles yoy growth

Airbus' newest platforms (A320neo, A350, A220) have outperformed legacy platforms (A320ceo, A330, A340, A380) in Dec-23

YoY %	A320neo	A320ceo	A330	A340	Airbus	A350	A380	A300	A220	Airbus total
Jan-20	87%	0%	-1%	-21%	48%	4%	-5%	67%	8%	
Feb-20	56%	-14%	-30%	-33%	20%	-6%	-6%	62%	-9%	
Mar-20	10%	-42%	-57%	-62%	-23%	-44%	-13%	-6%	-38%	
Apr-20	-74%	-87%	-83%	-87%	-68%	-99%	-4%	-71%	-85%	
May-20	-68%	-86%	-77%	-80%	-56%	-99%	-9%	-68%	-82%	
Jun-20	-49%	-79%	-77%	-87%	-52%	-99%	0%	-44%	-75%	
Jul-20	-25%	-60%	-71%	-86%	-42%	-98%	-4%	-19%	-57%	
Aug-20	-12%	-55%	-65%	-84%	-40%	-96%	-11%	-18%	-51%	
Sep-20	-7%	-57%	-62%	-83%	-37%	-96%	0%	-26%	-51%	
Oct-20	-6%	-57%	-55%	-81%	-32%	-96%	-5%	-41%	-51%	
Nov-20	-6%	-56%	-53%	-74%	-26%	-95%	-3%	-41%	-49%	
Dec-20	-1%	-52%	-52%	-71%	-25%	-94%	5%	-41%	-45%	
Vs 2019										
Jan '21 vs '19	63%	-56%	-59%	-79%	-6%	-94%	-4%	-12%	-46%	
Feb '21 vs '19	44%	-61%	-65%	-79%	-14%	-97%	-6%	-17%	-52%	
Mar '21 vs '19	60%	-52%	-53%	-80%	-7%	-95%	1%	-14%	-42%	
Apr '21 vs '19	56%	-50%	-49%	-75%	-2%	-93%	-2%	-11%	-40%	
May '21 vs '19	29%	-52%	-50%	-75%	-7%	-92%	-10%	-5%	-44%	
Jun '21 vs '19	29%	-50%	-53%	-71%	-11%	-92%	-6%	10%	-42%	
Jul '21 vs '19	45%	-42%	-47%	-66%	-7%	-89%	-11%	29%	-33%	
Aug '21 vs '19	44%	-45%	-57%	-67%	-14%	-89%	-12%	40%	-36%	
Sep '21 vs '19	53%	-41%	-48%	-67%	-7%	-88%	0%	38%	-31%	
Oct '21 vs '19	53%	-39%	-42%	-57%	-5%	-84%	-10%	37%	-28%	
Nov '21 vs '19	49%	-42%	-47%	-51%	-5%	-74%	-1%	48%	-30%	
Dec '21 vs '19	51%	-38%	-43%	-49%	-3%	-71%	9%	46%	-26%	
Jan '22 vs '19	149%	-41%	-47%	-64%	28%	-70%	-11%	136%	-25%	
Feb '22 vs '19	140%	-41%	-49%	-70%	12%	-69%	-9%	120%	-25%	
Mar '22 vs '19	129%	-42%	-48%	-65%	15%	-65%	-3%	119%	-26%	
Apr '22 vs '19	118%	-39%	-50%	-60%	18%	-62%	-6%	125%	-24%	
May '22 vs '19	120%	-34%	-49%	-61%	19%	-59%	-12%	114%	-19%	
Jun '22 vs '19	115%	-32%	-45%	-61%	19%	-61%	-1%	110%	-17%	
Jul '22 vs '19	113%	-28%	-42%	-58%	18%	-58%	-12%	104%	-14%	
Aug '22 vs '19	114%	-27%	-42%	-60%	21%	-58%	-10%	101%	-13%	
Sep '22 vs '19	100%	-31%	-42%	-61%	19%	-55%	-3%	91%	-16%	
Oct '22 vs '19	93%	-31%	-42%	-59%	18%	-51%	-20%	88%	-17%	
Nov '22 vs '19	85%	-32%	-43%	-54%	17%	-46%	-6%	102%	-17%	
Dec '22 vs '19	87%	-29%	-41%	-54%	17%	-45%	-10%	90%	-14%	
Jan '23 vs '19	252%	-24%	-31%	-64%	77%	-42%	-24%	218%	-1%	
Feb '23 vs '19	234%	-24%	-29%	-66%	72%	-39%	-22%	226%	-1%	
Mar '23 vs '19	218%	-23%	-26%	-63%	74%	-40%	-20%	204%	-1%	
Apr '23 vs '19	203%	-21%	-22%	-55%	78%	-37%	-26%	192%	1%	
May '23 vs '19	188%	-20%	-24%	-53%	77%	-33%	-26%	179%	1%	
Jun '23 vs '19	177%	-20%	-23%	-48%	78%	-34%	-21%	175%	1%	
Jul '23 vs '19	178%	-18%	-19%	-46%	77%	-35%	-30%	157%	4%	
Aug '23 vs '19	186%	-15%	-19%	-52%	79%	-35%	-27%	159%	7%	
Sep '23 vs '19	172%	-17%	-20%	-47%	76%	-32%	-24%	144%	5%	
Oct '23 vs '19	157%	-17%	-19%	-33%	76%	-30%	-32%	143%	5%	
Nov '23 vs '19	144%	-19%	-21%	-32%	71%	-27%	-20%	140%	3%	
Dec '23 vs '19	135%	-19%	-20%	-33%	69%	-32%	-26%	137%	3%	

Source: BofA Global Research, Flightradar24

Exhibit 155: Boeing aircraft monthly average flight cycles yoy growth

787 exhibited the strongest performance in Dec-23

YoY %	737 Org/Classic	737NG	747	757	767	777	787	717	Boeing Total
Jan-20	3%	3%	-5%	3%	6%	0%	22%	8%	0%
Feb-20	4%	-12%	-9%	4%	4%	-9%	0%	7%	-12%
Mar-20	-18%	-35%	-12%	-17%	-12%	-35%	-27%	-20%	-32%
Apr-20	-60%	-79%	-21%	-60%	-41%	-67%	-73%	-79%	-73%
May-20	-60%	-79%	-20%	-64%	-42%	-58%	-64%	-82%	-73%
Jun-20	-55%	-72%	-23%	-60%	-40%	-60%	-61%	-72%	-67%
Jul-20	-54%	-52%	-27%	-53%	-41%	-57%	-52%	-54%	-51%
Aug-20	-51%	-43%	-23%	-46%	-37%	-54%	-47%	-56%	-44%
Sep-20	-40%	-46%	-18%	-41%	-33%	-50%	-44%	-60%	-45%
Oct-20	-33%	-47%	-15%	-38%	-31%	-46%	-38%	-62%	-45%
Nov-20	-20%	-43%	-14%	-33%	-26%	-42%	-28%	-58%	-40%
Dec-20	-14%	-41%	-12%	-24%	-22%	-38%	-23%	-55%	-37%
Vs 2019									
Jan '21 vs '19	-19%	-47%	-11%	-31%	-26%	-44%	-19%	-53%	-44%
Feb '21 vs '19	-15%	-53%	-9%	-31%	-29%	-45%	-24%	-54%	-48%
Mar '21 vs '19	-13%	-40%	-15%	-27%	-23%	-43%	-14%	-52%	-37%
Apr '21 vs '19	-25%	-38%	-14%	-27%	-19%	-43%	-13%	-53%	-35%
May '21 vs '19	-31%	-40%	-14%	-34%	-23%	-42%	-19%	-54%	-36%
Jun '21 vs '19	-31%	-35%	-16%	-31%	-19%	-42%	-22%	-47%	-32%
Jul '21 vs '19	-36%	-29%	-16%	-31%	-18%	-39%	-16%	-48%	-27%
Aug '21 vs '19	-33%	-35%	-16%	-29%	-16%	-41%	-23%	-50%	-30%
Sep '21 vs '19	-23%	-28%	-12%	-23%	-13%	-38%	-19%	-46%	-24%
Oct '21 vs '19	-17%	-27%	-8%	-24%	-14%	-34%	-13%	-46%	-22%
Nov '21 vs '19	-4%	-31%	-12%	-15%	-8%	-32%	-13%	-40%	-24%
Dec '21 vs '19	-6%	-29%	-9%	-14%	-4%	-29%	-10%	-40%	-21%
Jan '22 vs '19	-9%	-30%	-13%	-17%	-7%	-35%	2%	-36%	-25%
Feb '22 vs '19	-5%	-29%	-10%	-17%	-10%	-34%	1%	-39%	-24%
Mar '22 vs '19	-6%	-33%	-19%	-16%	-6%	-32%	4%	-33%	-24%
Apr '22 vs '19	-20%	-33%	-21%	-25%	-7%	-34%	-1%	-34%	-24%
May '22 vs '19	-23%	-29%	-23%	-29%	-11%	-30%	1%	-32%	-21%
Jun '22 vs '19	-26%	-26%	-23%	-26%	-8%	-29%	0%	-33%	-18%
Jul '22 vs '19	-31%	-23%	-26%	-22%	-12%	-28%	2%	-32%	-16%
Aug '22 vs '19	-30%	-23%	-25%	-21%	-9%	-28%	1%	-32%	-15%
Sep '22 vs '19	-26%	-26%	-25%	-18%	-7%	-26%	-2%	-30%	-16%
Oct '22 vs '19	-23%	-28%	-21%	-26%	-11%	-26%	-3%	-26%	-17%
Nov '22 vs '19	-13%	-29%	-23%	-13%	-5%	-25%	-1%	-20%	-17%
Dec '22 vs '19	-14%	-28%	-25%	-16%	-7%	-22%	2%	-27%	-16%
Jan '23 vs '19	-16%	-18%	-32%	-14%	-5%	-22%	30%	-19%	-9%
Feb '23 vs '19	-13%	-17%	-18%	-10%	-3%	-20%	31%	-23%	-7%
Mar '23 vs '19	-17%	-17%	-20%	-14%	-2%	-19%	34%	-23%	-5%
Apr '23 vs '19	-30%	-16%	-21%	-25%	-5%	-16%	27%	-27%	-4%
May '23 vs '19	-31%	-16%	-25%	-27%	-7%	-14%	27%	-29%	-3%
Jun '23 vs '19	-33%	-17%	-22%	-24%	-4%	-11%	31%	-29%	-3%
Jul '23 vs '19	-38%	-14%	-24%	-28%	-11%	-10%	30%	-30%	-1%
Aug '23 vs '19	-35%	-11%	-27%	-25%	-6%	-12%	27%	-32%	2%
Sep '23 vs '19	-30%	-12%	-24%	-21%	-5%	-12%	25%	-24%	2%
Oct '23 vs '19	-29%	-12%	-21%	-24%	-8%	-10%	28%	-21%	2%
Nov '23 vs '19	-28%	-15%	-19%	-15%	-1%	-10%	25%	-18%	1%
Dec '23 vs '19	-30%	-15%	-21%	-19%	-5%	-10%	22%	-24%	1%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 156: Other aircraft monthly average flight cycles yoy growth

Airbus A220 exhibited the strongest performance in Dec-23

YoY%	ATR family	Embraer 135/145	Embraer E-Jet Family	Airbus A220	MD-11	MD-80	MD-90
Jan-20	19%	6%	12%	67%	-7%	-51%	-35%
Feb-20	17%	11%	4%	62%	-10%	-52%	-34%
Mar-20	-15%	-13%	-30%	-6%	-12%	-63%	-54%
Apr-20	-80%	-74%	-85%	-71%	-1%	-86%	-92%
May-20	-79%	-77%	-87%	-68%	-4%	-83%	-96%
Jun-20	-66%	-72%	-83%	-44%	-5%	-93%	-100%
Jul-20	-51%	-61%	-70%	-19%	0%	-91%	-100%
Aug-20	-47%	-63%	-63%	-18%	-2%	-88%	-100%
Sep-20	-49%	-65%	-62%	-26%	7%	-84%	-100%
Oct-20	-49%	-70%	-60%	-41%	-1%	-83%	-100%
Nov-20	-46%	-64%	-59%	-41%	-1%	-71%	-100%
Dec-20	-42%	-59%	-53%	-41%	5%	-66%	-100%
Vs 2019							
Jan '21 vs '19	-33%	-53%	-47%	-12%	-9%	-83%	-100%
Feb '21 vs '19	-36%	-55%	-58%	-17%	-12%	-82%	-100%
Mar '21 vs '19	-34%	-50%	-53%	-14%	-4%	-85%	-100%
Apr '21 vs '19	-36%	-45%	-50%	-11%	0%	-87%	-100%
May '21 vs '19	-41%	-47%	-50%	-5%	-6%	-89%	-100%
Jun '21 vs '19	-38%	-40%	-43%	10%	-2%	-86%	-100%
Jul '21 vs '19	-34%	-39%	-36%	29%	0%	-85%	-100%
Aug '21 vs '19	-34%	-42%	-36%	40%	-5%	-82%	-100%
Sep '21 vs '19	-33%	-46%	-34%	38%	2%	-77%	-100%
Oct '21 vs '19	-30%	-45%	-34%	37%	-6%	-73%	-100%
Nov '21 vs '19	-24%	-42%	-32%	48%	-2%	-71%	-100%
Dec '21 vs '19	-22%	-43%	-33%	46%	2%	-68%	-100%
Jan '22 vs '19	-12%	-42%	-31%	136%	-17%	-85%	-100%
Feb '22 vs '19	-15%	-40%	-32%	120%	-13%	-85%	-100%
Mar '22 vs '19	-11%	-42%	-29%	119%	-6%	-85%	-100%
Apr '22 vs '19	-7%	-40%	-27%	125%	-8%	-85%	-100%
May '22 vs '19	-5%	-43%	-23%	114%	-12%	-85%	-100%
Jun '22 vs '19	-4%	-44%	-26%	110%	-6%	-85%	-100%
Jul '22 vs '19	3%	-44%	-25%	104%	-8%	-86%	-100%
Aug '22 vs '19	-1%	-46%	-27%	101%	-6%	-83%	-100%
Sep '22 vs '19	-4%	-50%	-27%	91%	-3%	-77%	-100%
Oct '22 vs '19	-8%	-52%	-27%	88%	-15%	-75%	-100%
Nov '22 vs '19	-8%	-53%	-28%	102%	-6%	-73%	-100%
Dec '22 vs '19	-7%	-55%	-29%	90%	-14%	-71%	-100%
Jan '23 vs '19	10%	-49%	-16%	218%	-23%	-86%	-99%
Feb '23 vs '19	7%	-46%	-16%	226%	-22%	-83%	-99%
Mar '23 vs '19	9%	-47%	-16%	204%	-17%	-85%	-100%
Apr '23 vs '19	7%	-48%	-17%	192%	-24%	-85%	-100%
May '23 vs '19	11%	-49%	-16%	179%	-30%	-86%	-100%
Jun '23 vs '19	10%	-51%	-20%	175%	-29%	-85%	-100%
Jul '23 vs '19	17%	-51%	-19%	157%	-32%	-84%	-100%
Aug '23 vs '19	10%	-53%	-19%	159%	-25%	-83%	-100%
Sep '23 vs '19	6%	-54%	-19%	144%	-26%	-77%	-100%
Oct '23 vs '19	0%	-55%	-21%	143%	-31%	-77%	-100%
Nov '23 vs '19	-1%	-54%	-21%	140%	-26%	-76%	-100%
Dec '23 vs '19	-4%	-54%	-21%	137%	-32%	-70%	-100%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 157: Regional flight cycles yoy growth

Africa reported the strongest performance in Dec-23

	Africa	Asia-Pacific	Europe	Latin America	Middle East	North America	Global
Jan-20	21%	6%	2%	8%	3%	10%	8%
Feb-20	19%	-22%	-2%	9%	2%	14%	-5%
Mar-20	-26%	-40%	-39%	-23%	-47%	-13%	-32%
Apr-20	-90%	-73%	-90%	-90%	-88%	-65%	-80%
May-20	-87%	-69%	-87%	-87%	-84%	-63%	-79%
Jun-20	-83%	-62%	-80%	-83%	-78%	-53%	-72%
Jul-20	-71%	-49%	-61%	-79%	-73%	-40%	-56%
Aug-20	-63%	-44%	-49%	-74%	-69%	-36%	-49%
Sep-20	-59%	-41%	-51%	-66%	-62%	-36%	-49%
Oct-20	-55%	-40%	-55%	-56%	-58%	-34%	-49%
Nov-20	-51%	-36%	-61%	-47%	-52%	-30%	-46%
Dec-20	-42%	-32%	-61%	-39%	-51%	-30%	-43%
Vs 2019							
Jan '21 vs '19	-34%	-39%	-62%	-31%	-48%	-26%	-44%
Feb '21 vs '19	-38%	-44%	-66%	-37%	-48%	-27%	-49%
Mar '21 vs '19	-36%	-27%	-63%	-40%	-46%	-19%	-40%
Apr '21 vs '19	-38%	-24%	-62%	-45%	-44%	-17%	-38%
May '21 vs '19	-34%	-35%	-61%	-40%	-42%	-16%	-40%
Jun '21 vs '19	-27%	-40%	-48%	-32%	-43%	-10%	-37%
Jul '21 vs '19	-25%	-39%	-33%	-27%	-41%	-7%	-30%
Aug '21 vs '19	-22%	-49%	-27%	-24%	-39%	-8%	-33%
Sep '21 vs '19	-19%	-40%	-27%	-19%	-30%	-1%	-28%
Oct '21 vs '19	-18%	-36%	-24%	-17%	-25%	-5%	-26%
Nov '21 vs '19	-15%	-41%	-22%	-11%	-19%	-1%	-28%
Dec '21 vs '19	-21%	-35%	-21%	-9%	-18%	-5%	-25%
Jan '22 vs '19	-8%	-34%	-28%	-7%	-21%	0%	-24%
Feb '22 vs '19	-3%	-36%	-28%	-9%	-18%	5%	-25%
Mar '22 vs '19	-11%	-39%	-22%	-1%	-13%	2%	-26%
Apr '22 vs '19	-13%	-39%	-17%	5%	-12%	2%	-24%
May '22 vs '19	-8%	-35%	-13%	11%	-5%	1%	-21%
Jun '22 vs '19	-13%	-30%	-13%	8%	-13%	3%	-20%
Jul '22 vs '19	-15%	-27%	-12%	5%	-10%	2%	-18%
Aug '22 vs '19	-15%	-25%	-11%	7%	-11%	3%	-17%
Sep '22 vs '19	-16%	-30%	-12%	6%	-5%	7%	-19%
Oct '22 vs '19	-12%	-31%	-11%	7%	-4%	4%	-20%
Nov '22 vs '19	-5%	-30%	-13%	5%	2%	2%	-20%
Dec '22 vs '19	-3%	-26%	-13%	4%	2%	-4%	-20%
Jan '23 vs '19	16%	-12%	-12%	13%	4%	9%	-8%
Feb '23 vs '19	19%	-10%	-12%	11%	7%	14%	-8%
Mar '23 vs '19	10%	-8%	-11%	17%	9%	8%	-8%
Apr '23 vs '19	4%	-5%	-9%	17%	9%	7%	-7%
May '23 vs '19	10%	-5%	-7%	23%	14%	8%	-7%
Jun '23 vs '19	6%	-5%	-6%	22%	10%	6%	-8%
Jul '23 vs '19	5%	-2%	-5%	16%	9%	7%	-6%
Aug '23 vs '19	4%	3%	-5%	19%	6%	9%	-3%
Sep '23 vs '19	4%	0%	-5%	16%	13%	11%	-4%
Oct '23 vs '19	7%	-1%	-4%	13%	10%	10%	-4%
Nov '23 vs '19	11%	-2%	-7%	13%	10%	10%	-5%
Dec '23 vs '19	12%	-2%	-6%	10%	8%	5%	-6%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 158: CFM monthly engine hours growth vs 2019

CFM LEAP 1-B exhibited the strongest performance in Dec-23

	CF6	CFM LEAP 1-B	CFM/V2500	CFM56-5B	CFM56-5C	CFM56-7B	CFMLEAP 1-A
Jan-20	6%	-100%	845%	6%	-22%	7%	92%
Feb-20	4%	-100%	386%	-6%	-28%	-2%	70%
Mar-20	-16%	-100%	70%	-34%	-54%	-27%	18%
Apr-20	-50%	-89%	-99%	-88%	-88%	-83%	-82%
May-20	-48%	-77%	-99%	-90%	-88%	-86%	-80%
Jun-20	-45%	-76%	-98%	-84%	-88%	-80%	-68%
Jul-20	-48%	-60%	-53%	-58%	-89%	-55%	-38%
Aug-20	-45%	-26%	-26%	-49%	-84%	-45%	-17%
Sep-20	-42%	-57%	-37%	-50%	-83%	-47%	-15%
Oct-20	-38%	-77%	-81%	-59%	-82%	-54%	-27%
Nov-20	-33%	-71%	-100%	-55%	-74%	-48%	-30%
Dec-20	-33%	616%	-100%	-46%	-67%	-40%	-22%
Jan-21	-32%	-93%	-100%	-44%	-75%	-40%	28%
Feb-21	-34%	-88%	-100%	-53%	-76%	-50%	6%
Mar-21	-31%	-54%	-100%	-41%	-79%	-39%	23%
Apr-21	-29%	10597%	-100%	-39%	-72%	-36%	25%
May-21	-31%	12146%	-100%	-41%	-73%	-36%	13%
Jun-21	-32%	21191%	-100%	-39%	-70%	-31%	15%
Jul-21	-29%	37926%	-100%	-30%	-63%	-25%	29%
Aug-21	-26%	54922%	-100%	-35%	-63%	-28%	34%
Sep-21	-23%	32373%	-100%	-29%	-63%	-22%	40%
Oct-21	-21%	28301%	-100%	-29%	-54%	-21%	36%
Nov-21	-18%	37863%	-100%	-39%	-43%	-29%	23%
Dec-21	-17%	62966%	-100%	-39%	-37%	-29%	17%
Jan-22	-16%	48%	-100%	-40%	-49%	-29%	94%
Feb-22	-15%	46%	-100%	-41%	-55%	-28%	92%
Mar-22	-17%	217%	-100%	-41%	-53%	-30%	85%
Apr-22	-14%	65284%	-100%	-38%	-48%	-29%	85%
May-22	-17%	67474%	-100%	-33%	-52%	-25%	86%
Jun-22	-17%	70224%	-100%	-31%	-49%	-24%	81%
Jul-22	-19%	105831%	-100%	-26%	-49%	-22%	73%
Aug-22	-18%	131429%	-100%	-26%	-51%	-22%	81%
Sep-22	-17%	75035%	-100%	-29%	-51%	-23%	75%
Oct-22	-15%	62423%	-100%	-31%	-52%	-25%	68%
Nov-22	-15%	77322%	-100%	-33%	-48%	-26%	62%
Dec-22	-16%	118775%	-100%	-34%	-45%	-27%	51%
Jan-23	-15%	210%	-100%	-25%	-53%	-17%	178%
Feb-23	-14%	195%	-100%	-25%	-55%	-16%	173%
Mar-23	-14%	503%	-100%	-26%	-57%	-18%	160%
Apr-23	-13%	117070%	-100%	-24%	-56%	-18%	148%
May-23	-17%	116047%	-100%	-25%	-55%	-20%	134%
Jun-23	-17%	121622%	-100%	-24%	-53%	-20%	125%
Jul-23	-18%	179673%	-100%	-18%	-46%	-16%	123%
Aug-23	-16%	226064%	-100%	-9%	-48%	-8%	149%
Sep-23	-15%	126438%	-100%	-12%	-44%	-9%	139%
Oct-23	-15%	102826%	-100%	-16%	-40%	-12%	123%
Nov-23	-13%	124558%	-100%	-18%	-35%	-15%	113%
Dec-23	-14%	193321%	-100%	-19%	-32%	-16%	96%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 159: GE, P&W monthly engine hours growth vs 2019

PW1900G exhibited the strongest performance in Dec-23

	GE CF34	GE90	GENX	GENX-2B	GP7200	PW100	PW1100G	PW1500G	PW1900G	PW2000	PW4000
Jan-20	14%	1%	20%	19%	9%	20%	104%	82%	342%	6%	1%
Feb-20	13%	-6%	2%	-9%	0%	22%	79%	88%	357%	6%	-10%
Mar-20	-9%	-28%	-22%	-14%	-31%	-4%	27%	31%	244%	-11%	-41%
Apr-20	-75%	-66%	-78%	-20%	-99%	-80%	-74%	-69%	-38%	-66%	-72%
May-20	-78%	-58%	-68%	-25%	-100%	-81%	-74%	-68%	7%	-71%	-69%
Jun-20	-73%	-54%	-60%	-18%	-100%	-67%	-53%	-43%	10%	-69%	-67%
Jul-20	-55%	-53%	-53%	-17%	-99%	-52%	-23%	-14%	47%	-62%	-68%
Aug-20	-48%	-51%	-47%	-17%	-97%	-45%	-10%	-16%	41%	-51%	-64%
Sep-20	-45%	-47%	-44%	-17%	-97%	-45%	0%	-19%	51%	-45%	-62%
Oct-20	-45%	-42%	-40%	-20%	-97%	-46%	-4%	-40%	66%	-40%	-59%
Nov-20	-41%	-38%	-33%	-18%	-96%	-43%	-1%	-42%	29%	-29%	-52%
Dec-20	-36%	-41%	-35%	-17%	-95%	-39%	8%	-39%	8%	-24%	-50%
Jan-21	-25%	-44%	-28%	5%	-94%	-26%	107%	8%	365%	-26%	-61%
Feb-21	-33%	-41%	-28%	-13%	-98%	-29%	83%	-5%	264%	-30%	-63%
Mar-21	-27%	-37%	-18%	-15%	-96%	-27%	88%	10%	306%	-29%	-54%
Apr-21	-22%	-34%	-16%	-13%	-95%	-29%	89%	7%	294%	-27%	-49%
May-21	-21%	-35%	-20%	-11%	-93%	-35%	56%	10%	317%	-30%	-47%
Jun-21	-16%	-36%	-20%	-12%	-93%	-32%	45%	41%	258%	-34%	-48%
Jul-21	-9%	-34%	-19%	-8%	-88%	-30%	54%	53%	368%	-33%	-43%
Aug-21	-9%	-33%	-20%	-7%	-87%	-28%	58%	63%	322%	-30%	-44%
Sep-21	-8%	-30%	-19%	-2%	-85%	-26%	69%	63%	306%	-26%	-40%
Oct-21	-11%	-27%	-15%	-1%	-81%	-21%	72%	61%	323%	-27%	-36%
Nov-21	-10%	-24%	-14%	-2%	-71%	-15%	64%	73%	205%	-20%	-39%
Dec-21	-13%	-24%	-14%	-2%	-70%	-13%	67%	77%	140%	-21%	-34%
Jan-22	-9%	-27%	0%	12%	-66%	-4%	196%	216%	719%	-21%	-43%
Feb-22	-11%	-26%	-3%	-3%	-66%	-6%	177%	200%	736%	-22%	-45%
Mar-22	-12%	-24%	0%	-14%	-61%	-2%	173%	199%	785%	-25%	-41%
Apr-22	-9%	-22%	3%	-11%	-56%	4%	168%	200%	902%	-29%	-40%
May-22	-10%	-21%	4%	-13%	-52%	9%	164%	179%	835%	-33%	-41%
Jun-22	-14%	-20%	4%	-6%	-55%	9%	149%	174%	559%	-38%	-40%
Jul-22	-14%	-17%	3%	-8%	-51%	9%	139%	153%	614%	-34%	-38%
Aug-22	-16%	-17%	2%	-4%	-53%	7%	136%	138%	474%	-37%	-38%
Sep-22	-13%	-17%	-1%	-4%	-50%	4%	123%	130%	472%	-32%	-39%
Oct-22	-17%	-16%	-1%	-3%	-46%	2%	117%	122%	481%	-34%	-38%
Nov-22	-19%	-15%	-2%	-6%	-39%	2%	104%	139%	315%	-28%	-37%
Dec-22	-22%	-15%	0%	-6%	-40%	2%	99%	134%	223%	-26%	-33%
Jan-23	-7%	-14%	23%	17%	-33%	23%	303%	334%	1242%	-23%	-37%
Feb-23	-5%	-13%	21%	-1%	-32%	19%	284%	353%	1308%	-27%	-35%
Mar-23	-8%	-13%	21%	-1%	-35%	19%	247%	327%	1416%	-29%	-34%
Apr-23	-6%	-11%	20%	-3%	-27%	20%	223%	281%	1357%	-32%	-30%
May-23	-8%	-10%	19%	-5%	-21%	24%	197%	260%	1249%	-33%	-31%
Jun-23	-12%	-9%	22%	-3%	-29%	22%	176%	253%	989%	-34%	-29%
Jul-23	-11%	-7%	22%	-2%	-29%	21%	174%	217%	1072%	-34%	-28%
Aug-23	-10%	-3%	26%	3%	-28%	21%	190%	198%	922%	-34%	-25%
Sep-23	-7%	-2%	24%	6%	-24%	18%	173%	187%	924%	-30%	-26%
Oct-23	-9%	-2%	24%	5%	-23%	14%	147%	181%	973%	-31%	-25%
Nov-23	-9%	-1%	20%	4%	-20%	10%	127%	197%	672%	-29%	-28%
Dec-23	-11%	-1%	20%	6%	-28%	7%	117%	193%	515%	-27%	-25%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 160: Trent monthly engine hours growth vs 2019

Trent 7000 has exhibited the best performance vs 2019 as of Dec-23

	RB211	TRENT 1000	TRENT 700	TRENT 7000	TRENT 800	TRENT 900	TRENT XWB	V2500
Jan-20	28%	16%	2%	2531%	15%	3%	45%	5%
Feb-20	39%	4%	-24%	1061%	-2%	-12%	29%	-1%
Mar-20	4%	-23%	-53%	506%	-36%	-40%	-11%	-28%
Apr-20	-72%	-77%	-86%	-6%	-89%	-96%	-71%	-89%
May-20	-72%	-71%	-80%	-30%	-88%	-99%	-62%	-92%
Jun-20	-73%	-67%	-79%	-27%	-88%	-98%	-58%	-85%
Jul-20	-70%	-69%	-75%	-46%	-88%	-97%	-50%	-66%
Aug-20	-65%	-66%	-70%	-50%	-89%	-97%	-44%	-64%
Sep-20	-66%	-63%	-68%	-47%	-84%	-96%	-42%	-67%
Oct-20	-63%	-59%	-65%	-45%	-82%	-97%	-39%	-67%
Nov-20	-58%	-50%	-61%	-43%	-81%	-97%	-32%	-66%
Dec-20	-55%	-47%	-62%	-45%	-79%	-97%	-37%	-60%
Jan-21	-50%	-47%	-62%	1307%	-75%	-98%	-16%	-62%
Feb-21	-49%	-47%	-67%	472%	-72%	-99%	-15%	-66%
Mar-21	-52%	-45%	-59%	290%	-65%	-98%	-8%	-61%
Apr-21	-54%	-41%	-55%	261%	-69%	-98%	-8%	-57%
May-21	-56%	-44%	-54%	199%	-67%	-97%	-13%	-55%
Jun-21	-57%	-44%	-58%	179%	-60%	-98%	-15%	-52%
Jul-21	-52%	-40%	-56%	131%	-59%	-98%	-12%	-46%
Aug-21	-47%	-37%	-63%	69%	-60%	-97%	-11%	-45%
Sep-21	-42%	-33%	-57%	41%	-61%	-98%	-5%	-43%
Oct-21	-38%	-31%	-52%	26%	-58%	-98%	-5%	-43%
Nov-21	-39%	-25%	-55%	28%	-57%	-97%	-2%	-43%
Dec-21	-38%	-23%	-54%	18%	-54%	-90%	-6%	-40%
Jan-22	-32%	-13%	-55%	3038%	-54%	-88%	24%	-40%
Feb-22	-36%	-19%	-56%	1286%	-57%	-88%	13%	-44%
Mar-22	-38%	-17%	-56%	981%	-58%	-87%	11%	-40%
Apr-22	-39%	-15%	-58%	815%	-60%	-81%	14%	-31%
May-22	-44%	-12%	-58%	598%	-57%	-79%	10%	-29%
Jun-22	-49%	-12%	-55%	536%	-56%	-75%	13%	-30%
Jul-22	-41%	-8%	-54%	340%	-55%	-72%	12%	-30%
Aug-22	-42%	-8%	-52%	199%	-55%	-68%	15%	-29%
Sep-22	-41%	-5%	-52%	156%	-52%	-66%	15%	-30%
Oct-22	-42%	-7%	-53%	118%	-52%	-66%	14%	-30%
Nov-22	-43%	-5%	-53%	104%	-53%	-61%	17%	-27%
Dec-22	-43%	-4%	-53%	94%	-50%	-62%	15%	-28%
Jan-23	-42%	13%	-46%	5415%	-47%	-59%	64%	-23%
Feb-23	-35%	8%	-43%	2525%	-49%	-59%	59%	-25%
Mar-23	-42%	8%	-42%	1700%	-49%	-58%	54%	-26%
Apr-23	-48%	8%	-41%	1256%	-54%	-57%	56%	-25%
May-23	-51%	7%	-44%	925%	-50%	-57%	52%	-25%
Jun-23	-48%	7%	-45%	785%	-45%	-55%	52%	-27%
Jul-23	-47%	8%	-39%	528%	-44%	-56%	55%	-28%
Aug-23	-45%	9%	-29%	366%	-44%	-55%	65%	-25%
Sep-23	-43%	11%	-31%	294%	-47%	-54%	64%	-25%
Oct-23	-43%	12%	-33%	223%	-49%	-54%	62%	-26%
Nov-23	-42%	11%	-34%	195%	-47%	-46%	62%	-24%
Dec-23	-40%	9%	-33%	176%	-45%	-48%	57%	-25%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 161: CFM56-5B monthly engine hours growth vs 2019

LatAm has exhibited the strongest performance in Dec-23

	CFM56-5B Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	24%	1%	18%	3%	9%	3%
Feb-20	23%	0%	16%	6%	10%	-29%
Mar-20	-18%	-34%	-2%	-21%	-44%	-58%
Apr-20	-94%	-96%	-72%	-97%	-98%	-89%
May-20	-93%	-96%	-80%	-97%	-97%	-89%
Jun-20	-84%	-92%	-72%	-94%	-90%	-85%
Jul-20	-57%	-73%	-55%	-91%	-85%	-46%
Aug-20	-50%	-58%	-52%	-86%	-83%	-38%
Sep-20	-53%	-63%	-51%	-78%	-80%	-39%
Oct-20	-62%	-71%	-50%	-66%	-76%	-54%
Nov-20	-67%	-81%	-45%	-53%	-71%	-46%
Dec-20	-62%	-78%	-46%	-51%	-73%	-30%
Jan-21	-49%	-76%	-35%	-44%	-68%	-37%
Feb-21	-59%	-82%	-38%	-47%	-66%	-49%
Mar-21	-60%	-81%	-31%	-55%	-67%	-25%
Apr-21	-63%	-78%	-27%	-60%	-63%	-22%
May-21	-51%	-76%	-26%	-55%	-62%	-31%
Jun-21	-24%	-65%	-22%	-43%	-64%	-39%
Jul-21	-13%	-47%	-21%	-36%	-56%	-37%
Aug-21	-17%	-38%	-24%	-32%	-54%	-50%
Sep-21	-22%	-40%	-20%	-24%	-48%	-39%
Oct-21	-39%	-42%	-20%	-22%	-49%	-37%
Nov-21	-42%	-39%	-17%	-14%	-45%	-61%
Dec-21	-54%	-39%	-19%	-13%	-41%	-60%
Jan-22	-49%	-45%	-6%	-16%	-41%	-62%
Feb-22	-42%	-49%	-10%	-18%	-40%	-62%
Mar-22	-49%	-45%	-6%	-15%	-38%	-69%
Apr-22	-42%	-34%	-3%	-6%	-34%	-73%
May-22	-35%	-30%	-7%	-1%	-25%	-65%
Jun-22	-34%	-27%	-10%	-3%	-33%	-60%
Jul-22	-37%	-23%	-7%	0%	-25%	-55%
Aug-22	-41%	-22%	-11%	3%	-26%	-52%
Sep-22	-42%	-23%	-9%	3%	-29%	-58%
Oct-22	-39%	-26%	-13%	0%	-33%	-56%
Nov-22	-33%	-31%	-11%	-6%	-33%	-57%
Dec-22	-31%	-34%	-15%	-6%	-32%	-55%
Jan-23	-24%	-33%	0%	-1%	-24%	-42%
Feb-23	-23%	-34%	-4%	-3%	-24%	-38%
Mar-23	-27%	-33%	-5%	-6%	-26%	-40%
Apr-23	-34%	-29%	-3%	2%	-25%	-39%
May-23	-25%	-28%	-7%	6%	-20%	-43%
Jun-23	-33%	-25%	-7%	7%	-26%	-41%
Jul-23	-40%	-23%	-7%	2%	-23%	-29%
Aug-23	-45%	-24%	-10%	4%	-25%	-39%
Sep-23	-45%	-24%	-9%	4%	-25%	-13%
Oct-23	-42%	-26%	-11%	0%	-29%	-21%
Nov-23	-37%	-27%	-12%	2%	-30%	-25%
Dec-23	-34%	-30%	-15%	-2%	-32%	-24%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 162: CFM56-7B monthly engine hours growth vs 2019

APAC remained the best performing region in Dec-23

	CFM56-7B Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	49%	3%	11%	12%	-5%	5%
Feb-20	53%	3%	9%	17%	3%	-25%
Mar-20	-3%	-30%	-8%	-11%	-46%	-52%
Apr-20	-97%	-96%	-70%	-96%	-98%	-83%
May-20	-94%	-97%	-77%	-95%	-95%	-87%
Jun-20	-91%	-92%	-68%	-91%	-91%	-83%
Jul-20	-81%	-65%	-53%	-84%	-85%	-49%
Aug-20	-72%	-50%	-47%	-79%	-82%	-37%
Sep-20	-67%	-53%	-50%	-72%	-78%	-39%
Oct-20	-65%	-60%	-50%	-61%	-73%	-54%
Nov-20	-64%	-66%	-44%	-56%	-69%	-44%
Dec-20	-57%	-67%	-44%	-48%	-62%	-27%
Jan-21	-37%	-69%	-37%	-36%	-62%	-37%
Feb-21	-38%	-77%	-44%	-48%	-59%	-51%
Mar-21	-41%	-77%	-37%	-57%	-57%	-26%
Apr-21	-38%	-74%	-32%	-70%	-51%	-18%
May-21	-38%	-73%	-29%	-65%	-55%	-21%
Jun-21	-35%	-55%	-24%	-59%	-65%	-30%
Jul-21	-32%	-35%	-21%	-52%	-56%	-34%
Aug-21	-34%	-25%	-19%	-53%	-52%	-50%
Sep-21	-30%	-23%	-16%	-50%	-46%	-39%
Oct-21	-31%	-21%	-18%	-49%	-37%	-37%
Nov-21	-35%	-19%	-17%	-44%	-29%	-57%
Dec-21	-46%	-20%	-19%	-39%	-21%	-54%
Jan-22	-26%	-28%	-12%	-24%	-37%	-54%
Feb-22	-12%	-24%	-12%	-28%	-33%	-58%
Mar-22	-22%	-23%	-14%	-29%	-34%	-62%
Apr-22	-20%	-18%	-14%	-29%	-32%	-61%
May-22	-16%	-16%	-14%	-27%	-26%	-54%
Jun-22	-29%	-13%	-14%	-31%	-37%	-52%
Jul-22	-32%	-13%	-15%	-31%	-20%	-47%
Aug-22	-35%	-12%	-14%	-30%	-23%	-45%
Sep-22	-36%	-14%	-12%	-33%	-24%	-49%
Oct-22	-34%	-14%	-16%	-29%	-25%	-49%
Nov-22	-31%	-17%	-16%	-30%	-21%	-47%
Dec-22	-32%	-18%	-21%	-29%	-13%	-45%
Jan-23	-3%	-17%	-8%	-18%	-20%	-33%
Feb-23	-1%	-17%	-9%	-18%	-14%	-30%
Mar-23	-6%	-17%	-13%	-18%	-19%	-33%
Apr-23	-10%	-13%	-14%	-18%	-17%	-33%
May-23	-8%	-13%	-15%	-15%	-10%	-39%
Jun-23	-14%	-12%	-15%	-18%	-21%	-40%
Jul-23	-19%	-11%	-15%	-26%	-15%	-28%
Aug-23	-24%	-11%	-15%	-23%	-18%	-5%
Sep-23	-24%	-12%	-14%	-29%	-17%	-9%
Oct-23	-24%	-12%	-14%	-28%	-21%	-14%
Nov-23	-26%	-16%	-17%	-31%	-27%	-17%
Dec-23	-24%	-17%	-18%	-35%	-25%	-17%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 163: CF6 monthly engine hours growth vs 2019

North America has been the best performing region as of Dec-23

	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	24%	2%	19%	19%	4%	-7%
Feb-20	4%	-1%	16%	20%	1%	-10%
Mar-20	-29%	-30%	5%	0%	-35%	-34%
Apr-20	-70%	-75%	-28%	-62%	-65%	-57%
May-20	-68%	-73%	-25%	-60%	-64%	-53%
Jun-20	-65%	-74%	-24%	-60%	-59%	-43%
Jul-20	-57%	-74%	-27%	-59%	-64%	-48%
Aug-20	-55%	-70%	-24%	-54%	-60%	-44%
Sep-20	-48%	-68%	-21%	-52%	-51%	-42%
Oct-20	-48%	-65%	-17%	-50%	-48%	-39%
Nov-20	-37%	-56%	-12%	-53%	-57%	-35%
Dec-20	-38%	-55%	-14%	-46%	-59%	-40%
Jan-21	-19%	-57%	-1%	-38%	-66%	-46%
Feb-21	-25%	-57%	-6%	-40%	-67%	-48%
Mar-21	-26%	-56%	-2%	-41%	-67%	-42%
Apr-21	-17%	-56%	-2%	-39%	-63%	-40%
May-21	-13%	-60%	-4%	-37%	-67%	-40%
Jun-21	-24%	-60%	-5%	-37%	-60%	-41%
Jul-21	-25%	-54%	-2%	-38%	-61%	-37%
Aug-21	-32%	-49%	2%	-38%	-56%	-36%
Sep-21	-20%	-46%	6%	-37%	-47%	-35%
Oct-21	-24%	-43%	5%	-33%	-40%	-30%
Nov-21	-18%	-37%	3%	-33%	-40%	-25%
Dec-21	-27%	-35%	2%	-34%	-48%	-27%
Jan-22	-9%	-38%	14%	-27%	-49%	-32%
Feb-22	-8%	-36%	12%	-20%	-49%	-33%
Mar-22	-13%	-36%	9%	-21%	-46%	-33%
Apr-22	8%	-33%	9%	-16%	-42%	-27%
May-22	10%	-33%	3%	-20%	-44%	-29%
Jun-22	6%	-31%	0%	-28%	-33%	-27%
Jul-22	9%	-33%	-1%	-26%	-34%	-28%
Aug-22	5%	-31%	1%	-25%	-43%	-28%
Sep-22	7%	-30%	4%	-25%	-38%	-27%
Oct-22	2%	-27%	3%	-28%	-33%	-24%
Nov-22	4%	-23%	0%	-28%	-43%	-22%
Dec-22	-6%	-23%	-5%	-30%	-46%	-23%
Jan-23	16%	-25%	9%	-21%	-37%	-32%
Feb-23	8%	-23%	6%	-19%	-34%	-30%
Mar-23	2%	-24%	5%	-21%	-37%	-28%
Apr-23	10%	-22%	3%	-18%	-28%	-28%
May-23	14%	-26%	0%	-20%	-32%	-32%
Jun-23	3%	-26%	-2%	-17%	-26%	-32%
Jul-23	-5%	-28%	-3%	-15%	-33%	-29%
Aug-23	-13%	-27%	1%	-15%	-50%	-22%
Sep-23	3%	-27%	3%	-17%	-41%	-22%
Oct-23	-5%	-25%	2%	-21%	-37%	-21%
Nov-23	1%	-21%	0%	-20%	-49%	-16%
Dec-23	-7%	-22%	-6%	-22%	-51%	-15%

Source: BofA Global Research, Flightradar24

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Exhibit 164: GE90 monthly engine hours growth vs 2019

North America has led the recovery in Dec-23

	GE90 Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	5%	2%	5%	-3%	0%	3%
Feb-20	5%	0%	-3%	0%	-2%	-13%
Mar-20	-13%	-21%	-21%	-19%	-26%	-39%
Apr-20	-68%	-66%	-66%	-82%	-67%	-65%
May-20	-52%	-59%	-57%	-81%	-52%	-58%
Jun-20	-50%	-58%	-55%	-76%	-53%	-49%
Jul-20	-46%	-56%	-55%	-71%	-50%	-48%
Aug-20	-43%	-54%	-54%	-68%	-46%	-46%
Sep-20	-34%	-50%	-50%	-63%	-38%	-44%
Oct-20	-21%	-45%	-46%	-61%	-34%	-40%
Nov-20	-31%	-43%	-38%	-55%	-36%	-34%
Dec-20	-31%	-43%	-42%	-46%	-39%	-40%
Jan-21	-33%	-44%	-44%	-48%	-40%	-46%
Feb-21	-30%	-41%	-42%	-45%	-35%	-43%
Mar-21	-25%	-40%	-40%	-49%	-30%	-34%
Apr-21	-25%	-38%	-38%	-48%	-25%	-31%
May-21	-19%	-40%	-41%	-45%	-21%	-33%
Jun-21	-26%	-39%	-39%	-37%	-30%	-34%
Jul-21	-20%	-36%	-34%	-38%	-28%	-35%
Aug-21	-16%	-34%	-29%	-39%	-28%	-37%
Sep-21	-11%	-32%	-24%	-42%	-21%	-35%
Oct-21	-15%	-29%	-21%	-39%	-20%	-31%
Nov-21	-17%	-23%	-15%	-40%	-18%	-31%
Dec-21	-21%	-22%	-15%	-39%	-18%	-33%
Jan-22	-19%	-23%	-14%	-33%	-22%	-36%
Feb-22	-12%	-24%	-17%	-30%	-21%	-36%
Mar-22	-12%	-23%	-15%	-34%	-16%	-33%
Apr-22	-2%	-19%	-14%	-35%	-11%	-35%
May-22	0%	-18%	-15%	-34%	-4%	-34%
Jun-22	-8%	-15%	-12%	-29%	-15%	-32%
Jul-22	0%	-11%	-7%	-25%	-11%	-30%
Aug-22	-1%	-10%	-9%	-24%	-10%	-31%
Sep-22	-3%	-11%	-7%	-27%	-8%	-29%
Oct-22	-3%	-12%	-7%	-26%	-6%	-28%
Nov-22	-14%	-10%	-6%	-12%	-7%	-26%
Dec-22	-11%	-9%	-7%	-16%	-9%	-28%
Jan-23	-2%	-10%	-2%	-19%	-9%	-25%
Feb-23	-1%	-9%	-4%	-17%	-8%	-24%
Mar-23	2%	-11%	-4%	-19%	-8%	-22%
Apr-23	-7%	-6%	-4%	-26%	-2%	-21%
May-23	-6%	0%	-4%	-26%	11%	-25%
Jun-23	-12%	1%	-2%	-22%	-1%	-23%
Jul-23	-6%	2%	1%	-22%	1%	-18%
Aug-23	-1%	5%	1%	-23%	-1%	-7%
Sep-23	0%	4%	3%	-25%	1%	-7%
Oct-23	0%	6%	2%	-23%	0%	-6%
Nov-23	-2%	5%	6%	-20%	-1%	-6%
Dec-23	-6%	4%	5%	-22%	-2%	-7%

Source: BofA Global Research, Flightradar24

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Exhibit 165: GENX monthly engine hours growth vs 2019

Europe is the best performing region as of Dec-23

	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	35%	28%	26%	33%	16%	15%
Feb-20	44%	21%	11%	38%	7%	-16%
Mar-20	15%	-4%	-9%	10%	-20%	-41%
Apr-20	-79%	-77%	-74%	-90%	-86%	-77%
May-20	-67%	-70%	-59%	-76%	-86%	-67%
Jun-20	-60%	-64%	-55%	-62%	-77%	-54%
Jul-20	-53%	-56%	-46%	-55%	-66%	-53%
Aug-20	-46%	-50%	-40%	-49%	-58%	-47%
Sep-20	-40%	-42%	-38%	-47%	-47%	-47%
Oct-20	-31%	-36%	-34%	-39%	-43%	-46%
Nov-20	-35%	-26%	-26%	-19%	-44%	-39%
Dec-20	-33%	-30%	-26%	-5%	-48%	-42%
Jan-21	-7%	-16%	-14%	35%	-33%	-44%
Feb-21	-6%	-9%	-15%	28%	-25%	-48%
Mar-21	-12%	-4%	-8%	33%	-18%	-32%
Apr-21	-10%	-7%	-12%	26%	-18%	-24%
May-21	-8%	-17%	-17%	15%	-20%	-27%
Jun-21	1%	-24%	-6%	3%	-16%	-33%
Jul-21	2%	-22%	-1%	2%	-11%	-35%
Aug-21	1%	-21%	0%	1%	-7%	-40%
Sep-21	5%	-13%	-5%	9%	-5%	-38%
Oct-21	4%	-6%	-5%	16%	-1%	-34%
Nov-21	3%	-2%	7%	35%	-7%	-37%
Dec-21	-6%	-2%	9%	31%	-7%	-37%
Jan-22	21%	25%	30%	59%	4%	-30%
Feb-22	34%	16%	26%	67%	-3%	-32%
Mar-22	42%	21%	24%	78%	6%	-31%
Apr-22	30%	32%	20%	68%	11%	-29%
May-22	31%	32%	19%	48%	17%	-28%
Jun-22	37%	26%	20%	32%	14%	-27%
Jul-22	32%	22%	17%	27%	19%	-26%
Aug-22	25%	20%	15%	34%	14%	-23%
Sep-22	26%	21%	12%	29%	11%	-28%
Oct-22	29%	21%	11%	25%	13%	-27%
Nov-22	10%	16%	13%	12%	8%	-23%
Dec-22	22%	17%	14%	14%	10%	-23%
Jan-23	60%	50%	47%	50%	33%	-7%
Feb-23	63%	49%	43%	50%	28%	-8%
Mar-23	63%	50%	39%	56%	28%	-8%
Apr-23	54%	49%	28%	49%	27%	-3%
May-23	51%	49%	25%	48%	32%	-7%
Jun-23	59%	48%	28%	40%	30%	-3%
Jul-23	56%	43%	28%	31%	28%	2%
Aug-23	48%	40%	29%	34%	23%	14%
Sep-23	59%	41%	28%	33%	25%	8%
Oct-23	64%	45%	27%	34%	28%	6%
Nov-23	43%	38%	32%	22%	21%	3%
Dec-23	36%	37%	30%	22%	18%	5%

Source: BofA Global Research, Flightradar24

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Exhibit 166: PW100 monthly engine hours growth vs 2019

Africa is the Strongest region of growth as of Dec 2023

	PW100 Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	39%	3%	24%	29%	17%	30%
Feb-20	14%	9%	28%	30%	-3%	29%
Mar-20	-13%	-24%	13%	5%	7%	7%
Apr-20	-93%	-85%	-74%	-91%	16%	-81%
May-20	-91%	-82%	-76%	-89%	60%	-82%
Jun-20	-83%	-72%	-65%	-82%	47%	-59%
Jul-20	-58%	-51%	-52%	-77%	9%	-48%
Aug-20	-31%	-41%	-50%	-60%	14%	-44%
Sep-20	-16%	-44%	-50%	-52%	24%	-43%
Oct-20	-16%	-44%	-53%	-46%	-3%	-43%
Nov-20	-7%	-44%	-53%	-37%	-14%	-41%
Dec-20	-1%	-42%	-45%	-33%	-41%	-40%
Jan-21	63%	-45%	-35%	-4%	-5%	-20%
Feb-21	22%	-48%	-36%	-15%	-17%	-20%
Mar-21	13%	-48%	-25%	-16%	-8%	-16%
Apr-21	18%	-45%	-29%	-35%	7%	-19%
May-21	24%	-41%	-31%	-26%	13%	-34%
Jun-21	41%	-34%	-30%	-19%	13%	-31%
Jul-21	42%	-26%	-23%	-18%	-11%	-33%
Aug-21	44%	-22%	-22%	-6%	-13%	-39%
Sep-21	50%	-17%	-22%	-12%	-15%	-42%
Oct-21	56%	-14%	-20%	-13%	-27%	-30%
Nov-21	58%	-10%	-22%	-13%	-23%	-23%
Dec-21	38%	-12%	-21%	-15%	-47%	-18%
Jan-22	126%	-18%	-10%	-3%	-40%	2%
Feb-22	96%	-14%	-13%	3%	-47%	-5%
Mar-22	53%	-14%	-9%	10%	-38%	4%
Apr-22	50%	-3%	-7%	11%	-27%	10%
May-22	61%	1%	-10%	24%	-14%	19%
Jun-22	56%	7%	-13%	2%	-38%	18%
Jul-22	67%	13%	-8%	5%	-71%	8%
Aug-22	78%	15%	-8%	7%	-53%	2%
Sep-22	74%	12%	-10%	0%	-45%	1%
Oct-22	56%	14%	-9%	-3%	-60%	-1%
Nov-22	75%	12%	-7%	-11%	-40%	-2%
Dec-22	75%	9%	-10%	-9%	-32%	0%
Jan-23	159%	12%	13%	19%	-11%	33%
Feb-23	100%	13%	9%	11%	-28%	28%
Mar-23	87%	11%	3%	17%	-33%	31%
Apr-23	93%	19%	-1%	11%	36%	28%
May-23	112%	20%	-1%	16%	32%	37%
Jun-23	89%	20%	-6%	8%	48%	35%
Jul-23	84%	26%	-3%	17%	60%	21%
Aug-23	103%	26%	1%	21%	65%	16%
Sep-23	111%	24%	5%	13%	50%	15%
Oct-23	117%	25%	-2%	7%	48%	10%
Nov-23	106%	23%	-8%	-5%	45%	9%
Dec-23	93%	19%	-13%	-5%	19%	6%

Source: BofA Global Research, Flightradar24

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Exhibit 167: PW2000 monthly engine hours growth vs 2019

Latam has remained the best performing region in Dec-23

	PW2000 Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	-9%	-14%	10%	25%	-20%	16%
Feb-20	4%	-5%	8%	17%	-6%	10%
Mar-20	89%	-14%	-9%	-15%	-16%	-34%
Apr-20	10%	-50%	-68%	-91%	-22%	-82%
May-20	-34%	-62%	-73%	-85%	-11%	-60%
Jun-20	-20%	-65%	-70%	-90%	-7%	-43%
Jul-20	-6%	-65%	-62%	-86%	-19%	-31%
Aug-20	-15%	-62%	-50%	-66%	50%	-45%
Sep-20	-30%	-50%	-44%	-59%	71%	-20%
Oct-20	-14%	-35%	-40%	-61%	54%	-50%
Nov-20	59%	-9%	-30%	-36%	36%	-58%
Dec-20	-59%	-18%	-24%	-25%	32%	-50%
Jan-21	-15%	-29%	-23%	-23%	22%	-57%
Feb-21	1%	-24%	-28%	-28%	29%	-64%
Mar-21	88%	-20%	-27%	-41%	37%	-62%
Apr-21	3%	-24%	-25%	-65%	47%	-60%
May-21	-38%	-46%	-26%	-76%	112%	-34%
Jun-21	-23%	-49%	-30%	-64%	36%	-15%
Jul-21	-6%	-42%	-31%	-59%	37%	-4%
Aug-21	14%	-39%	-28%	-54%	125%	-19%
Sep-21	2%	-37%	-22%	-49%	133%	-37%
Oct-21	24%	-26%	-26%	-51%	93%	-38%
Nov-21	-40%	-10%	-20%	-42%	219%	-47%
Dec-21	43%	-11%	-21%	-33%	262%	-49%
Jan-22	-2%	-27%	-18%	-21%	115%	-48%
Feb-22	-1%	-38%	-18%	-41%	75%	-65%
Mar-22	82%	-45%	-21%	-44%	63%	-66%
Apr-22	-2%	-34%	-27%	-48%	7%	-64%
May-22	-37%	-49%	-29%	-53%	-6%	-48%
Jun-22	-25%	-52%	-36%	-37%	-10%	-29%
Jul-22	-8%	-49%	-31%	-33%	-20%	-27%
Aug-22	-14%	-50%	-34%	-36%	21%	-46%
Sep-22	-25%	-50%	-27%	-43%	27%	-41%
Oct-22	12%	-49%	-31%	-50%	8%	-46%
Nov-22	289%	-40%	-26%	-53%	-2%	-66%
Dec-22	-54%	-36%	-24%	-30%	10%	-73%
Jan-23	-16%	-42%	-17%	-28%	-14%	-78%
Feb-23	2%	-48%	-21%	-78%	-8%	-90%
Mar-23	93%	-50%	-24%	-75%	-6%	-88%
Apr-23	-9%	-48%	-27%	-51%	3%	-92%
May-23	-36%	-55%	-28%	-13%	-2%	-94%
Jun-23	-29%	-53%	-30%	-20%	-14%	-86%
Jul-23	-11%	-54%	-29%	-18%	-26%	-79%
Aug-23	-97%	-53%	-30%	-11%	5%	-79%
Sep-23	-100%	-52%	-24%	-11%	25%	-62%
Oct-23	-100%	-51%	-26%	-16%	-52%	-73%
Nov-23	-100%	-56%	-25%	-11%	-100%	-82%
Dec-23	-100%	-59%	-23%	4%	-100%	-69%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 168: PW4000 monthly engine hours growth vs 2019

Middle East has remained the best performing region in Dec-23

	PW4000 Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	38%	9%	13%	-41%	30%	-7%
Feb-20	13%	14%	21%	-39%	14%	-29%
Mar-20	-22%	-15%	-4%	-49%	-53%	-62%
Apr-20	-87%	-78%	-55%	-68%	-75%	-76%
May-20	-81%	-73%	-58%	-78%	-71%	-72%
Jun-20	-80%	-77%	-57%	-77%	-62%	-67%
Jul-20	-78%	-83%	-61%	-76%	-78%	-66%
Aug-20	-73%	-80%	-60%	-72%	-84%	-61%
Sep-20	-74%	-77%	-57%	-69%	-82%	-58%
Oct-20	-78%	-74%	-54%	-70%	-75%	-55%
Nov-20	-69%	-68%	-43%	-22%	-64%	-51%
Dec-20	-60%	-65%	-40%	4%	-64%	-53%
Jan-21	-52%	-71%	-42%	-44%	-66%	-67%
Feb-21	-60%	-71%	-45%	-51%	-67%	-69%
Mar-21	-56%	-69%	-36%	-51%	-58%	-57%
Apr-21	-56%	-67%	-27%	-52%	-62%	-53%
May-21	-59%	-62%	-18%	-63%	-60%	-52%
Jun-21	-56%	-62%	-18%	-67%	-65%	-56%
Jul-21	-50%	-49%	-12%	-59%	-72%	-56%
Aug-21	-42%	-43%	-7%	-39%	-68%	-62%
Sep-21	-56%	-42%	2%	-61%	-65%	-55%
Oct-21	-50%	-35%	-4%	-65%	-61%	-48%
Nov-21	-56%	-35%	1%	-57%	-58%	-55%
Dec-21	-51%	-30%	5%	2%	-38%	-54%
Jan-22	-39%	-39%	3%	-22%	-58%	-61%
Feb-22	-57%	-44%	-7%	-22%	-62%	-60%
Mar-22	-67%	-35%	-2%	-17%	-44%	-57%
Apr-22	-65%	-27%	5%	-36%	-50%	-60%
May-22	-71%	-24%	-2%	-44%	-55%	-60%
Jun-22	-67%	-23%	-6%	-49%	-49%	-57%
Jul-22	-70%	-17%	-8%	-54%	-49%	-56%
Aug-22	-76%	-18%	-15%	-51%	-55%	-52%
Sep-22	-76%	-19%	-18%	-45%	-39%	-51%
Oct-22	-71%	-32%	-21%	-53%	-8%	-46%
Nov-22	-65%	-34%	-18%	-39%	-8%	-44%
Dec-22	-56%	-31%	-17%	-14%	16%	-42%
Jan-23	-63%	-38%	-18%	-40%	4%	-44%
Feb-23	-57%	-35%	-21%	-33%	-1%	-41%
Mar-23	-59%	-33%	-23%	-39%	10%	-39%
Apr-23	-54%	-32%	-17%	-40%	25%	-36%
May-23	-67%	-30%	-16%	-46%	29%	-37%
Jun-23	-55%	-32%	-19%	-38%	62%	-36%
Jul-23	-58%	-30%	-21%	-33%	26%	-33%
Aug-23	-60%	-27%	-20%	-29%	-10%	-27%
Sep-23	-61%	-28%	-20%	-29%	-13%	-28%
Oct-23	-58%	-34%	-20%	-37%	30%	-25%
Nov-23	-52%	-40%	-23%	-41%	28%	-27%
Dec-23	-54%	-35%	-21%	-2%	58%	-27%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 169: TRENT monthly engine hours growth vs 2019

Latin America exhibited strongest growth in Dec-23

	Trent Monthly Data vs 2019					
	Africa	Europe	North America	Latin America	Middle East	APAC
Jan-20	35%	20%	16%	24%	14%	17%
Feb-20	37%	8%	9%	19%	13%	-15%
Mar-20	0%	-24%	-17%	-2%	-30%	-49%
Apr-20	-83%	-82%	-83%	-82%	-76%	-82%
May-20	-74%	-72%	-78%	-72%	-67%	-79%
Jun-20	-69%	-74%	-78%	-71%	-62%	-74%
Jul-20	-62%	-74%	-73%	-71%	-61%	-70%
Aug-20	-58%	-71%	-70%	-68%	-63%	-65%
Sep-20	-60%	-68%	-67%	-62%	-59%	-63%
Oct-20	-54%	-66%	-63%	-57%	-50%	-61%
Nov-20	-55%	-57%	-54%	-55%	-49%	-57%
Dec-20	-50%	-57%	-51%	-53%	-50%	-60%
Jan-21	-34%	-54%	-45%	-44%	-36%	-58%
Feb-21	-34%	-52%	-45%	-48%	-38%	-62%
Mar-21	-38%	-51%	-42%	-52%	-35%	-51%
Apr-21	-26%	-51%	-42%	-47%	-32%	-47%
May-21	-30%	-54%	-41%	-50%	-31%	-47%
Jun-21	-26%	-55%	-37%	-48%	-32%	-52%
Jul-21	-23%	-50%	-34%	-42%	-31%	-51%
Aug-21	-26%	-47%	-33%	-42%	-34%	-55%
Sep-21	-32%	-44%	-31%	-36%	-30%	-49%
Oct-21	-29%	-39%	-27%	-33%	-30%	-45%
Nov-21	-33%	-29%	-13%	-31%	-34%	-50%
Dec-21	-39%	-28%	-11%	-26%	-34%	-51%
Jan-22	-20%	-16%	-1%	-15%	-30%	-47%
Feb-22	-17%	-23%	-5%	-18%	-27%	-50%
Mar-22	-13%	-24%	-6%	-12%	-23%	-50%
Apr-22	-10%	-19%	-7%	1%	-22%	-52%
May-22	-9%	-20%	-7%	1%	-21%	-51%
Jun-22	-2%	-17%	-7%	5%	-24%	-48%
Jul-22	3%	-17%	-6%	-1%	-16%	-47%
Aug-22	-1%	-16%	-4%	-6%	-20%	-44%
Sep-22	-3%	-14%	-4%	0%	-15%	-43%
Oct-22	0%	-15%	-1%	-1%	-16%	-43%
Nov-22	3%	-13%	5%	8%	-17%	-42%
Dec-22	3%	-13%	1%	5%	-14%	-41%
Jan-23	33%	4%	20%	24%	2%	-26%
Feb-23	32%	1%	17%	18%	5%	-25%
Mar-23	36%	-1%	15%	25%	3%	-25%
Apr-23	36%	0%	10%	26%	1%	-22%
May-23	36%	1%	5%	22%	5%	-25%
Jun-23	38%	2%	3%	21%	6%	-24%
Jul-23	27%	5%	8%	14%	12%	-20%
Aug-23	21%	8%	10%	12%	6%	-7%
Sep-23	14%	8%	11%	17%	9%	-8%
Oct-23	26%	9%	12%	22%	8%	-10%
Nov-23	27%	13%	14%	29%	1%	-11%
Dec-23	20%	13%	13%	20%	-1%	-12%

Source: BofA Global Research, Flightradar24

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Quarterly flight cycles data tables

Exhibit 170: Major engines quarterly average flight cycles yoy growth

CFM LEAP family has been the best performer in 4Q23

	CFM56 -5B (A320)	CFM56 -7B (737NG)	CFM56 family	CFMLEAP	V2500	GTF family	Rolls-Royce commercial	P&W	GE
1Q20	-16%	-15%	-15%	-7%	-14%	57%	-10%	-3%	-3%
2Q20	-82%	-76%	-78%	-66%	-87%	-59%	-73%	-78%	-62%
3Q20	-53%	-47%	-50%	-18%	-64%	-13%	-60%	-53%	-45%
4Q20	-52%	-43%	-47%	-16%	-62%	-4%	-49%	-46%	-34%
1Q21	-43%	-37%	-39%	-9%	-57%	9%	-40%	-39%	-27%
2Q21	195%	164%	170%	334%	239%	237%	118%	172%	93%
3Q21	29%	31%	31%	124%	45%	71%	48%	45%	47%
4Q21	28%	26%	26%	122%	48%	62%	26%	43%	28%
1Q22	25%	29%	27%	122%	55%	54%	26%	43%	21%
2Q22	19%	13%	15%	97%	56%	73%	12%	52%	17%
3Q22	16%	10%	12%	63%	33%	45%	21%	36%	7%
4Q22	6%	1%	2%	49%	27%	21%	9%	21%	1%
1Q23	26%	19%	21%	61%	29%	32%	37%	27%	13%
2Q23	23%	19%	20%	57%	7%	18%	44%	13%	10%
3Q23	17%	15%	15%	54%	7%	19%	36%	12%	11%
4Q23	22%	20%	20%	49%	5%	14%	37%	9%	12%
Vs 2019									
1Q21 vs 1Q19	-51%	-46%	-48%	-16%	-63%	71%	-45%	-41%	-29%
2Q21 vs 2Q19	-47%	-38%	-41%	46%	-56%	39%	-41%	-39%	-26%
3Q21 vs 3Q19	-39%	-31%	-34%	84%	-48%	49%	-41%	-32%	-20%
4Q21 vs 4Q19	-39%	-29%	-33%	88%	-44%	56%	-35%	-23%	-16%
1Q22 vs 1Q19	-39%	-31%	-34%	88%	-43%	163%	-31%	-16%	-14%
2Q22 vs 2Q19	-37%	-29%	-32%	187%	-32%	142%	-33%	-8%	-13%
3Q22 vs 3Q19	-30%	-24%	-27%	199%	-31%	116%	-29%	-8%	-14%
4Q22 vs 4Q19	-35%	-28%	-31%	179%	-29%	89%	-29%	-7%	-15%
1Q23 vs 1Q19	-24%	-17%	-20%	202%	-27%	247%	-6%	7%	-3%
2Q23 vs 2Q19	-22%	-16%	-19%	350%	-27%	184%	-4%	4%	-4%
3Q23 vs 3Q19	-18%	-12%	-15%	360%	-26%	157%	-3%	3%	-5%
4Q23 vs 4Q19	-21%	-14%	-17%	316%	-25%	116%	-3%	1%	-5%

Source: BofA Global Research, Flightradar24

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Exhibit 171: P&W engine quarterly average flight cycles yoy growth

PW1900G has been the best performer P&W engine throughout 4Q23

	GP7200	V2500	PW100	PW1100G	PW1500G	PW1900G	PW2000	PW4000	JT3D	JT8D	JT9D	Total P&W
1Q20	-10%	-14%	7%	56%	39%	337%	-1%	-19%	n.a	-50%	-65%	-3%
2Q20	-100%	-87%	-76%	-60%	-61%	29%	-53%	-62%	n.a	-81%	-80%	-78%
3Q20	-97%	-64%	-51%	-13%	-21%	88%	-35%	-52%	n.a	-80%	-80%	-53%
4Q20	-94%	-62%	-46%	3%	-41%	27%	-20%	-42%	n.a	-59%	-54%	-46%
1Q21	-93%	-57%	-39%	18%	-38%	-9%	-18%	-42%	n.a	-45%	162%	-39%
2Q21	3579%	239%	147%	256%	151%	193%	76%	51%	n.a	26%	439%	172%
3Q21	384%	45%	28%	67%	71%	160%	29%	17%	n.a	40%	22%	45%
4Q21	447%	48%	37%	51%	144%	147%	8%	4%	n.a	3%	-6%	43%
1Q22	562%	55%	33%	41%	162%	138%	8%	11%	n.a	-13%	-74%	43%
2Q22	374%	56%	55%	65%	119%	127%	-4%	-11%	n.a	-3%	-68%	52%
3Q22	217%	33%	50%	44%	47%	43%	2%	-3%	n.a	-9%	-8%	36%
4Q22	92%	27%	24%	18%	34%	36%	-4%	-3%	n.a	-12%	-52%	21%
1Q23	71%	29%	24%	29%	40%	60%	3%	24%	n.a	-8%	-98%	27%
2Q23	59%	7%	14%	14%	30%	44%	0%	41%	n.a	-6%	-98%	13%
3Q23	56%	7%	10%	15%	27%	58%	-7%	32%	n.a	-3%	-89%	12%
4Q23	30%	5%	7%	10%	24%	60%	-1%	25%	n.a	-12%	338%	9%
Vs 2019												
1Q21 vs 1Q19	-94%	-63%	-35%	85%	-14%	296%	-19%	-52%	n.a	-73%	-8%	-41%
2Q21 vs 2Q19	-90%	-56%	-40%	44%	-1%	280%	-18%	-42%	n.a	-76%	6%	-39%
3Q21 vs 3Q19	-84%	-48%	-37%	46%	35%	390%	-16%	-44%	n.a	-72%	-76%	-32%
4Q21 vs 4Q19	-68%	-44%	-26%	55%	44%	212%	-14%	-40%	n.a	-58%	-57%	-23%
1Q22 vs 1Q19	-59%	-43%	-13%	161%	125%	842%	-13%	-47%	n.a	-76%	-76%	-16%
2Q22 vs 2Q19	-51%	-32%	-8%	138%	116%	762%	-21%	-49%	n.a	-77%	-66%	-8%
3Q22 vs 3Q19	-50%	-31%	-6%	111%	99%	601%	-15%	-46%	n.a	-75%	-78%	-8%
4Q22 vs 4Q19	-39%	-29%	-8%	82%	93%	326%	-17%	-42%	n.a	-63%	-79%	-7%
1Q23 vs 1Q19	-30%	-27%	7%	238%	215%	1410%	-10%	-34%	n.a	-78%	-100%	7%
2Q23 vs 2Q19	-22%	-27%	6%	170%	182%	1138%	-22%	-27%	n.a	-78%	-99%	4%
3Q23 vs 3Q19	-22%	-26%	4%	143%	153%	1006%	-20%	-28%	n.a	-76%	-98%	3%
4Q23 vs 4Q19	-21%	-25%	-2%	100%	140%	581%	-18%	-28%	n.a	-67%	-10%	1%

Source: BofA Global Research, Flightradar24

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Exhibit 172: GE engine quarterly average flight cycles yoy growth

Genx-1B has been the strongest performer through 4Q23

	CF34	CF6	GE90	Genx-1B	Genx-2B	Total GE
1Q20	-1%	1%	-11%	-5%	5%	-3%
2Q20	-76%	-35%	-55%	-66%	-11%	-62%
3Q20	-52%	-33%	-47%	-43%	-12%	-45%
4Q20	-42%	-24%	-34%	-24%	-7%	-34%
1Q21	-34%	-22%	-27%	-8%	-1%	-27%
2Q21	201%	23%	49%	160%	8%	93%
3Q21	69%	23%	32%	47%	11%	47%
4Q21	43%	15%	18%	18%	10%	28%
1Q22	28%	15%	19%	18%	0%	21%
2Q22	21%	14%	21%	11%	-6%	17%
3Q22	3%	8%	18%	16%	-7%	7%
4Q22	0%	0%	7%	6%	-12%	1%
1Q23	16%	1%	15%	26%	0%	13%
2Q23	9%	-1%	19%	29%	7%	10%
3Q23	11%	-3%	17%	29%	6%	11%
4Q23	15%	-2%	17%	28%	7%	12%
Vs 2019						
1Q21 vs 1Q19	-35%	-21%	-35%	-13%	4%	-29%
2Q21 vs 2Q19	-29%	-21%	-33%	-11%	-4%	-26%
3Q21 vs 3Q19	-18%	-18%	-30%	-16%	-3%	-20%
4Q21 vs 4Q19	-18%	-12%	-22%	-10%	3%	-16%
1Q22 vs 1Q19	-17%	-9%	-23%	3%	5%	-14%
2Q22 vs 2Q19	-15%	-10%	-19%	-1%	-10%	-13%
3Q22 vs 3Q19	-16%	-11%	-17%	-2%	-10%	-14%
4Q22 vs 4Q19	-18%	-12%	-16%	-5%	-9%	-15%
1Q23 vs 1Q19	-3%	-9%	-11%	29%	5%	-3%
2Q23 vs 2Q19	-7%	-11%	-4%	27%	-4%	-4%
3Q23 vs 3Q19	-7%	-14%	-3%	27%	-4%	-5%
4Q23 vs 4Q19	-6%	-14%	-2%	22%	-3%	-5%

Source: BofA Global Research, Flightradar24

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Exhibit 173: Rolls-Royce engine quarterly average flight cycles yoy growth

Rolls-Royce's newest commercial platforms (Trent 1000, Trent 7000 and Trent XWB) have outperformed the broader portfolio as of 4Q23

	RB211	Trent 500	Trent 700	Trent 800	Trent 900	Trent 1000	Trent 7000	Trent XWB	Total Rolls-Royce commercial
1Q20	28%	-40%	-29%	-10%	-21%	3%	957%	14%	-10%
2Q20	-61%	-83%	-79%	-88%	-97%	-67%	-36%	-58%	-73%
3Q20	-54%	-88%	-62%	-88%	-97%	-60%	-52%	-40%	-60%
4Q20	-41%	-84%	-52%	-81%	-97%	-43%	-33%	-27%	-49%
1Q21	-46%	-78%	-39%	-68%	-97%	-35%	-33%	-20%	-40%
2Q21	57%	5%	143%	195%	-13%	101%	352%	124%	118%
3Q21	44%	62%	24%	196%	-17%	81%	262%	50%	48%
4Q21	45%	84%	1%	120%	106%	44%	95%	32%	26%
1Q22	32%	43%	4%	31%	531%	48%	115%	30%	26%
2Q22	22%	29%	-21%	-12%	856%	47%	118%	27%	12%
3Q22	13%	28%	2%	-5%	1041%	39%	67%	32%	21%
4Q22	-9%	-3%	-7%	-12%	439%	24%	46%	23%	9%
1Q23	-3%	-1%	44%	16%	192%	32%	63%	47%	37%
2Q23	-2%	43%	72%	45%	90%	26%	41%	50%	44%
3Q23	-5%	23%	52%	43%	44%	18%	56%	48%	36%
4Q23	0%	41%	54%	35%	47%	19%	49%	47%	37%
Vs 2019									
1Q21 vs 1Q19	-31%	-87%	-56%	-71%	-98%	-33%	605%	-9%	-45%
2Q21 vs 2Q19	-39%	-82%	-48%	-65%	-97%	-33%	191%	-7%	-41%
3Q21 vs 3Q19	-34%	-80%	-53%	-64%	-97%	-27%	76%	-9%	-41%
4Q21 vs 4Q19	-15%	-70%	-52%	-58%	-93%	-18%	31%	-4%	-35%
1Q22 vs 1Q19	-9%	-81%	-55%	-62%	-86%	-1%	1417%	19%	-31%
2Q22 vs 2Q19	-26%	-77%	-59%	-69%	-76%	-2%	534%	19%	-33%
3Q22 vs 3Q19	-25%	-74%	-52%	-66%	-67%	1%	194%	20%	-29%
4Q22 vs 4Q19	-23%	-71%	-55%	-63%	-63%	2%	91%	17%	-29%
1Q23 vs 1Q19	-12%	-82%	-35%	-56%	-59%	31%	2375%	74%	-6%
2Q23 vs 2Q19	-27%	-67%	-30%	-55%	-53%	24%	796%	78%	-4%
3Q23 vs 3Q19	-29%	-69%	-27%	-51%	-52%	19%	358%	77%	-3%
4Q23 vs 4Q19	-23%	-59%	-31%	-50%	-46%	22%	184%	72%	-3%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 174: Airbus aircraft quarterly average flight cycles yoy growth

Airbus' newest platforms (A320neo, A350, A220) have outperformed legacy platforms (A320ceo, A330, A340, A380) as of 4Q23

	A320neo	A320ceo	A330	A340	A350	A380	A300	A220	Airbus total
1Q20	49%	-19%	-29%	-39%	14%	-16%	-8%	39%	-13%
2Q20	-63%	-84%	-79%	-85%	-58%	-99%	-4%	-61%	-80%
3Q20	-15%	-57%	-66%	-84%	-40%	-97%	-5%	-21%	-53%
4Q20	-4%	-55%	-53%	-76%	-27%	-95%	-1%	-41%	-48%
1Q21	5%	-46%	-42%	-66%	-20%	-94%	5%	-38%	-38%
2Q21	271%	206%	137%	75%	124%	549%	-2%	151%	199%
3Q21	73%	34%	46%	112%	50%	246%	-3%	71%	42%
4Q21	58%	35%	20%	93%	32%	367%	0%	144%	40%
1Q22	53%	34%	26%	64%	30%	545%	-5%	162%	39%
2Q22	59%	32%	6%	48%	27%	425%	0%	119%	37%
3Q22	42%	25%	17%	22%	32%	283%	-1%	47%	29%
4Q22	25%	14%	4%	-7%	23%	123%	-12%	34%	17%
1Q23	40%	29%	37%	6%	47%	87%	-16%	40%	32%
2Q23	33%	21%	47%	22%	50%	65%	-20%	30%	26%
3Q23	34%	17%	39%	28%	48%	53%	-20%	27%	23%
4Q23	30%	19%	38%	52%	47%	34%	-16%	24%	23%
Vs 2019									
1Q21 vs 1Q19	56%	-56%	-59%	-79%	-9%	-95%	-3%	-14%	-46%
2Q21 vs 2Q19	37%	-51%	-51%	-73%	-7%	-92%	-6%	-1%	-42%
3Q21 vs 3Q19	47%	-43%	-51%	-67%	-9%	-89%	-8%	35%	-34%
4Q21 vs 4Q19	51%	-39%	-44%	-53%	-4%	-76%	0%	44%	-28%
1Q22 vs 1Q19	139%	-41%	-48%	-66%	19%	-68%	-8%	125%	-25%
2Q22 vs 2Q19	118%	-35%	-48%	-61%	19%	-61%	-6%	116%	-20%
3Q22 vs 3Q19	109%	-29%	-42%	-60%	20%	-57%	-9%	99%	-14%
4Q22 vs 4Q19	88%	-31%	-42%	-56%	17%	-47%	-12%	93%	-16%
1Q23 vs 1Q19	234%	-24%	-29%	-64%	74%	-40%	-22%	215%	-1%
2Q23 vs 2Q19	189%	-21%	-23%	-52%	78%	-35%	-24%	182%	1%
3Q23 vs 3Q19	179%	-16%	-20%	-48%	77%	-34%	-27%	153%	5%
4Q23 vs 4Q19	145%	-18%	-20%	-33%	72%	-30%	-26%	140%	4%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 175: Boeing aircraft quarterly average flight cycles yoy growth

787 exhibited the strongest performance in 4Q23

	737 Org/Classic	737NG	747	757	767	777	787	717	Boeing Total
1Q20	-4%	-15%	-9%	-4%	-1%	-15%	-2%	-2%	-15%
2Q20	-58%	-76%	-21%	-61%	-41%	-62%	-66%	-78%	-71%
3Q20	-49%	-47%	-23%	-47%	-37%	-54%	-48%	-57%	-47%
4Q20	-23%	-43%	-13%	-32%	-26%	-42%	-30%	-59%	-41%
1Q21	-12%	-37%	-3%	-27%	-25%	-34%	-17%	-52%	-33%
2Q21	67%	164%	9%	79%	35%	50%	140%	117%	127%
3Q21	34%	31%	10%	36%	34%	32%	55%	20%	37%
4Q21	17%	26%	4%	20%	24%	18%	25%	40%	31%
1Q22	10%	29%	-3%	19%	25%	18%	26%	36%	33%
2Q22	9%	13%	-9%	6%	15%	20%	22%	38%	20%
3Q22	3%	10%	-12%	10%	8%	20%	24%	32%	16%
4Q22	-8%	1%	-15%	-1%	1%	11%	13%	31%	7%
1Q23	-9%	19%	-10%	5%	5%	20%	29%	22%	22%
2Q23	-11%	19%	-1%	2%	4%	25%	29%	6%	22%
3Q23	-8%	15%	1%	-6%	3%	21%	27%	4%	20%
4Q23	-15%	20%	3%	-1%	3%	19%	25%	4%	22%
Vs 2019									
1Q21 vs 1Q19	-16%	-46%	-12%	-30%	-26%	-44%	-19%	-53%	-43%
2Q21 vs 2Q19	-29%	-38%	-14%	-31%	-20%	-42%	-18%	-51%	-34%
3Q21 vs 3Q19	-31%	-31%	-15%	-28%	-16%	-39%	-19%	-48%	-27%
4Q21 vs 4Q19	-10%	-29%	-10%	-18%	-9%	-32%	-12%	-42%	-22%
1Q22 vs 1Q19	-7%	-31%	-15%	-17%	-8%	-33%	2%	-36%	-24%
2Q22 vs 2Q19	-23%	-29%	-22%	-27%	-9%	-31%	0%	-33%	-21%
3Q22 vs 3Q19	-29%	-24%	-25%	-21%	-9%	-27%	0%	-31%	-16%
4Q22 vs 4Q19	-17%	-28%	-23%	-18%	-8%	-24%	0%	-24%	-17%
1Q23 vs 1Q19	-15%	-17%	-23%	-13%	-3%	-20%	32%	-22%	-7%
2Q23 vs 2Q19	-32%	-16%	-23%	-25%	-5%	-14%	28%	-29%	-3%
3Q23 vs 3Q19	-34%	-12%	-25%	-25%	-7%	-12%	27%	-29%	1%
4Q23 vs 4Q19	-29%	-14%	-21%	-20%	-4%	-10%	25%	-21%	1%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 176: Other airframe quarterly average flight cycles yoy growth

Airbus A220 exhibited the strongest performance in 4Q23

	ATR family	Embraer 135/145	Embraer E-Jet Family	Airbus A220	MD-11	MD-80	MD-90
1Q20	7%	1%	-5%	39%	-9%	-56%	-41%
2Q20	-75%	-75%	-85%	-61%	-3%	-87%	-96%
3Q20	-49%	-63%	-65%	-21%	1%	-88%	-100%
4Q20	-46%	-64%	-57%	-41%	1%	-74%	-100%
1Q21	-38%	-53%	-50%	-38%	1%	-63%	-100%
2Q21	144%	120%	241%	151%	1%	-1%	-98%
3Q21	30%	56%	85%	71%	-2%	52%	500%
4Q21	37%	58%	57%	144%	-3%	14%	-100%
1Q22	33%	24%	46%	162%	-4%	-11%	-100%
2Q22	54%	3%	43%	119%	-6%	16%	-85%
3Q22	50%	-8%	14%	47%	-5%	-4%	-100%
4Q22	24%	-17%	8%	34%	-10%	-9%	
1Q23	24%	-11%	21%	40%	-10%	3%	
2Q23	15%	-12%	10%	30%	-21%	-3%	-50%
3Q23	12%	-11%	10%	27%	-23%	3%	
4Q23	7%	-2%	10%	24%	-21%	-4%	-100%
Vs2019							
1Q21 vs 1Q19	-34%	-53%	-53%	-14%	-9%	-83%	-100%
2Q21 vs 2Q19	-38%	-44%	-48%	-1%	-3%	-87%	-100%
3Q21 vs 3Q19	-34%	-42%	-35%	35%	-1%	-82%	-100%
4Q21 vs 4Q19	-25%	-44%	-33%	44%	-2%	-70%	-100%
1Q22 vs 1Q19	-13%	-41%	-31%	125%	-12%	-85%	-100%
2Q22 vs 2Q19	-5%	-42%	-25%	116%	-9%	-85%	-100%
3Q22 vs 3Q19	-1%	-47%	-26%	99%	-6%	-83%	-100%
4Q22 vs 4Q19	-8%	-53%	-28%	93%	-12%	-73%	-100%
1Q23 vs 1Q19	8%	-48%	-16%	215%	-21%	-85%	-99%
2Q23 vs 2Q19	9%	-49%	-18%	182%	-28%	-86%	-100%
3Q23 vs 3Q19	11%	-52%	-19%	153%	-28%	-82%	-100%
4Q23 vs 4Q19	-2%	-54%	-21%	140%	-30%	-74%	-100%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 177: Europe airlines quarterly average flight cycles yoy growth

SWISS daily cycles were the strongest of major European airlines in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Aer Lingus	-8%	-89%	-81%	-84%	-88%	5%	88%	263%	550%	681%	128%	54%	25%	5%	9%	5%
Air France	-12%	-89%	-47%	-62%	-54%	243%	25%	99%	83%	115%	33%	14%	16%	0%	-5%	-4%
Air-France KLM	-11%	-89%	-47%	-56%	-56%	276%	41%	85%	107%	116%	22%	12%	15%	3%	4%	6%
Austrian Air	-27%	-97%	-70%	-77%	-75%	1096%	97%	142%	147%	139%	38%	42%	58%	20%	10%	7%
British Airways	-18%	-93%	-75%	-74%	-86%	93%	37%	97%	404%	446%	114%	66%	55%	8%	13%	4%
Brussels Airlines	-8%	-98%	-76%	-84%	-84%	961%	169%	309%	299%	201%	34%	23%	51%	15%	2%	5%
Buzz (Ryanair)	86%	-96%	-1%	-52%	-87%	1485%	78%	283%	1039%	309%	51%	7%	12%	10%	9%	11%
Easjet	-15%	-99%	-61%	-83%	-88%	1228%	44%	251%	544%	441%	49%	30%	21%	7%	13%	16%
Edelweiss Air	-13%	-95%	-39%	-64%	-73%	767%	36%	137%	189%	130%	42%	38%	57%	11%	13%	22%
Eurowings	-23%	-89%	-44%	-63%	-80%	190%	39%	143%	312%	211%	23%	10%	21%	-14%	-7%	-15%
Germanwings	3%	-100%	-100%	-100%	-100%	-100%	-100%	-100%	n.a.	n.a.	n.a.	n.a.	n.a.	2300%	-50%	8%
IAG	-13%	-94%	-69%	-74%	-80%	313%	75%	137%	300%	247%	60%	46%	44%	5%	5%	6%
Iberia	-6%	-95%	-66%	-67%	-60%	846%	114%	135%	148%	108%	35%	29%	22%	9%	9%	8%
KLM	-8%	-87%	-50%	-48%	-53%	236%	49%	51%	85%	89%	15%	1%	9%	4%	7%	17%
LEVEL	57%	-100%	-100%	-100%	-100%	-100%	-100%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lufthansa	-17%	-91%	-70%	-75%	-78%	210%	79%	163%	211%	178%	41%	15%	22%	-1%	10%	11%
Lufthansa Group	-17%	-93%	-69%	-76%	-80%	268%	78%	169%	228%	180%	33%	16%	26%	0%	6%	7%
Norwegian	36%	-88%	-65%	-78%	-90%	20%	69%	-96%	-100%	-100%	-100%	-100%	n.a.	n.a.	n.a.	n.a.
Ryanair	8%	-96%	-46%	-72%	-90%	564%	44%	203%	723%	340%	31%	12%	22%	7%	12%	9%
SWISS	-14%	-92%	-67%	-79%	-82%	232%	87%	213%	289%	190%	15%	1%	12%	-4%	4%	23%
Transavia	-18%	-95%	-40%	-62%	-75%	662%	54%	178%	374%	186%	17%	33%	25%	6%	17%	4%
Turkish Air	-13%	-85%	-55%	-50%	-41%	317%	106%	87%	66%	73%	17%	15%	33%	18%	10%	11%
Vueling	-13%	-97%	-59%	-73%	-82%	871%	85%	172%	359%	190%	30%	34%	57%	1%	-4%	7%
Wizz Air	3%	-86%	-28%	-66%	-73%	206%	27%	160%	225%	185%	29%	19%	21%	-30%	-35%	-26%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 178: North America airlines quarterly average flight cycles yoy growth

Frontier Airlines cycles were strongest of major US carriers in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Air Canada	7%	-71%	-63%	-61%	-67%	40%	98%	116%	162%	197%	70%	36%	33%	15%	9%	14%
Alaska	5%	-72%	-57%	-44%	-36%	188%	89%	51%	37%	17%	14%	10%	12%	9%	13%	7%
Allegiant	4%	-50%	-13%	-18%	-1%	108%	26%	32%	10%	2%	-4%	-4%	2%	2%	0%	7%
American Airlines	5%	-67%	-44%	-49%	-39%	171%	70%	77%	57%	18%	12%	10%	14%	12%	9%	4%
Delta	19%	-75%	-47%	-36%	-32%	233%	69%	44%	36%	23%	14%	11%	12%	14%	14%	11%
Frontier Airlines	30%	-72%	-45%	-39%	-33%	300%	90%	78%	58%	11%	7%	6%	11%	11%	14%	21%
Hawaiian	5%	-81%	-69%	-62%	-54%	252%	176%	115%	83%	29%	6%	8%	17%	9%	8%	9%
Jet Blue	-7%	-86%	-66%	-56%	-46%	403%	142%	88%	76%	24%	10%	13%	12%	7%	3%	0%
MESA Airlines	-6%	-70%	-53%	-44%	-36%	138%	56%	21%	-10%	-24%	-39%	-36%	-16%	-24%	-13%	-6%
Southwest	-4%	-55%	-33%	-41%	-37%	75%	33%	49%	49%	21%	15%	11%	16%	12%	8%	16%
Spirit	11%	-81%	-38%	-33%	-31%	394%	61%	57%	52%	17%	13%	18%	19%	19%	10%	12%
United Airlines	-6%	-85%	-67%	-51%	-42%	300%	143%	82%	73%	57%	23%	17%	23%	17%	21%	14%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 179: Asia Pacific airlines quarterly average flight cycles yoy growth

China Southern cycles were the strongest in APAC in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Air Asia	-13%	-97%	-75%	-89%	-91%	42%	-90%	135%	441%	913%	1919%	118%	71%	65%	41%	26%
Air China	-41%	-58%	-13%	-3%	36%	152%	-8%	-33%	-26%	-65%	-26%	-40%	52%	180%	113%	198%
Air India	-5%	-87%	-69%	-51%	-31%	308%	78%	47%	15%	50%	46%	18%	25%	18%	13%	11%
Air New Zealand	3%	-74%	-40%	-22%	-23%	239%	1%	-20%	-3%	1%	54%	61%	28%	13%	6%	2%
ANA	11%	-69%	-40%	-32%	-55%	60%	-4%	0%	70%	86%	80%	55%	30%	12%	5%	1%
Cathay Pacific	-36%	-78%	-79%	-74%	-69%	-17%	38%	32%	-6%	15%	-4%	-3%	142%	148%	105%	93%
China Eastern	-48%	-60%	-6%	-11%	60%	182%	-14%	-22%	-32%	-75%	-29%	-50%	48%	236%	99%	195%
China Southern	-48%	-55%	-3%	1%	67%	136%	-12%	-32%	-31%	-65%	-32%	-48%	46%	136%	103%	208%
GoAir	14%	-96%	-79%	-49%	-31%	705%	115%	75%	19%	201%	67%	-26%	8%	-76%	-100%	-100%
Hainan Airlines	-54%	-55%	-19%	-6%	84%	118%	1%	-30%	-39%	-66%	-37%	-48%	69%	169%	110%	168%
Indigo	11%	-89%	-58%	-35%	-13%	393%	73%	48%	2%	120%	52%	13%	42%	13%	23%	19%
Japan Airlines	-4%	-65%	-45%	-43%	-63%	25%	-11%	26%	108%	93%	89%	28%	19%	7%	3%	5%
Korean Air	-25%	-59%	-56%	-49%	-36%	29%	22%	15%	18%	12%	9%	11%	24%	31%	37%	37%
Qantas	2%	-87%	-81%	-61%	-41%	510%	47%	4%	5%	3%	185%	113%	42%	9%	7%	2%
Shenzhen Airlines	-44%	-49%	-2%	2%	42%	86%	-20%	-28%	-34%	-61%	-17%	-46%	69%	150%	60%	144%
Sichuan Airlines	-41%	-49%	4%	2%	65%	139%	-9%	-28%	-28%	-53%	-28%	-36%	45%	99%	84%	128%
Singapore Airlines	4%	-80%	-75%	-64%	-48%	192%	159%	105%	79%	86%	68%	53%	37%	20%	18%	19%
SpiceJet	24%	-80%	-60%	-37%	-14%	118%	18%	5%	-28%	75%	15%	-28%	-23%	-42%	-33%	-22%
Spring	-28%	-39%	17%	14%	59%	113%	-4%	-24%	-25%	-75%	-34%	6%	167%	63%	115%	

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 180: Middle East airlines quarterly average flight cycles yoy growth

Etihad cycles were the most resilience in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Emirates	-12%	-74%	-62%	-48%	-42%	117%	45%	27%	39%	44%	36%	23%	20%	23%	22%	14%
Etihad	1%	-79%	-63%	-54%	-48%	141%	43%	18%	17%	31%	30%	24%	26%	27%	30%	29%
Qatar	3%	-59%	-46%	-29%	-21%	89%	50%	19%	13%	21%	11%	4%	10%	16%	25%	28%
Saudia	-20%	-90%	-69%	-48%	-30%	529%	126%	64%	43%	30%	21%	10%	5%	0%	-1%	2%

Source: BofA Global Research, Flightradar24

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Exhibit 181: LATAM airlines quarterly average flight cycles yoy growth

Avianca cycles were the most resilience in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Aeromexico	-1%	-82%	-56%	-35%	-20%	400%	147%	81%	42%	68%	39%	34%	45%	7%	14%	3%
Avianca	6%	-98%	-96%	-64%	-51%	3591%	1672%	113%	65%	75%	47%	30%	21%	15%	14%	31%
Azul	3%	-84%	-62%	-25%	-9%	390%	163%	45%	15%	61%	20%	7%	19%	3%	5%	2%
LATAM Airlines	-4%	-92%	-81%	-53%	-45%	522%	271%	73%	58%	91%	43%	23%	25%	20%	10%	10%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 182: Cargo airlines quarterly average flight cycles yoy growth

DHL was the best performer yoy among cargo airlines in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Atlas Air	2%	6%	6%	3%	2%	2%	-10%	1%	21%	15%	13%	1%	-6%	3%	15%	16%
Cargolux	-1%	22%	0%	11%	28%	0%	9%	-3%	-2%	-7%	-9%	-12%	-18%	-12%	-10%	2%
DHL	22%	3%	5%	25%	12%	28%	35%	-5%	-49%	-60%	-53%	-50%	13%	51%	31%	54%
Fedex	2%	7%	11%	11%	9%	6%	6%	3%	0%	0%	-2%	-9%	-12%	-16%	-13%	-9%
Lufthansa Cargo	13%	28%	25%	22%	4%	-11%	-22%	-12%	-10%	-6%	2%	-10%	-4%	-11%	-8%	-6%
UPS	11%	12%	10%	9%	6%	4%	2%	1%	1%	-1%	-1%	-6%	-4%	-7%	-16%	-13%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 183: Global airlines quarterly average flight cycles yoy growth

China airline cycles exhibited strong yoy growth in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
EU Flag	-14%	-90%	-63%	-66%	-65%	267%	74%	111%	133%	138%	35%	21%	28%	7%	8%	9%
EU LCC	6%	-94%	-48%	-71%	-86%	344%	48%	165%	415%	241%	24%	15%	26%	-3%	-2%	0%
US Legacy	6%	-75%	-53%	-46%	-39%	206%	85%	66%	54%	31%	17%	13%	16%	13%	14%	9%
US Low Cost Carriers	-1%	-64%	-39%	-41%	-36%	127%	49%	56%	51%	19%	12%	11%	15%	11%	8%	13%
US Cargo	5%	9%	10%	9%	8%	5%	3%	2%	2%	1%	-1%	-7%	-9%	-11%	-11%	-8%
China Airlines	-46%	-55%	-5%	-3%	58%	141%	-11%	-28%	-31%	-67%	-29%	-46%	48%	166%	96%	180%
Middle East	-9%	-75%	-59%	-43%	-33%	161%	66%	32%	28%	30%	22%	12%	14%	16%	16%	16%
LATAM	0%	-90%	-77%	-46%	-35%	537%	246%	69%	43%	76%	36%	20%	24%	13%	10%	10%
Asia ex China	-1%	-80%	-61%	-48%	-39%	147%	27%	29%	21%	72%	66%	26%	32%	11%	12%	10%

Source: BofA Global Research, Flightradar24

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Exhibit 184: Europe airports quarterly average flight cycles yoy growth

London Southend cycles exhibited the strongest performance in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
London Heathrow	-13%	-84%	-66%	-63%	-71%	77%	35%	68%	151%	190%	76%	41%	48%	13%	20%	14%
Paris Charles de Gaulle	-14%	-85%	-57%	-65%	-58%	143%	37%	97%	95%	124%	41%	25%	27%	9%	8%	9%
Amsterdam Schiphol	-13%	-86%	-54%	-58%	-60%	165%	50%	82%	117%	125%	23%	8%	14%	5%	11%	16%
Frankfurt	-20%	-82%	-65%	-64%	-60%	120%	70%	100%	95%	101%	25%	13%	21%	7%	16%	13%
Madrid-Barajas	-12%	-92%	-68%	-69%	-63%	375%	87%	122%	138%	110%	39%	29%	23%	9%	8%	8%
Barcelona	-17%	-94%	-65%	-74%	-76%	407%	84%	174%	255%	175%	35%	26%	31%	8%	8%	13%
Ibiza	-16%	-94%	-46%	-53%	-42%	797%	93%	149%	133%	120%	15%	7%	18%	4%	1%	2%
Mykonos	-41%	-93%	-50%	-57%	18%	774%	140%	158%	128%	103%	17%	22%	19%	-14%	-8%	5%
Istanbul - Istanbul Ataturk Airport	-18%	-91%	-64%	-57%	-45%	465%	113%	87%	75%	92%	35%	28%	39%	20%	15%	12%
Sheremetyevo Moscow	-5%	-83%	-61%	-60%	-53%	233%	75%	67%	24%	-28%	-18%	-26%	3%	41%	17%	17%
Munich	-19%	-93%	-71%	-77%	-83%	218%	56%	161%	298%	216%	59%	24%	25%	2%	5%	4%
London Gatwick	-17%	-98%	-74%	-84%	-94%	211%	-3%	146%	752%	1027%	234%	115%	79%	9%	9%	10%
Rome Fiumicino	-27%	-90%	-71%	-74%	-72%	149%	50%	102%	150%	170%	63%	44%	47%	18%	19%	26%
Paris Orly	-18%	-98%	-62%	-62%	-61%	2061%	88%	111%	134%	146%	32%	28%	15%	6%	4%	-2%
Milan Malpensa	-21%	-83%	-62%	-66%	-55%	132%	43%	102%	129%	122%	33%	17%	16%	4%	7%	8%
London Stansted	-15%	-89%	-54%	-68%	-77%	131%	32%	146%	261%	264%	53%	23%	31%	7%	8%	7%
London City	-21%	-99%	-89%	-91%	-96%	1161%	112%	326%	1012%	719%	184%	68%	73%	0%	-3%	4%
London Luton	-14%	-92%	-44%	-70%	-75%	240%	5%	160%	262%	267%	67%	22%	32%	4%	5%	7%
London Southend	30%	-80%	-50%	-49%	-75%	86%	-10%	-33%	36%	-33%	-39%	-60%	-52%	-19%	-22%	70%

Source: BofA Global Research, Flightradar24

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Exhibit 185: Asia airports quarterly average flight cycles yoy growth

Xianyang exhibited the strongest performance in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Beijing Capital	-52%	-77%	-50%	-35%	-3%	173%	0%	-32%	-27%	-73%	-29%	-58%	39%	263%	94%	281%
Dubai	-18%	-78%	-65%	-49%	-37%	184%	66%	57%	63%	49%	63%	25%	24%	40%	19%	14%
Tokyo Haneda	-6%	-69%	-46%	-35%	-50%	81%	14%	15%	61%	47%	43%	26%	30%	24%	19%	14%
Hong Kong	-41%	-71%	-72%	-64%	-49%	7%	31%	22%	-2%	-2%	-11%	-4%	75%	108%	115%	103%
Shanghai Hongqiao	-43%	-40%	-3%	-3%	51%	63%	-17%	-15%	-26%	-96%	-28%	-33%	48%	2426%	75%	81%
Shanghai Pudong	-45%	-57%	-26%	-28%	20%	101%	-18%	-11%	-11%	-84%	-27%	-31%	22%	465%	125%	124%
Shenzhen Airport	-35%	-20%	1%	2%	39%	12%	-18%	-12%	-36%	-25%	-9%	-31%	79%	73%	53%	94%
Indira Gandhi	1%	-84%	-61%	-43%	-20%	232%	64%	47%	2%	79%	41%	8%	26%	5%	7%	3%
Guangzhou Baiyun	-40%	-42%	-15%	-3%	36%	28%	-17%	-37%	-28%	-51%	-14%	-51%	30%	113%	60%	218%
Incheon	-27%	-75%	-73%	-67%	-53%	42%	30%	23%	9%	9%	35%	48%	90%	112%	92%	64%
Soekarno-Hatta	2%	-78%	-60%	-42%	-44%	163%	-18%	-3%	26%	54%	137%	41%	26%	13%	15%	12%
Singapore Changi	-21%	-86%	-83%	-78%	-68%	91%	69%	57%	52%	94%	115%	114%	104%	63%	44%	26%
Suvarnabhumi	-19%	-87%	-75%	-61%	-63%	118%	-20%	-6%	41%	92%	212%	95%	78%	47%	33%	21%
Kuala Lumpur	-17%	-92%	-82%	-86%	-83%	78%	-25%	118%	158%	206%	279%	109%	99%	87%	58%	30%
Chengdu Shuangliu	-35%	-39%	-3%	-5%	40%	78%	-22%	-32%	-35%	-62%	-48%	-40%	3%	47%	47%	42%
Taiwan	-61%	-57%	19%	29%	101%	179%	-5%	-20%	-19%	-69%	-16%	-54%	28%	245%	44%	178%
Xianyang	-36%	-38%	28%	-14%	62%	140%	-13%	-36%	-68%	-63%	-26%	-54%	231%	159%	86%	326%
Osaka Kansai	-22%	-78%	-71%	-69%	-66%	29%	14%	20%	36%	42%	40%	50%	79%	80%	74%	56%
Tokyo Haneda	-6%	-69%	-46%	-35%	-50%	81%	14%	15%	61%	47%	43%	26%	30%	24%	19%	14%
Tokyo Narita	-9%	-67%	-62%	-53%	-51%	41%	31%	24%	27%	27%	29%	23%	35%	29%	25%	23%
Chongqing Jianyebei	-36%	-22%	-1%	4%	43%	36%	-16%	-29%	-20%	-52%	-31%	-68%	1%	78%	74%	282%

Source: BofA Global Research, Flightradar24

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Exhibit 186: North America airports quarterly average flight cycles yoy growth

Orlando delivered the strongest performance in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Hartsfield-Jackson Atlanta	-5%	-73%	-45%	-33%	-23%	184%	44%	24%	10%	1%	0%	0%	8%	8%	8%	8%
Los Angeles (LAX)	-8%	-71%	-56%	-46%	-39%	140%	81%	55%	43%	18%	1%	-3%	1%	3%	7%	9%
Chicago O'Hare	-1%	-70%	-51%	-50%	-45%	129%	70%	61%	47%	13%	-9%	-8%	2%	-1%	3%	4%
Dallas/Fort Worth	-1%	-56%	-34%	-23%	-14%	107%	37%	20%	8%	1%	-1%	-4%	3%	2%	6%	10%
Denver	6%	-60%	-37%	-26%	-21%	127%	54%	27%	20%	4%	-5%	2%	11%	9%	11%	11%
John F. Kennedy (JFK)	-10%	-84%	-68%	-58%	-52%	268%	123%	103%	113%	57%	38%	21%	12%	9%	5%	6%
San Francisco	-4%	-76%	-62%	-57%	-54%	106%	58%	58%	70%	62%	29%	14%	12%	9%	10%	11%
McCarran	-2%	-67%	-42%	-39%	-35%	150%	58%	57%	62%	31%	21%	18%	20%	10%	4%	11%
Seattle-Tacoma	-1%	-63%	-41%	-31%	-24%	125%	45%	21%	17%	6%	4%	5%	6%	5%	7%	7%
Toronto Pearson	-10%	-85%	-77%	-74%	-77%	31%	80%	135%	180%	283%	92%	32%	42%	12%	6%	11%
Mexico City	11%	-82%	-60%	-44%	-36%	307%	96%	45%	37%	27%	15%	5%	4%	-8%	-8%	-7%
Orlando	0%	-69%	-48%	-39%	-32%	190%	85%	57%	42%	14%	8%	8%	17%	14%	16%	19%

Source: BofA Global Research, Flightradar24

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Exhibit 187: Oceania airports quarterly average flight cycles yoy growth

All Oceania airports reported strong performance in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Melbourne	-11%	-87%	-89%	-78%	-55%	335%	99%	53%	59%	51%	261%	152%	45%	12%	20%	15%
Auckland	-12%	-78%	-57%	-45%	-38%	199%	4%	-46%	4%	5%	71%	186%	49%	31%	23%	13%
Sydney	-10%	-84%	-80%	-69%	-54%	288%	-2%	23%	49%	31%	315%	129%	50%	12%	16%	9%
Brisbane	-7%	-75%	-63%	-52%	-36%	180%	18%	14%	11%	22%	82%	64%	45%	16%	22%	13%

Source: BofA Global Research, Flightradar24

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Exhibit 188: LATAM airports quarterly average flight cycles yoy growth

Santiago was the strongest Latam airport in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Mexico City	11%	-82%	-60%	-44%	-36%	307%	96%	45%	37%	27%	15%	5%	4%	-8%	-8%	-7%
Sao Paulo - Guarulhos International	2%	-80%	-58%	-34%	-35%	214%	84%	28%	29%	56%	27%	12%	18%	23%	15%	10%
Bogota	7%	-90%	-86%	-54%	-31%	636%	424%	83%	49%	53%	34%	20%	15%	3%	7%	7%
Cancun	-6%	-88%	-54%	-22%	-16%	724%	142%	55%	49%	29%	19%	11%	12%	12%	7%	8%
Santiago	-10%	-82%	-77%	-55%	-48%	131%	162%	52%	47%	91%	38%	24%	26%	21%	23%	17%

Source: BofA Global Research, Flightradar24

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Exhibit 189: Global airports quarterly average flight cycles yoy growth

Chinese airports have reported strong yoy growth in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
Chinese Airports	-40%	-46%	-16%	-12%	30%	72%	-11%	-24%	-26%	-62%	-27%	-42%	39%	157%	85%	150%
Top 10 European airports	-16%	-87%	-64%	-65%	-63%	196%	64%	98%	113%	111%	34%	20%	27%	12%	12%	13%
Top 10 NA airports	-3%	-70%	-50%	-42%	-36%	136%	59%	43%	36%	20%	7%	4%	9%	6%	7%	9%
Top 10 APAC airports	-27%	-71%	-54%	-45%	-34%	81%	7%	3%	9%	-6%	21%	7%	44%	72%	51%	55%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 190: EU short airport-pairs quarterly average flight cycles yoy growth

FRA-LTN route delivered the strongest performance through 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
AMS-LCY	-17%	-100%	-91%	-89%	-95%	n.m.	117%	228%	820%	771%	235%	88%	90%	14%	21%	22%
AMS-LGW	-19%	-100%	-75%	-94%	-99%	4900%	-58%	232%	2900%	2398%	660%	268%	191%	18%	7%	14%
AMS-LHR	-12%	-88%	-73%	-75%	-82%	62%	25%	117%	245%	307%	139%	57%	59%	1%	12%	2%
AMS-LTN	-16%	-99%	-71%	-89%	-97%	86%	1%	378%	1918%	3346%	200%	40%	42%	6%	10%	21%
AMS-SEN	-26%	-85%	-47%	-54%	-100%	-100%	-100%	-100%	n.m.	n.m.	n.m.	n.m.	0%	1050%	n.m.	n.m.
AMS-STN	-13%	-79%	-58%	-72%	-76%	-9%	17%	167%	205%	367%	57%	18%	31%	4%	12%	4%
CDG-FRA	-16%	-78%	-65%	-69%	-61%	58%	67%	149%	132%	123%	20%	7%	5%	10%	22%	10%
CIA-CDG	-16%	-78%	-65%	-71%	-64%	53%	65%	147%	148%	129%	24%	19%	4%	12%	15%	3%
CIA-FRA	-1%	n.m.	n.m.	-100%	102%	n.m.	0%	n.m.	-50%	150%	300%	75%	700%	60%	50%	0%
CIA-LHR	-26%	-69%	-46%	-63%	-81%	-15%	-28%	44%	281%	157%	93%	57%	39%	10%	11%	1%
CIA-LTN	-41%	-100%	-99%	-96%	-96%	n.m.	1600%	3033%	2750%	243%	41%	-82%	-74%	13%	8%	41%
CIA-SEN	n.m.	-100%	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	-100%	n.m.	n.m.	n.m.	n.m.	n.m.	0%
CIA-STN	-18%	-98%	-67%	-89%	-95%	1171%	63%	436%	1394%	345%	62%	70%	78%	12%	13%	8%
DUB-LCY	-16%	-100%	-97%	-97%	-97%	n.m.	344%	1278%	1845%	2203%	437%	37%	54%	1%	6%	4%
DUB-LGW	-13%	-91%	-77%	-88%	-95%	-59%	54%	518%	1364%	2818%	183%	37%	42%	3%	13%	9%
DUB-LHR	-15%	-84%	-75%	-77%	-81%	38%	41%	128%	236%	282%	109%	60%	55%	3%	21%	11%
DUB-LTN	-22%	-97%	-60%	-80%	-86%	89%	3%	335%	636%	2235%	182%	30%	32%	5%	4%	2%
DUB-SEN	-52%	-98%	-98%	-98%	-100%	-67%	-75%	-67%	n.m.	200%	200%	100%	n.m.	0%	-100%	0%
DUB-STN	-7%	-74%	-50%	-67%	-71%	14%	23%	165%	187%	196%	30%	-3%	12%	-2%	10%	0%
FCO-CDG	-23%	-82%	-50%	-64%	-47%	176%	17%	87%	71%	73%	24%	25%	23%	1%	7%	-2%
FCO-FRA	-17%	-89%	-79%	-81%	-85%	72%	70%	160%	249%	323%	90%	33%	55%	8%	22%	25%
FCO-LCY	-16%	-100%	-78%	-94%	-99%	1100%	-78%	309%	3067%	5633%	1213%	203%	141%	19%	9%	12%
FCO-LGW	-16%	-91%	-67%	-77%	-87%	87%	-9%	105%	293%	389%	193%	91%	110%	3%	5%	2%
FCO-LHR	-20%	-81%	-60%	-76%	-89%	-17%	-24%	91%	480%	353%	140%	52%	42%	10%	13%	14%
FCO-LTN	-32%	-100%	-69%	-87%	-93%	n.m.	98%	496%	1170%	459%	66%	49%	65%	36%	39%	32%
FCO-ORY	-37%	-100%	-73%	-88%	-93%	3700%	88%	401%	977%	448%	73%	76%	89%	36%	36%	32%
FCO-SEN	-3%	-76%	-34%	-54%	-81%	-91%	-58%	2%	142%	3100%	71%	24%	37%	-2%	0%	-7%
FCO-STN	-90%	-50%	-50%	n.m.	102%	0%	100%	33%	350%	700%	0%	-75%	-44%	613%	n.m.	n.m.
FRA-LCY	-16%	-94%	-82%	-90%	-94%	-18%	70%	556%	1151%	1949%	227%	48%	51%	-5%	0%	-4%
FRA-LGW	-51%	-100%	n.m.	300%	-100%	n.m.	300%	-75%	n.m.	n.m.	-50%	100%	n.m.	3225%	n.m.	n.m.
FRA-LHR	-19%	-81%	-71%	-75%	-79%	47%	29%	117%	182%	209%	84%	59%	76%	0%	22%	12%
FRA-LTN	-27%	-98%	-99%	-91%	-85%	-25%	400%	48%	46%	1600%	450%	84%	26%	39%	36%	77%
FRA-SEN	-16%	-99%	-66%	-89%	-96%	1383%	61%	432%	1540%	347%	63%	74%	82%	-1%	0%	-2%
FRA-STN	20%	-96%	-55%	-85%	-95%	186%	-5%	397%	1367%	80%	-88%	-95%	-88%	-97%	0%	-88%
ORY-FRA	-13%	-100%	-99%	-99%	-100%	n.m.	408%	5714%	32300%	n.m.	469%	11%	37%	-2%	-2%	3%
CIA-ORY	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	0%	n.m.	n.m.	-100%	-100%	100%	n.m.	n.m.	n.m.	n.m.
LGW-CIA	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.	n.m.

Source: BofA Global Research, Flightradar24

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Exhibit 191: EU International airport-pairs quarterly average flight cycles yoy growth

JFK-LHR exhibited the strongest performance through 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
JFK-CDG	-12%	-85%	-63%	-54%	-51%	225%	79%	91%	133%	138%	78%	37%	17%	15%	32%	16%
JFK-FRA	-14%	-87%	-71%	-61%	-59%	225%	54%	76%	111%	165%	154%	53%	27%	6%	8%	11%
JFK-LHR	-16%	-73%	-63%	-53%	-51%	52%	33%	45%	67%	124%	75%	35%	31%	17%	30%	27%

Source: BofA Global Research, Flightradar24

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Exhibit 192: APAC airport-pairs quarterly average flight cycles yoy growth

PKX-CAN was the most resilient route in APAC in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
DEL-BOM	-4%	-92%	-76%	-57%	-36%	342%	118%	86%	18%	148%	49%	2%	31%	-2%	9%	5%
GMP-CJU	-17%	-22%	-9%	-9%	1%	36%	12%	19%	33%	6%	9%	-4%	-5%	-11%	-10%	-5%
HND-CTS	-2%	-55%	-23%	-15%	-33%	72%	17%	24%	57%	47%	31%	11%	15%	5%	-1%	1%
HND-FUK	5%	-52%	-19%	-11%	-33%	72%	15%	16%	56%	42%	28%	9%	13%	3%	3%	1%
NRT-CTS	-7%	-82%	-54%	-50%	-74%	126%	25%	42%	175%	123%	83%	85%	60%	13%	2%	-8%
NRT-FUK	20%	-73%	-39%	-40%	-61%	135%	23%	43%	145%	88%	48%	33%	24%	-3%	7%	12%
PEK-CAN	-58%	-94%	-30%	-30%	11%	761%	-34%	-45%	-32%	-82%	-58%	-73%	26%	273%	215%	500%
PEK-PVG	-58%	-85%	-57%	-39%	1%	247%	-23%	-26%	-10%	-76%	-30%	-30%	-4%	218%	186%	177%
PEK-SHA	-62%	-90%	-22%	-1%	93%	874%	-7%	-21%	-26%	-97%	-25%	-48%	68%	3335%	80%	126%
PKX-CAN	n.m.	n.m.	42233%	492%	661%	976%	108%	-39%	-4%	-89%	-54%	-80%	31%	389%	229%	742%
PKX-PVG	n.m.	n.m.	70200%	163%	294%	917%	0%	-25%	-40%	-100%	-22%	-68%	156%	n.m.	199%	481%
PKX-SHA	n.m.	n.m.	45500%	60%	135%	162%	-3%	-5%	-7%	-100%	-25%	-29%	63%	93600%	138%	128%
PVG-CAN	-61%	-94%	-39%	-3%	105%	1308%	17%	-1%	-22%	-94%	-14%	-46%	57%	1381%	139%	240%
SHA-CAN	-54%	-76%	8%	0%	84%	266%	-20%	-17%	-26%	-99%	-41%	-55%	42%	6425%	110%	165%
SIN-CGK	-21%	-86%	-86%	-83%	-72%	74%	68%	56%	37%	87%	98%	133%	148%	95%	74%	27%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 193: North America airport-pairs quarterly average flight cycles yoy growth

LGA-LAX exhibited the strongest growth in North America in 4Q23

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23
ATL-MCO	-4%	-72%	-45%	-33%	-25%	188%	48%	20%	7%	4%	8%	3%	20%	14%	18%	23%
EWR-ATL	-2%	-83%	-40%	-37%	-31%	305%	34%	63%	42%	24%	5%	-11%	1%	-1%	-2%	-4%
EWR-BOS	30%	-88%	-75%	-77%	-77%	218%	132%	129%	189%	159%	49%	31%	32%	-2%	-18%	-19%
EWR-LAX	-7%	-72%	-49%	-44%	-40%	83%	42%	58%	94%	103%	40%	16%	14%	12%	15%	13%
EWR-SFO	-6%	-78%	-66%	-67%	-66%	53%	37%	113%	168%	124%	37%	-11%	-1%	-4%	11%	17%
JFK-LHR	-16%	-73%	-63%	-53%	-51%	52%	33%	45%	67%	125%	75%	35%	31%	17%	37%	29%
LAX-LAS	-8%	-77%	-55%	-47%	-40%	223%	73%	54%	39%	23%	22%	12%	20%	3%	-8%	2%
LAX-SFO	-12%	-70%	-52%	-48%	-47%	94%	47%	45%	37%	32%	10%	3%	7%	4%	-2%	2%
LGA-ATL	-9%	-80%	-59%	-59%	-57%	124%	48%	105%	125%	86%	39%	-2%	-6%	-2%	-3%	8%
LGA-BOS	-6%	-89%	-78%	-85%	-86%	116%	62%	364%	548%	237%	164%	37%	16%	3%	-23%	-10%
LGA-LAX	-1%	n.m.	n.m.	n.m.	-100%	n.m.	n.m.	n.m.	n.m.	43%	-79%	-92%	-92%	-40%	100%	1200%
ORD-LAX	-11%	-67%	-52%	-49%	-53%	87%	63%	56%	83%	32%	9%	12%	7%	4%	1%	-6%
SEA-LAX	-12%	-68%	-44%	-38%	-30%	114%	40%	17%	10%	-6%	-17%	-6%	4%	16%	29%	12%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 194: CFM quarterly engine hours growth vs 2019

CFM LEAP 1-B outperformed the rest of CFM family in 4Q23

	BR700	CF6	CFM LEAP 1-B	CFM/V2500	CFM56-3	CFM56-5B	CFM56-5C	CFM56-7B	CFMLEAP 1-A
1Q20	-9%	-2%	-100%	276%	2%	-12%	-35%	-8%	57%
2Q20	-81%	-48%	-80%	-99%	-57%	-88%	-88%	-83%	-77%
3Q20	-61%	-45%	-50%	-38%	-50%	-52%	-85%	-49%	-23%
4Q20	-61%	-35%	87%	-93%	-25%	-53%	-75%	-48%	-26%
1Q21	-54%	-32%	-82%	-100%	-8%	-46%	-77%	-43%	19%
2Q21	-53%	-31%	14762%	-100%	-26%	-40%	-72%	-34%	17%
3Q21	-56%	-26%	39908%	-100%	-30%	-31%	-63%	-25%	34%
4Q21	-50%	-18%	39609%	-100%	-2%	-36%	-45%	-26%	25%
1Q22	-44%	-16%	87%	-100%	9%	-41%	-52%	-29%	89%
2Q22	-40%	-16%	67727%	-100%	-9%	-34%	-50%	-26%	84%
3Q22	-39%	-18%	99097%	-100%	-20%	-27%	-50%	-22%	76%
4Q22	-34%	-15%	80590%	-100%	-7%	-32%	-49%	-26%	60%
1Q23	-33%	-14%	274%	-100%	3%	-25%	-55%	-17%	169%
2Q23	-37%	-16%	118283%	-100%	-22%	-24%	-55%	-19%	135%
3Q23	-37%	-16%	168585%	-100%	-29%	-13%	-46%	-11%	137%
4Q23	-28%	-14%	131267%	-100%	-28%	-18%	-36%	-14%	110%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 195: GE, P&W quarterly engine hours growth vs 2019

PW1900G outperformed the rest of PW family in 4Q23

	GE CF34	GE90	GENX	GENX-2B	GP7200	PW100	PW1100G	PW1500G	PW1900G	PW2000	PW4000
1Q20	5%	-11%	0%	-4%	-8%	12%	67%	65%	312%	0%	-17%
2Q20	-76%	-59%	-68%	-21%	-100%	-76%	-66%	-59%	-3%	-69%	-69%
3Q20	-49%	-50%	-48%	-17%	-98%	-48%	-11%	-16%	47%	-53%	-65%
4Q20	-41%	-40%	-36%	-18%	-96%	-43%	1%	-40%	30%	-31%	-54%
1Q21	-28%	-41%	-25%	-9%	-96%	-28%	92%	5%	311%	-28%	-59%
2Q21	-20%	-35%	-19%	-12%	-94%	-32%	62%	20%	286%	-30%	-48%
3Q21	-9%	-32%	-19%	-5%	-87%	-28%	60%	60%	330%	-30%	-42%
4Q21	-11%	-25%	-14%	-2%	-74%	-17%	68%	70%	208%	-22%	-36%
1Q22	-11%	-26%	-1%	-4%	-64%	-4%	180%	204%	745%	-23%	-43%
2Q22	-11%	-21%	3%	-10%	-54%	7%	160%	183%	737%	-34%	-40%
3Q22	-14%	-17%	1%	-6%	-51%	7%	133%	140%	514%	-35%	-38%
4Q22	-19%	-15%	-1%	-5%	-42%	2%	107%	131%	319%	-30%	-36%
1Q23	-7%	-14%	22%	3%	-33%	20%	274%	336%	1320%	-27%	-35%
2Q23	-9%	-10%	20%	-4%	-26%	22%	197%	264%	1169%	-33%	-30%
3Q23	-9%	-4%	24%	2%	-27%	20%	179%	200%	966%	-33%	-26%
4Q23	-10%	-1%	21%	5%	-24%	11%	130%	190%	683%	-29%	-26%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 196: Trent quarterly engine hours growth vs 2019

Trent 7000 delivered the best performance in 4Q23

	RB211	TRENT 1000	TRENT 700	TRENT 7000	TRENT 800	TRENT 900	TRENT XWB	V2500
1Q20	22%	-2%	-25%	978%	-8%	-16%	20%	-8%
2Q20	-72%	-71%	-81%	-23%	-88%	-98%	-63%	-89%
3Q20	-67%	-66%	-71%	-48%	-87%	-97%	-46%	-66%
4Q20	-59%	-52%	-63%	-44%	-81%	-97%	-36%	-65%
1Q21	-51%	-46%	-62%	494%	-70%	-98%	-13%	-63%
2Q21	-56%	-43%	-55%	206%	-65%	-98%	-12%	-55%
3Q21	-47%	-36%	-59%	73%	-60%	-98%	-9%	-45%
4Q21	-38%	-26%	-54%	24%	-56%	-95%	-4%	-42%
1Q22	-36%	-17%	-56%	1362%	-56%	-88%	16%	-41%
2Q22	-44%	-13%	-57%	626%	-58%	-78%	12%	-30%
3Q22	-41%	-7%	-53%	216%	-54%	-69%	14%	-30%
4Q22	-43%	-5%	-53%	105%	-52%	-63%	15%	-28%
1Q23	-41%	10%	-44%	2478%	-48%	-59%	58%	-25%
1Q23	-41%	10%	-44%	2478%	-48%	-59%	58%	-25%
2Q23	-49%	7%	-43%	949%	-50%	-56%	53%	-26%
3Q23	-45%	9%	-33%	376%	-45%	-55%	61%	-26%
4Q23	-42%	10%	-33%	197%	-47%	-49%	60%	-25%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 197: CFM56-5B quarterly engine hours growth vs 2019

Latam remained the best performing region among all in 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	9%	-12%	10%	-4%	-9%	-28%
2Q20	-90%	-95%	-75%	-96%	-95%	-88%
3Q20	-53%	-65%	-53%	-85%	-83%	-41%
4Q20	-64%	-76%	-47%	-57%	-73%	-43%
1Q21	-56%	-80%	-35%	-48%	-67%	-36%
2Q21	-45%	-73%	-25%	-53%	-63%	-30%
3Q21	-17%	-42%	-22%	-31%	-53%	-42%
4Q21	-45%	-40%	-19%	-16%	-45%	-53%
1Q22	-47%	-46%	-8%	-16%	-39%	-65%
2Q22	-37%	-30%	-7%	-3%	-31%	-66%
3Q22	-40%	-23%	-9%	2%	-27%	-55%
4Q22	-35%	-30%	-13%	-4%	-33%	-56%
1Q23	-25%	-34%	-3%	-3%	-25%	-40%
2Q23	-31%	-27%	-6%	5%	-24%	-41%
3Q23	-43%	-23%	-8%	3%	-24%	-15%
4Q23	-38%	-27%	-13%	0%	-30%	-23%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 198: CFM56-7B quarterly engine hours growth vs 2019

Europe is the best performing region among all in 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	31%	-9%	3%	7%	-17%	-25%
2Q20	-94%	-95%	-72%	-94%	-95%	-84%
3Q20	-73%	-56%	-50%	-79%	-82%	-42%
4Q20	-62%	-64%	-46%	-55%	-68%	-41%
1Q21	-39%	-75%	-39%	-46%	-59%	-38%
2Q21	-37%	-67%	-28%	-65%	-57%	-23%
3Q21	-32%	-28%	-19%	-52%	-51%	-41%
4Q21	-38%	-20%	-18%	-44%	-29%	-49%
1Q22	-21%	-25%	-13%	-26%	-35%	-58%
2Q22	-22%	-16%	-14%	-29%	-32%	-56%
3Q22	-34%	-13%	-14%	-31%	-22%	-47%
4Q22	-33%	-16%	-18%	-29%	-20%	-47%
1Q23	-4%	-17%	-10%	-17%	-18%	-32%
2Q23	-11%	-13%	-15%	-17%	-16%	-37%
3Q23	-22%	-12%	-15%	-26%	-17%	-14%
4Q23	-25%	-14%	-17%	-32%	-24%	-16%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 199: CF6 quarterly engine hours growth vs 2019

North America has remained the best performing region as of 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	-3%	-10%	13%	13%	-11%	-17%
2Q20	-67%	-74%	-26%	-60%	-63%	-51%
3Q20	-53%	-71%	-24%	-55%	-59%	-45%
4Q20	-41%	-59%	-14%	-50%	-55%	-38%
1Q21	-24%	-57%	-3%	-40%	-67%	-45%
2Q21	-18%	-59%	-3%	-38%	-63%	-40%
3Q21	-26%	-50%	2%	-38%	-55%	-36%
4Q21	-23%	-39%	3%	-34%	-43%	-27%
1Q22	-11%	-37%	12%	-23%	-48%	-33%
2Q22	8%	-33%	4%	-21%	-40%	-28%
3Q22	7%	-31%	1%	-25%	-38%	-28%
4Q22	0%	-25%	-1%	-29%	-41%	-23%
1Q23	7%	-24%	6%	-20%	-36%	-30%
2Q23	9%	-25%	0%	-18%	-29%	-31%
3Q23	-5%	-27%	0%	-16%	-42%	-24%
4Q23	-4%	-23%	-2%	-21%	-46%	-17%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 200: GE90 quarterly engine hours growth vs 2019

Africa has remained the best performing region as of 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	-1%	-7%	-7%	-8%	-10%	-16%
2Q20	-57%	-61%	-59%	-80%	-57%	-57%
3Q20	-41%	-54%	-53%	-68%	-45%	-46%
4Q20	-28%	-43%	-42%	-54%	-36%	-38%
1Q21	-29%	-42%	-42%	-47%	-35%	-41%
2Q21	-23%	-39%	-39%	-43%	-25%	-33%
3Q21	-16%	-34%	-29%	-40%	-26%	-35%
4Q21	-18%	-25%	-17%	-39%	-19%	-32%
1Q22	-15%	-23%	-15%	-32%	-20%	-35%
2Q22	-3%	-17%	-13%	-33%	-10%	-34%
3Q22	-2%	-10%	-8%	-25%	-10%	-30%
4Q22	-9%	-10%	-7%	-18%	-7%	-27%
1Q23	0%	-10%	-4%	-19%	-8%	-24%
2Q23	-8%	-1%	-3%	-25%	3%	-23%
3Q23	-2%	4%	2%	-23%	0%	-10%
4Q23	-3%	5%	4%	-22%	-1%	-6%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 201: GENX quarterly engine hours growth vs 2019

Africa has remained the best performing region as of 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	31%	14%	8%	27%	1%	-15%
2Q20	-69%	-70%	-62%	-75%	-83%	-66%
3Q20	-47%	-49%	-41%	-50%	-57%	-49%
4Q20	-33%	-31%	-29%	-21%	-45%	-43%
1Q21	-8%	-9%	-12%	33%	-25%	-41%
2Q21	-6%	-17%	-11%	14%	-18%	-28%
3Q21	3%	-19%	-2%	4%	-8%	-38%
4Q21	0%	-3%	3%	27%	-5%	-36%
1Q22	33%	21%	27%	68%	2%	-31%
2Q22	33%	30%	20%	49%	14%	-28%
3Q22	28%	21%	14%	30%	15%	-26%
4Q22	20%	18%	13%	17%	10%	-24%
1Q23	63%	50%	43%	52%	30%	-8%
2Q23	54%	48%	27%	46%	30%	-4%
3Q23	54%	41%	28%	32%	25%	8%
4Q23	47%	40%	30%	26%	22%	5%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 202: PW100 quarterly engine hours growth vs 2019

Africa has remained the best performing region as of 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	9%	-5%	21%	21%	6%	21%
2Q20	-89%	-80%	-71%	-87%	41%	-74%
3Q20	-36%	-46%	-51%	-63%	15%	-45%
4Q20	-8%	-43%	-50%	-38%	-19%	-41%
1Q21	28%	-47%	-32%	-12%	-11%	-19%
2Q21	28%	-40%	-30%	-27%	11%	-28%
3Q21	45%	-22%	-23%	-12%	-13%	-38%
4Q21	50%	-12%	-21%	-14%	-33%	-23%
1Q22	85%	-16%	-10%	3%	-42%	0%
2Q22	56%	2%	-10%	12%	-26%	16%
3Q22	73%	13%	-9%	4%	-57%	4%
4Q22	68%	12%	-9%	-8%	-44%	-1%
1Q23	109%	12%	8%	16%	-25%	30%
2Q23	98%	19%	-3%	11%	38%	33%
3Q23	99%	25%	1%	17%	58%	17%
4Q23	105%	22%	-8%	-1%	37%	8%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 203: PW2000 quarterly engine hours growth vs 2019

Latam has remained the best performing region among all as of 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	19%	-11%	2%	8%	-14%	-5%
2Q20	-18%	-60%	-71%	-88%	-13%	-64%
3Q20	-17%	-59%	-52%	-71%	25%	-33%
4Q20	-14%	-23%	-31%	-41%	40%	-53%
1Q21	15%	-24%	-27%	-31%	30%	-61%
2Q21	-23%	-42%	-27%	-68%	65%	-39%
3Q21	3%	-39%	-27%	-54%	88%	-19%
4Q21	20%	-17%	-22%	-42%	194%	-45%
1Q22	19%	-37%	-19%	-35%	87%	-60%
2Q22	-24%	-47%	-31%	-46%	-3%	-50%
3Q22	-16%	-50%	-31%	-37%	5%	-39%
4Q22	33%	-43%	-27%	-44%	5%	-63%
1Q23	16%	-47%	-21%	-60%	-9%	-85%
2Q23	-27%	-52%	-28%	-28%	-5%	-91%
3Q23	-71%	-53%	-28%	-13%	-4%	-74%
4Q23	-100%	-55%	-24%	-8%	-85%	-74%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 204: PW4000 quarterly engine hours growth vs 2019

Middle East reported the best performance in 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	6%	3%	9%	-43%	-5%	-33%
2Q20	-83%	-76%	-57%	-75%	-69%	-72%
3Q20	-75%	-80%	-59%	-73%	-81%	-62%
4Q20	-70%	-69%	-46%	-38%	-67%	-53%
1Q21	-56%	-70%	-41%	-49%	-64%	-64%
2Q21	-57%	-63%	-21%	-62%	-62%	-54%
3Q21	-50%	-45%	-6%	-53%	-68%	-58%
4Q21	-52%	-34%	1%	-48%	-52%	-52%
1Q22	-56%	-39%	-2%	-21%	-55%	-59%
2Q22	-68%	-25%	-1%	-43%	-51%	-59%
3Q22	-74%	-18%	-13%	-50%	-48%	-53%
4Q22	-64%	-32%	-18%	-40%	0%	-44%
1Q23	-60%	-35%	-21%	-37%	4%	-41%
2Q23	-59%	-31%	-18%	-42%	38%	-36%
3Q23	-60%	-28%	-20%	-31%	0%	-29%
4Q23	-55%	-36%	-21%	-31%	38%	-26%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 205: TRENT quarterly engine hours growth vs 2019

Africa has reported the strongest growth among all regions in 4Q23

	Africa	Europe	North America	Latin America	Middle East	APAC
1Q20	24%	1%	2%	14%	-1%	-16%
2Q20	-75%	-76%	-80%	-75%	-68%	-78%
3Q20	-60%	-71%	-70%	-67%	-61%	-66%
4Q20	-53%	-60%	-56%	-55%	-50%	-59%
1Q21	-35%	-52%	-44%	-48%	-36%	-57%
2Q21	-27%	-53%	-40%	-48%	-32%	-49%
3Q21	-27%	-47%	-32%	-40%	-32%	-52%
4Q21	-34%	-32%	-17%	-30%	-33%	-49%
1Q22	-17%	-21%	-4%	-15%	-27%	-49%
2Q22	-7%	-19%	-7%	2%	-22%	-50%
3Q22	0%	-16%	-4%	-2%	-17%	-45%
4Q22	2%	-14%	2%	4%	-15%	-42%
1Q23	34%	1%	17%	22%	3%	-26%
2Q23	37%	1%	6%	23%	4%	-24%
3Q23	21%	7%	10%	15%	9%	-12%
4Q23	24%	11%	13%	24%	2%	-11%

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



What is the BofA Commercial Aerospace Tracker?

In partnership with **BofA's Predictive Data Analytics** team, the BofA Commercial Aerospace Tracker analyses Flightradar24 data which tracks ADS-B positions from global commercial, freight, regional and business aircraft allowing daily tracking and analysis of flight activity. The dataset will provide a real-time insight into daily activity by **engine type, airframe, narrowbody vs widebody, commercial vs freight, region, airline and airport**.

Below we highlight the data we intend to regularly highlight which can help to provide a frame of reference for the COVID-19 recovery.

Exhibit 206: Available data matrix – Flight Radar daily aircraft cycles data

Available data matrix

Usage	Equipment	Engine type	Region	Aircraft type
Bizjet	A220	CF6	Africa	Bizjet
Commercial	A320neo	CFM LEAP	Asia-Pacific	Narrowbody
Freight	A320ceo	CFM56	Europe	Regional
Light	A330	GE CF34	Latin America	Widebody
Regional	A340	GE90	Middle East	
	A350	GE9X	North America	
	A380	GENX		
	A300	GENX-2B		
	737 Original/Classic	GP7200		
	737NG	JT3D		
	737MAX	JT8D		
	747	JT9D		
	757	PW100		
	767	PW1100G 'GTF'		
	777	PW1500G		
	787	PW1900G		
	717	PW2000		
ATR family		PW4000		
Embraer 135/145		RB211		
Embraer E-Jet Family		TRENT		
		TRENT 1000		
		TRENT 500		
		TRENT 700		
		TRENT 7000		
		TRENT 800		
		TRENT 900		
		TRENT XWB		
		V2500		

Source: BofA Global Research, Flightradar24

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What is Flightradar24?

Flightradar24 is a global flight tracking service that provides real-time information about thousands of aircraft around the world. Flightradar24 has access to the largest ADS-B network in the world with over 20,000 connected receivers in the commercial fleet, tracking over 180,000 flights per day across commercial, freight, regional, light, military and more. Flightradar24 combines data from several data sources including ADS-B, MLAT and radar data. The ADS-B, MLAT and radar data is aggregated together with schedule and flight status data from airlines and airports. (Source: Flightradar24.com)

How does BofA Research process Flightradar24's data?

In partnership with **BofA's Predictive Data Analytics** team, we apply an overlay to Flightradar24's daily flight data, stripping out takeoffs and landings by aircraft engine type, airframe, narrowbody vs widebody, commercial vs freight, region, airports and more. This allows us to track the daily evolution of cycles for different aircraft and group in different datasets and display timeseries trends.



Data exceptions

Flightradar24 has an extensive database detailing aircraft registration, Mode S address, age, aircraft type and more. Due to the large volume of data and continual updates there are occasionally minor inaccuracies. (Source: Flightradar24).

The Flightradar24 data analysed and presented by **BofA Research** in the charts may also have some minor inaccuracies. This reflects in some cases inability to determine engine type for wetleased aircraft flying under different airline ICAO tags. In some cases, older commercial aircraft do not have ADS-B transponders fitted and do not appear in the daily data. For security and privacy reasons information about some aircraft is limited or blocked. This includes most military aircraft and certain high profile aircraft, like Air Force One. We therefore cannot guarantee the data we have analysed and displayed in the report is 100% representative of the number of flight movements for each platform/engine/region/use type, although we think it is a good indicator



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