

Global Aerospace

BofA Commercial Aerospace: Major engine family cycles show mixed performance

Industry Overview

Feb in review: Major engine family monthly average cycles vs 2019 show mixed performance MoM

Major engine family monthly average cycles vs 2019 show mixed performance MoM in Feb compared to Jan with GTF reporting the highest fall followed by P&W at one end and CFM LEAP and CFM56 family reporting an increase at the other end while Rolls-Royce remained flat MoM.

Global commercial monthly average cycles vs 2019 improved by +0.6ppts to +1.4% in Feb, vs +0.8% in Jan. GTF family monthly average cycles vs 2019 declined the most by -19.4ppts to +238.6% in Feb vs +258% in Jan. Similarly, P&W monthly average cycles vs 2019 declined by -1.2ppts to +7.5% in Feb, vs +8.7% in Jan. CFM56-5B and CFM56-7B monthly average cycles vs 2019 improved by +2.3ppts and +0.7ppts to -14.7% and -10.4% in Feb, vs -17% and -11.1% in Jan resp. CFM LEAP monthly average cycles vs 2019 improved by +1.7ppts to +275.7% in Feb, vs +274.1% in Jan. GE monthly average cycles vs 2019 improved by +0.8ppts to +5.3% in Feb, vs +4.6% in Jan. V2500 and Rolls-Royce monthly average cycles vs 2019 remained broadly stable at -25.9% and +15.4% in Feb, vs -25.8% and +15.3% in Jan resp.

Exhibit 1: Major engine family monthly average flight cycles yoy growth vs 2019

Major engine family monthly average cycles vs 2019 show mixed performance MoM in Feb vs Jan

| | CFM56 -5B (A320ceo) | CFM56 -7B (737NG) | CFM56 family | V2500 | CFM LEAP | GTF family | Rolls-Royce commercial | P&W | GE | Total |
|---------------|------------------------|----------------------|-----------------|-------|-------------|---------------|---------------------------|-----|-----|-------|
| 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% |
| Jan'24 vs '19 | -17% | -11% | -14% | -26% | 274% | 258% | 15% | 9% | 5% | 1% |
| Feb'24 vs '19 | -15% | -10% | -13% | -26% | 276% | 239% | 15% | 7% | 5% | 1% |

Source: Global Research, Flightradar24

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North America, Middle East strongly improved MoM in Feb

North America and Middle East monthly average cycles vs 2019 strongly improved by +7.6ppts and +3.6ppts to +18.5% and +17.4% in Feb, vs +10.9% and +13.8% in Jan resp. Similarly, APAC monthly average cycles vs 2019 improved by +1.3ppts to +7.3% in Feb, vs +6% in Jan. Africa and Europe monthly average cycles vs 2019 on the other hand fell by -5.8ppts and -1.7ppts to +26.7% and -8% in Feb, vs +32.5% and -6.3% in Jan resp. Latam monthly avg. cycles vs 2019 slightly fell by -0.4ppts to +17.3% in Feb, vs +17% in Jan.

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Refer to important disclosures on page 24 to 25.

12667023

Timestamp: 05 March 2024 12:30AM EST

05 March 2024

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WoW: Week over Week

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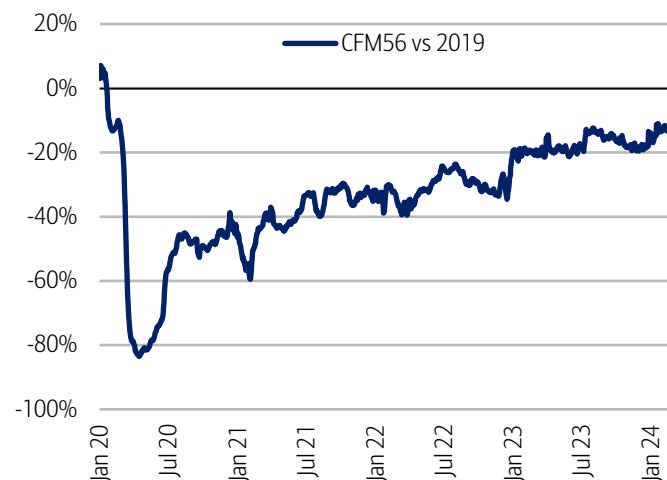
Engine cycles tracker

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 8.8% YoY and improved to -12.4% vs 2019 this week, a -0.3 pts fall and 0.1 ppts improvement vs 9% and -12.5% respectively last week.

Exhibit 2: CFM56 family 7-day avg. daily flights tracked YoY %

The CFM56 family made gradual progress through FY23

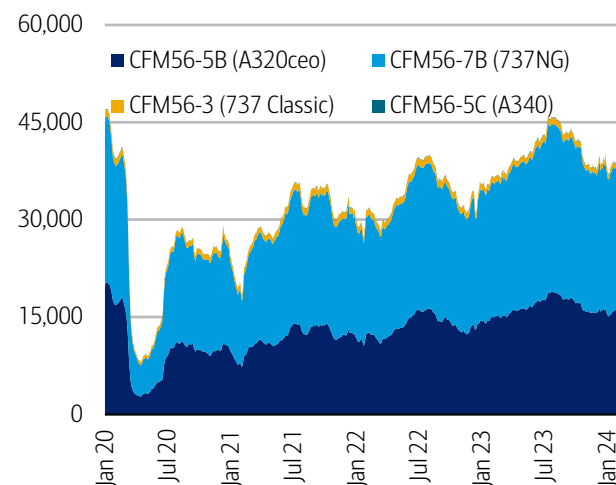


Source: BofA Global Research, Flightradar24

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Exhibit 3: CFM56 family 7-day avg. daily flights total

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



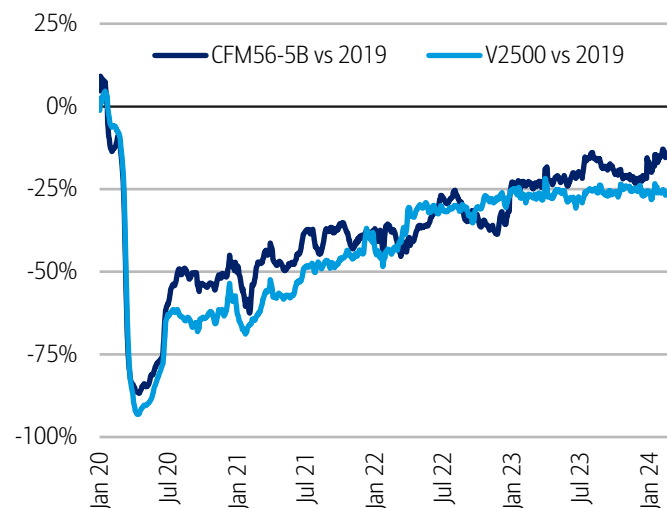
Source: BofA Global Research, Flightradar24

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- **CFM56-5B (A320ceo)** 7 day rolling avg. daily flights declined to 10.9% YoY and declined to -14.7% vs 2019 this week, a -0.1 pts fall and 0 ppts fall vs 11% and -14.6% respectively last week. This compares to **V2500 (A320ceo)**, which declined to 1.1% YoY and declined to -26.2% vs 2019 this week, a -0.6 pts fall and -0.3 ppts fall vs 1.6% and -25.9% respectively last week.

Exhibit 4: CFM56-5B (A320ceo) vs V2500 (A320ceo)– 7 day avg. YoY

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

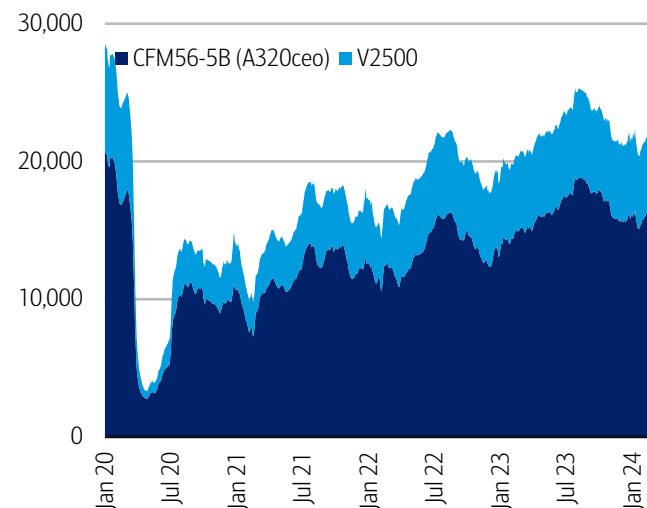


Source: BofA Global Research, Flightradar24

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

CFM56 has higher market share vs V2500 on the A320ceo



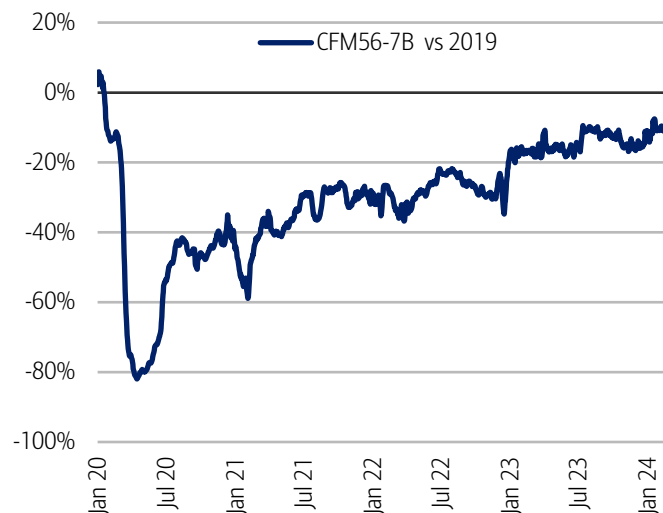
Source: BofA Global Research, Flightradar24

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- **CFM56-7B (737 NG)** 7 day rolling avg. daily flights declined to 7.9% YoY and improved to -10% vs 2019 this week, a -0.6 pts fall and 0.1 ppts improvement vs 8.5% and -10.1% respectively last week.

Exhibit 6: CFM56-7B (737NG) 7 day avg. daily flights tracked YoY %

CFM56-7B shown gradual improvement through 2023

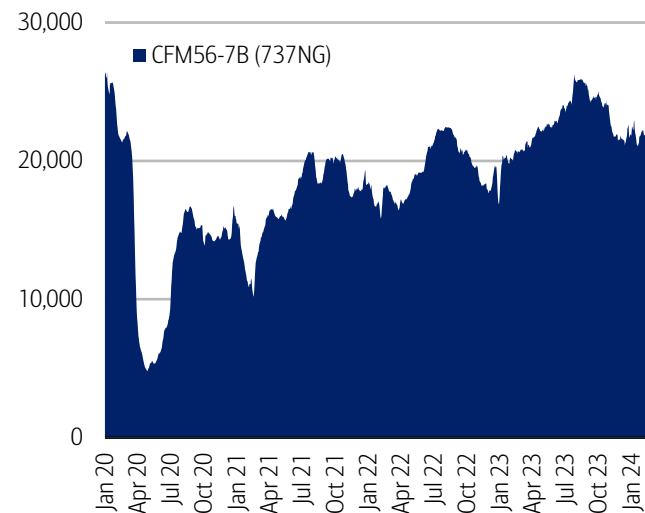


Source: BofA Global Research, Flightradar24

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

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



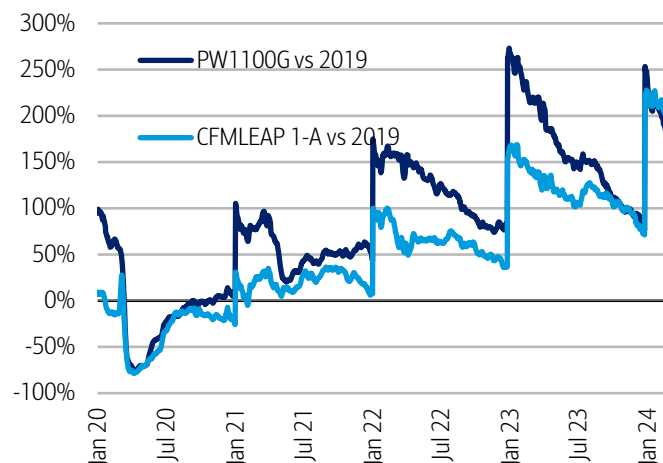
Source: BofA Global Research, Flightradar24

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- **CFM LEAP-1A (A320neo)** 7 day rolling avg. daily flights improved to 23.4% YoY and declined to 199.4% vs 2019 this week, a 0.1 pts improvement and -9.9 ppts fall vs 23.3% and 209.4% respectively last week. This compares to **PW1100G (A320neo)**, which improved to -12% YoY and declined to 182.8% vs 2019 this week, a 0 pts improvement and -13.7 ppts fall vs -12% and 196.5% respectively last week.

Exhibit 8: 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

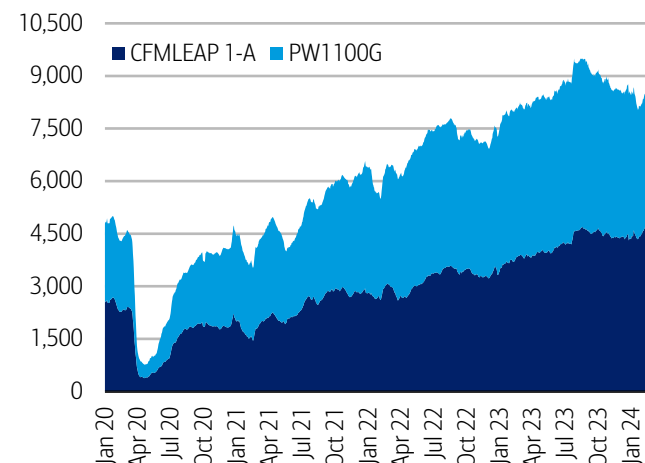


Source: BofA Global Research, Flightradar24

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

LEAP1-A fleet is slightly smaller than the GTF



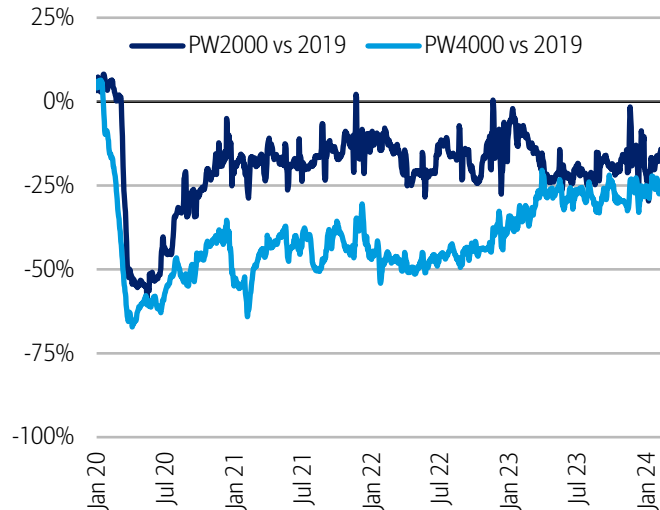
Source: BofA Global Research, Flightradar24

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- **PW2000 (757)** 7 day rolling avg. daily flights declined to -6.7% YoY and declined to -16.3% vs 2019 this week, a -1.1 pts fall and -1.1 ppts fall vs -5.6% and -15.2% respectively last week. This compares to **PW4000 (A300, A330, 747, 767, 777, MD-11)**, which improved to 12.6% YoY and declined to -26% vs 2019 this week, a 2.4 pts improvement and -1.4 ppts fall vs 10.2% and -24.6% respectively last week.

Exhibit 10: 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



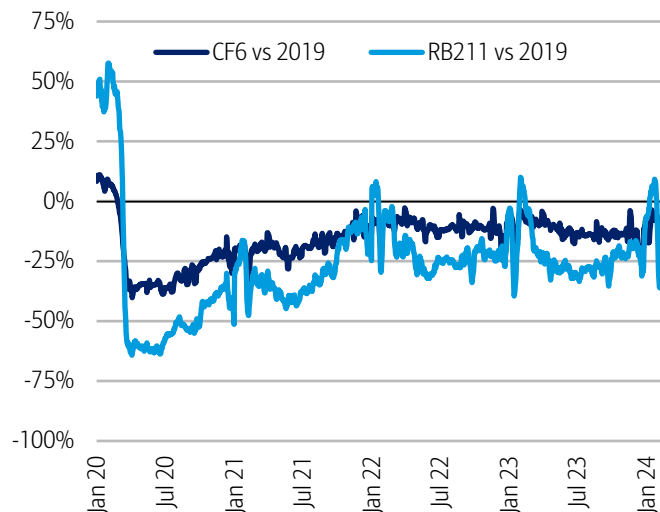
Source: BofA Global Research, Flightradar24

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- **CF6 (A300, A310, A330, 747, 767)** 7 day rolling avg. daily flights improved to -2.2% YoY and improved to -10.7% vs 2019 this week, a 2.7 pts improvement and 0.8 ppts improvement vs -4.9% and -11.5% respectively last week. This compares to **RB211 (747, 757, 767)**, which improved to -14.6% YoY and improved to -18.5% vs 2019 this week, a 11.2 pts improvement and 5.4 ppts improvement vs -25.8% and -23.9% respectively last week.

Exhibit 12: 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

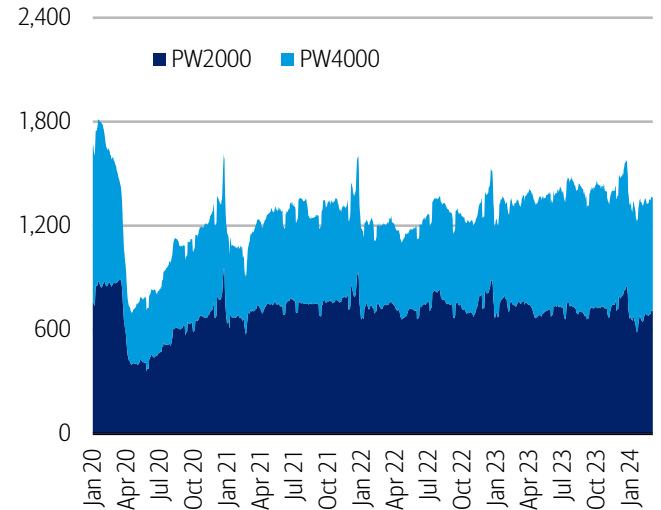


Source: BofA Global Research, Flightradar24

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Exhibit 11: 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

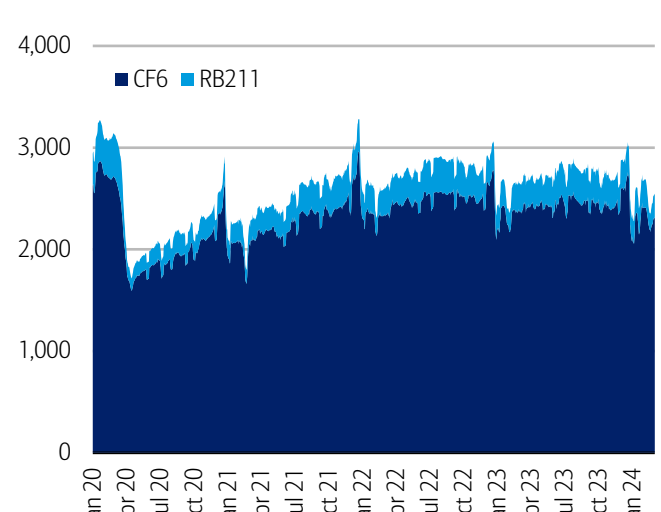


Source: BofA Global Research, Flightradar24

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Exhibit 13: 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



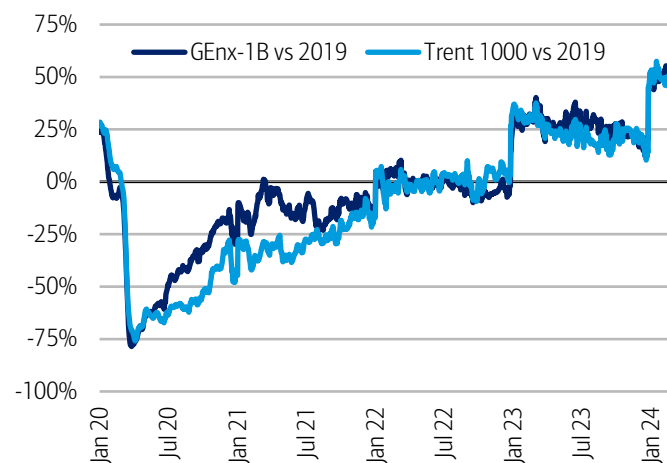
Source: BofA Global Research, Flightradar24

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- **GENX (787)** 7 day rolling avg. daily flights declined to 14.1% YoY and declined to 47.7% vs 2019 this week, a -2.3 pts fall and -4.7 ppts fall vs 16.4% and 52.4% respectively last week. This compares to Trent 1000 (787), which declined to 11.3% YoY and declined to 44.8% vs 2019 this week, a -2.6 pts fall and -3.2 ppts fall vs 13.9% and 48% respectively last week.

Exhibit 14: GENX (787) vs Trent 1000 (787) 7 day avg.

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

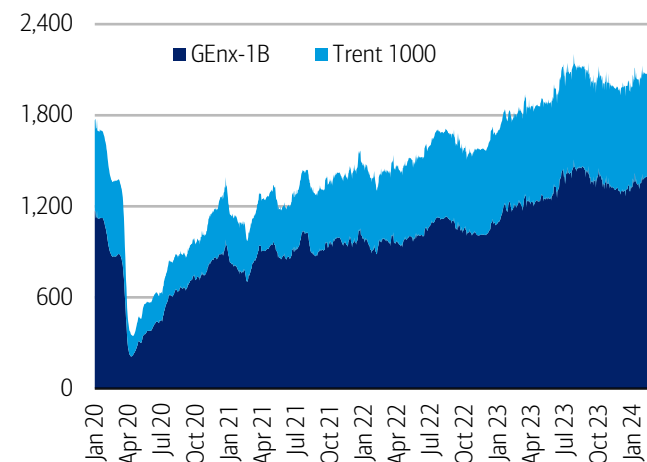


Source: BofA Global Research, Flightradar24

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

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



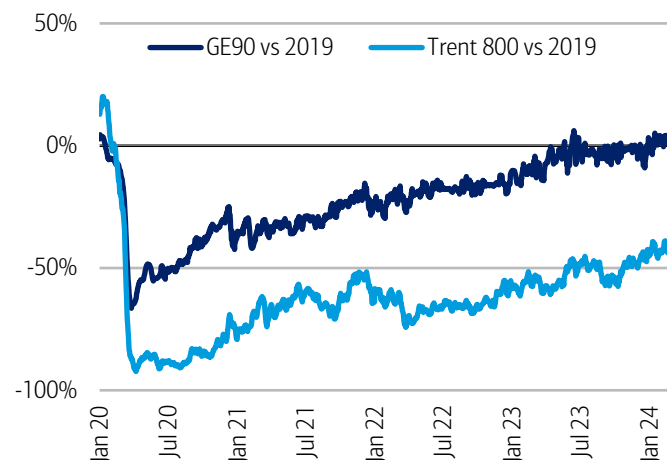
Source: BofA Global Research, Flightradar24

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- **GE90 (777)** 7 day rolling avg. daily flights declined to 13.4% YoY and improved to 2.5% vs 2019 this week, a -0.4 pts fall and 0.2 ppts improvement vs 13.8% and 2.3% respectively last week. This compares to **Trent 800 (777)**, which declined to 26.3% YoY and declined to -43.8% vs 2019 this week, a -3.4 pts fall and -4.8 ppts fall vs 29.7% and -39% respectively last week.

Exhibit 16: GE90 (777) vs Trent 800 (777) 7 day avg. daily flights tracked YoY %

GE90 historically competed with the Trent 800 and PW4000 on 777

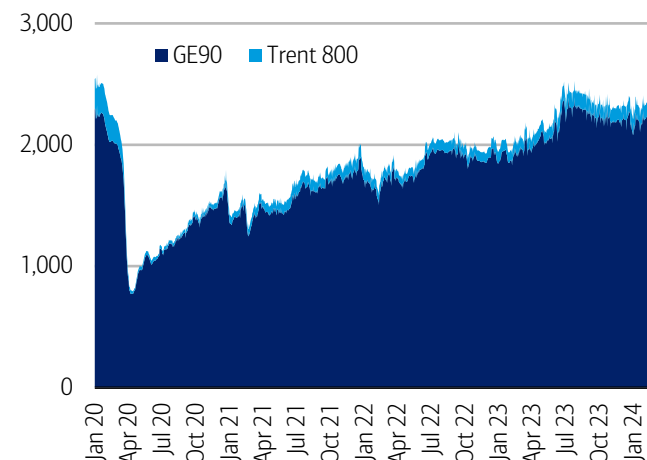


Source: BofA Global Research, Flightradar24

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

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



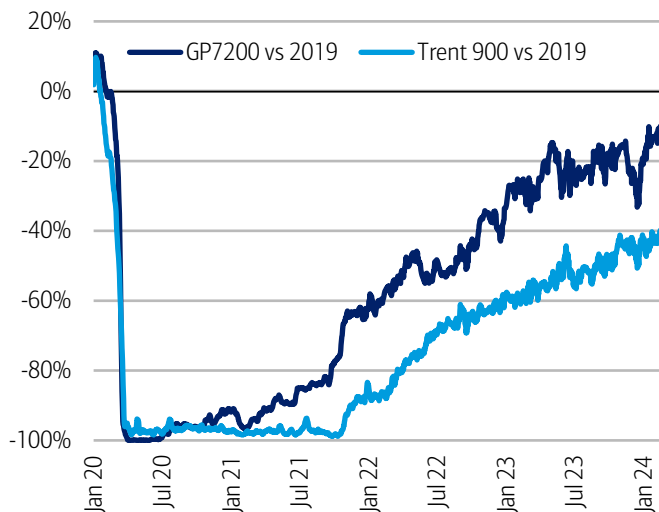
Source: BofA Global Research, Flightradar24

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- **GP7200 (A380)** 7 day rolling avg. daily flights declined to 21.3% YoY and declined to -13.9% vs 2019 this week, a -0.3 pts fall and -2.5 ppts fall vs 21.6% and -11.4% respectively last week. This compares to **Trent 900(A380)**, which declined to 39.8% YoY and improved to -41.3% vs 2019 this week, a -0.5 pts fall and 0.6 ppts improvement vs 40.3% and -41.9% respectively last week.

Exhibit 18: 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



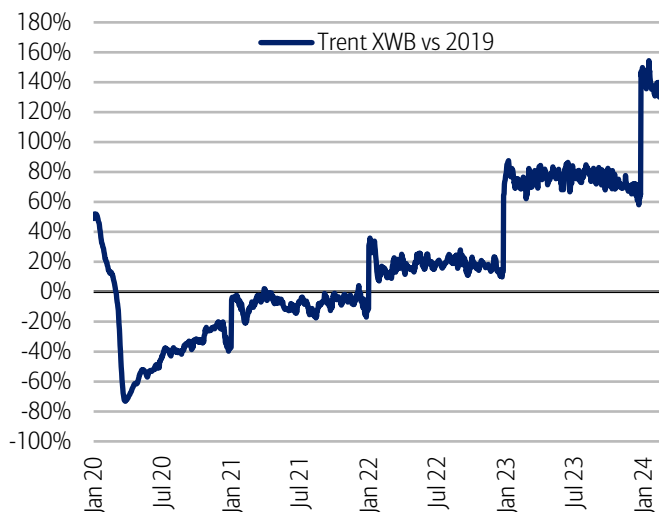
Source: BofA Global Research, Flightradar24

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- **Trent XWB (A350)** 7 day rolling avg. daily flights declined to 34.3% YoY and declined to 131% vs 2019 this week, a -0.9 pts fall and -4 ppts fall vs 35.3% and 135% respectively last week.

Exhibit 20: Trent XWB (A350) 7 day avg. daily flights YoY %

Trent XWB has strongly recovered driven in part by new deliveries



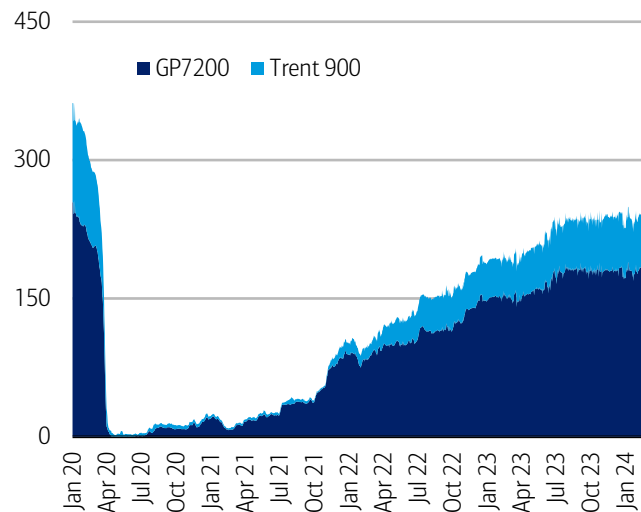
Source: BofA Global Research, Flightradar24

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- **Trent 700 (A330)** 7 day rolling avg. daily flights declined to 19% YoY and declined to -21.8% vs 2019 this week, a -6 pts fall and -1.9 ppts fall vs 25% and -19.9% respectively last week.

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

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

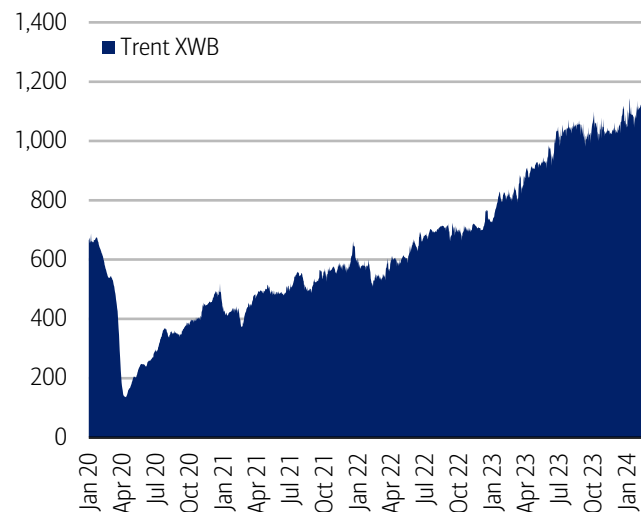


Source: BofA Global Research, Flightradar24

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

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

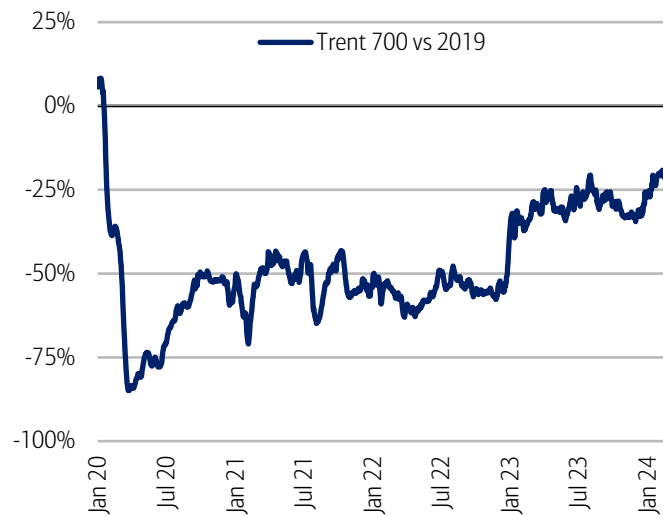


Source: BofA Global Research, Flightradar24

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Exhibit 22: Trent 700 (A330ceo) 7 day avg. daily flights tracked YoY %

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

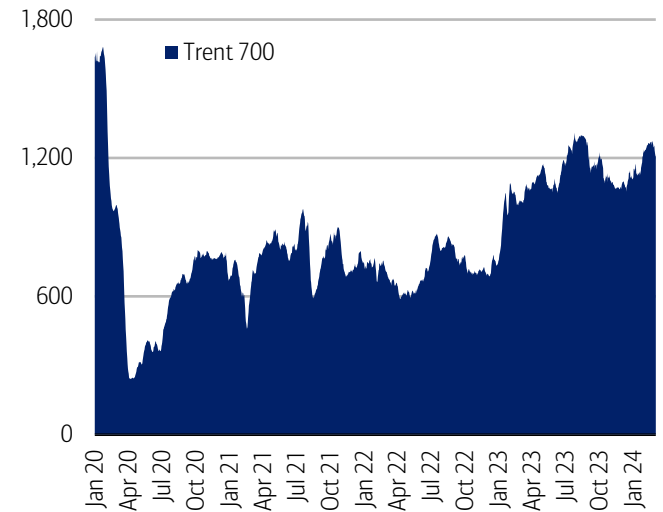


Source: BofA Global Research, Flightradar24

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Exhibit 23: Trent 700 (A330ceo) 7 day avg. daily flights total

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

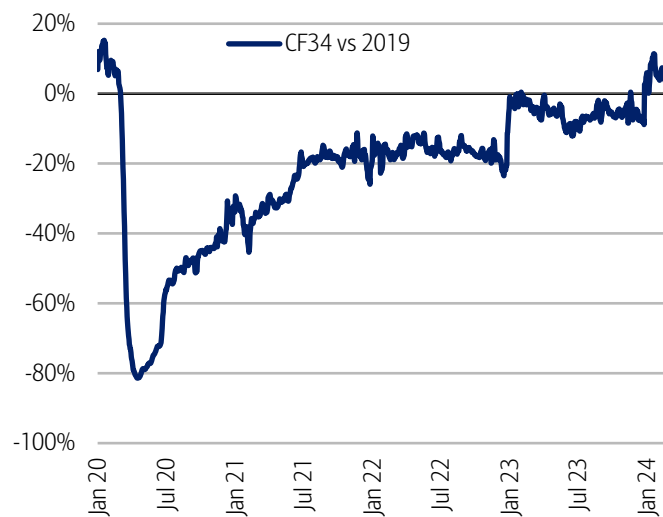


Source: BofA Global Research, Flightradar24

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Exhibit 24: GE CF34 (E-Jet) 7 day avg. daily flights YoY %

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

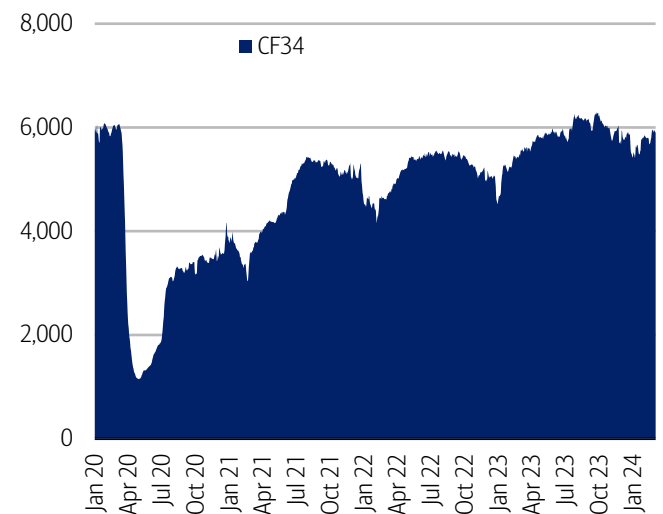


Source: BofA Global Research, Flightradar24

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Exhibit 25: 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 14.2% YoY and 267.3% vs 2019 improving 0.1 ppts YoY and declining -15 ppts over 2019 vs 14.1% YoY and 282.4% over 2019 last week and comparing to a 2020 low of -76.5%.
- **Airbus A320ceo** 7 day avg. daily flights were 9.9% YoY and -15.5 % vs 2019 declining -0.3 ppts YoY and declining 0 ppts over 2019 vs 10.2% YoY and -15.5% over 2019 last week and comparing to a 2020 low of -88.9%.

Exhibit 26: Airbus A320neo – 7 day avg. daily flights YoY %

A320neo fleet is much larger vs 2019 levels

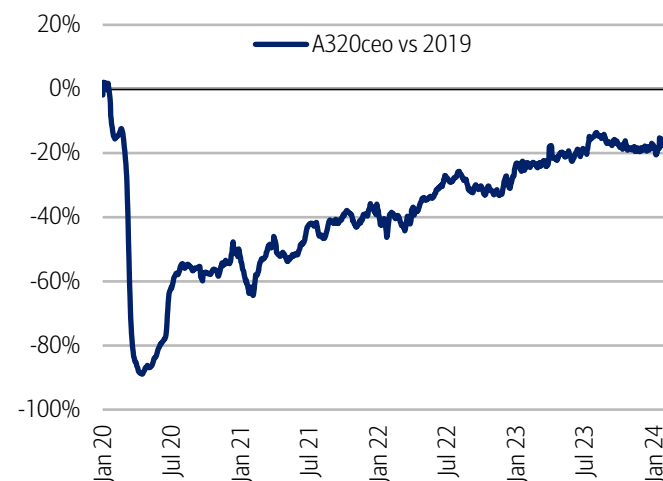


Source: BofA Global Research, Flightradar24

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Exhibit 27: 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 16.3% YoY and -16.4 % vs 2019 declining -1.7 ppts YoY and declining -1.5 ppts over 2019 vs 18.1% YoY and -14.9% over 2019 last week and comparing to a 2020 low of -84.9%.
- **Airbus A340 family** 7 day avg. daily flights were 40.6% YoY and -49.1 % vs 2019 improving 1.3 ppts YoY and improving 1.1 ppts over 2019 vs 39.3% YoY and -50.2% over 2019 last week and comparing to a 2020 low of -89.5%.

Exhibit 28: 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 29: Airbus A340 family – 7 day avg. daily flights YoY %

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



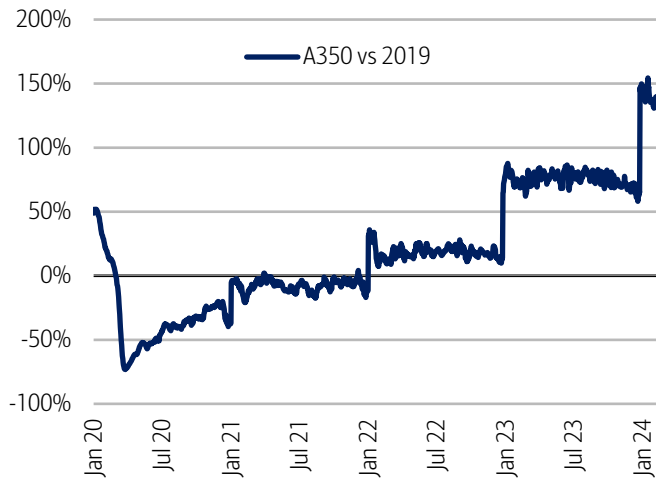
Source: BofA Global Research, Flightradar24

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- **Airbus A350** 7 day avg. daily flights were 34.3% YoY and 131 % vs 2019 declining -0.9 ppts YoY and declining -4 ppts over 2019 vs 35.3% YoY and 135% over 2019 last week and comparing to a 2020 low of -73.2%.
- **Airbus A380 family** 7 day avg. daily flights were 25.3% YoY and -24.5 % vs 2019 declining -0.3 ppts YoY and declining -1.6 ppts over 2019 vs 25.6% YoY and -23% over 2019 last week and comparing to a 2020 low of -99.4%.

Exhibit 30: Airbus A350 family – 7 day avg. daily flights YoY %

A350 is a 'next gen' widebody and has outperformed older platforms

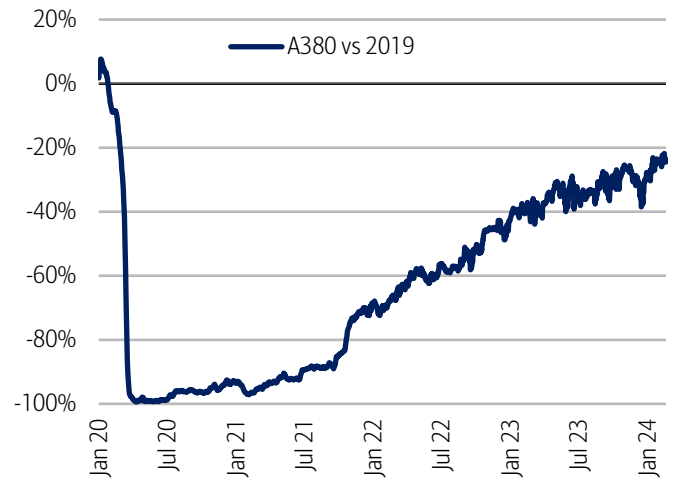


Source: BofA Global Research, Flightradar24

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Exhibit 31: 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

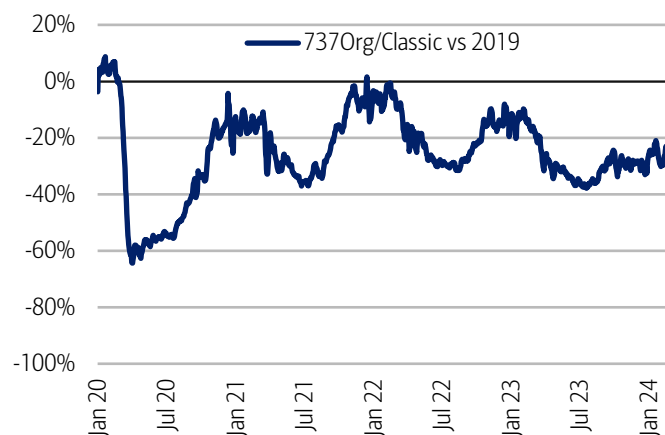
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Boeing: Airframe flight cycles

- **Boeing 737 Original/Classic** 7 day avg. daily flights were -10.3% YoY and -24.4 % vs 2019 improving 3.3 ppts YoY and improving 1.8 ppts over 2019 vs -13.5% YoY and -26.3% over 2019 last week and comparing to a 2020 low of -64.4%.
- **Boeing 737 NG** 7 day avg. daily flights were 7.9% YoY and -10 % vs 2019 declining -0.6 ppts YoY and improving 0.1 ppts over 2019 vs 8.5% YoY and -10.1% over 2019 last week and comparing to a 2020 low of -82%.

Exhibit 32: Boeing 737 Original/classic – 7 day avg. flights YoY %

Older 737s and 737 Classics have a large freight concentration

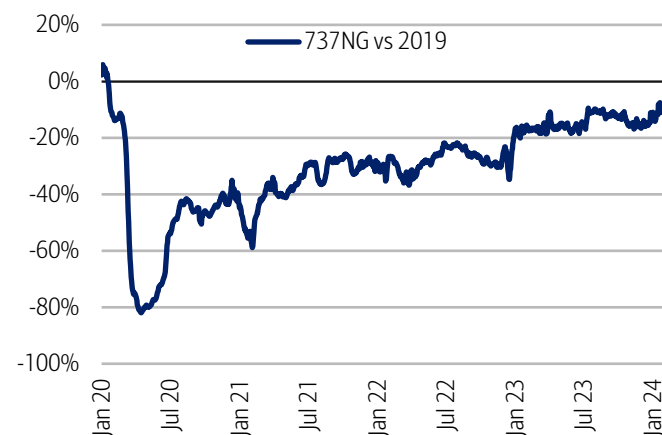


Source: BofA Global Research, Flightradar24

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Exhibit 33: Boeing 737NG– 7 day avg. daily flights YoY %

737NG recovery has gradually recovered



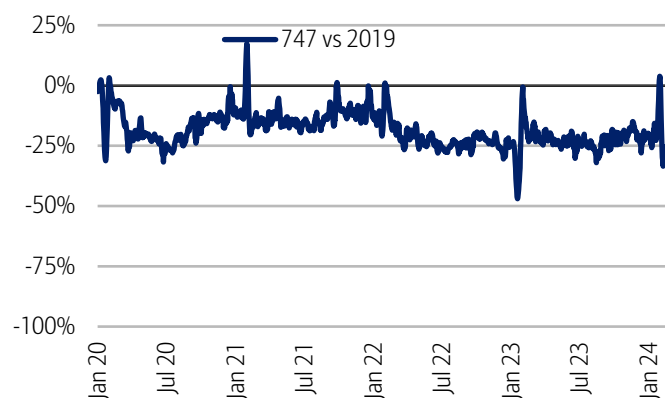
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

- **Boeing 747** 7 day avg. daily flights were -2.8% YoY and -24.9 % vs 2019 improving 10.1 ppts YoY and improving 3.8 ppts over 2019 vs -12.9% YoY and -28.7% over 2019 last week and comparing to a 2020 low of -31.7%.
- **Boeing 757** 7 day avg. daily flights were -9% YoY and -18.7 % vs 2019 improving 2.2 ppts YoY and improving 1.2 ppts over 2019 vs -11.1% YoY and -19.9% over 2019 last week and comparing to a 2020 low of -65.6%.
- **Boeing 767** 7 day avg. daily flights were 3.5% YoY and -1.9 % vs 2019 improving 0.6 ppts YoY and declining -1.1 ppts over 2019 vs 2.9% YoY and -0.8% over 2019 last week and comparing to a 2020 low of -46%.

Exhibit 34: Boeing 747– 7 day avg. daily flights YoY %

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

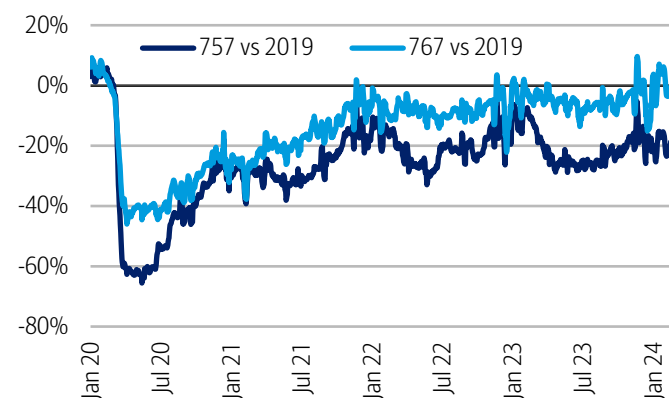


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 35: Boeing 757/767– 7 day avg. flights YoY %

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



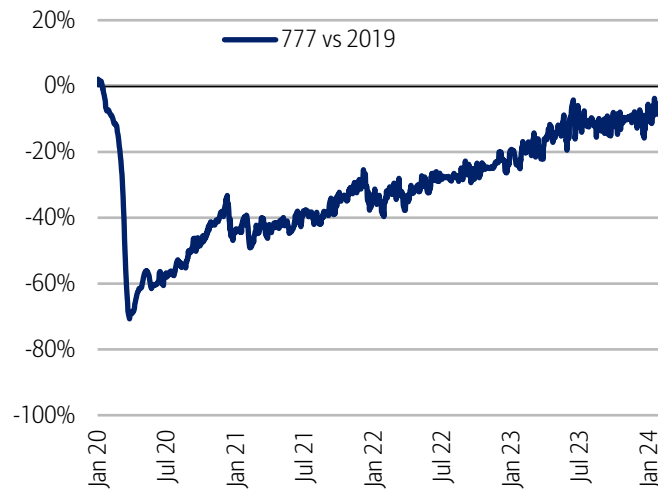
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

- **Boeing 777** 7 day avg. daily flights were 15% YoY and -6.4 % vs 2019 declining - 0.2 ppts YoY and declining -0.1 ppts over 2019 vs 15.2% YoY and -6.2% over 2019 last week and comparing to a 2020 low of -70.7%.
- **Boeing 787** 7 day avg. daily flights were 13.7% YoY and 48.8 % vs 2019 declining - 2.1 ppts YoY and declining -4.2 ppts over 2019 vs 15.8% YoY and 53.1% over 2019 last week and comparing to a 2020 low of -76.3%.

Exhibit 36: Boeing 777 – 7 day avg. daily flights YoY %

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

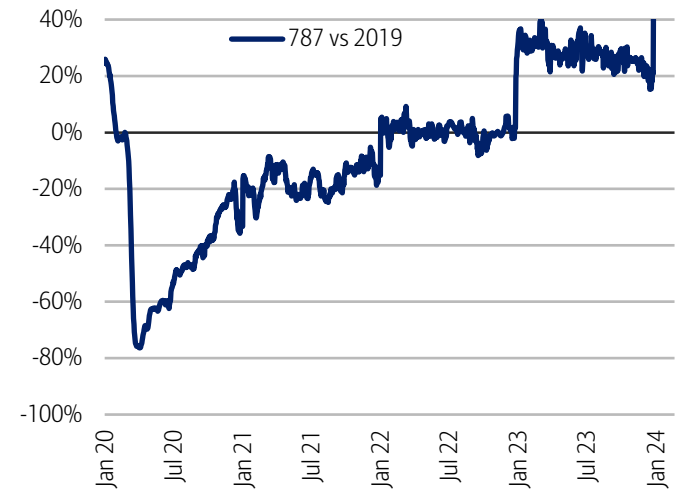


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 37: Boeing 787 – 7 day avg. daily flights YoY %

787 is already exhibiting >2019 levels through 2023

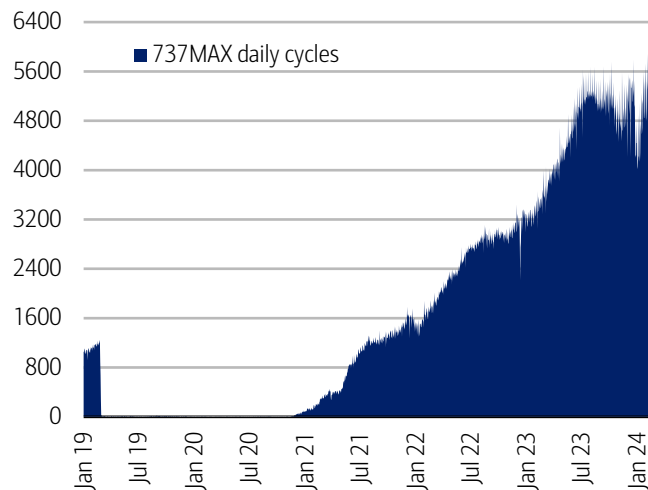


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 38: Boeing 737 MAX daily flight cycles

MAX daily cycles have seen a very strong recovery

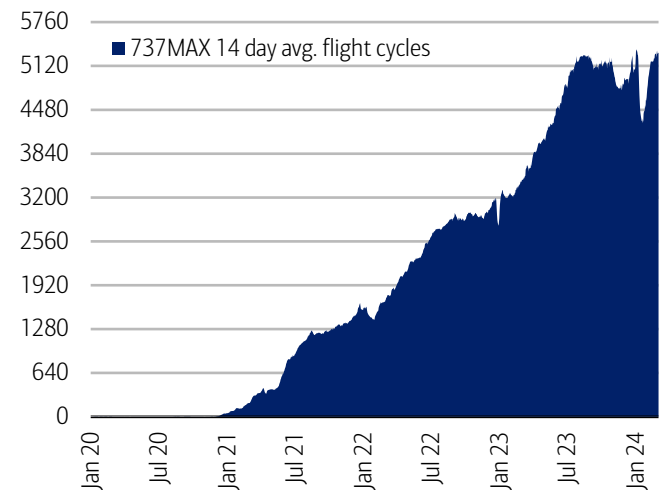


Source: BofA Global Research estimates, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 39: Boeing 737 – 14 day avg. daily flight cycles

Cycles have started to resume as regulators approve aircraft for service



Source: BofA Global Research, Flightradar24

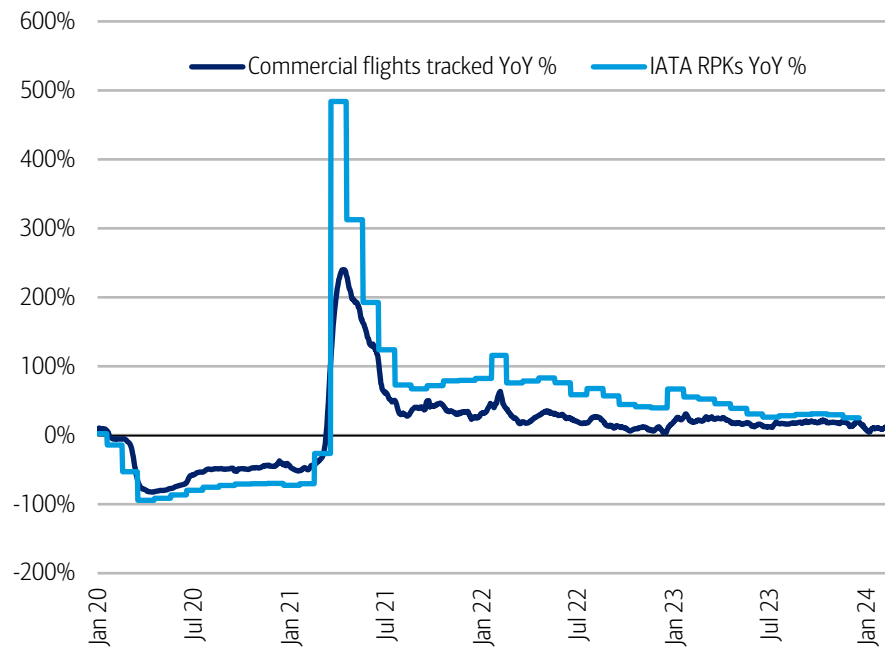
BofA GLOBAL RESEARCH

Global commercial flight cycles

- **Global commercial** 7 day avg. daily flights were 9.5% YoY and 0.6% vs 2019 declining -0.8 ppts and declining -1.1 ppts vs 10.3% and 1.6% respectively last week and comparing to a 2020 low of -82.5%.

Exhibit 40: Global commercial flights tracked 7 day daily moving average YoY %

IATA RPKs have broadly followed Global commercial flight cycles

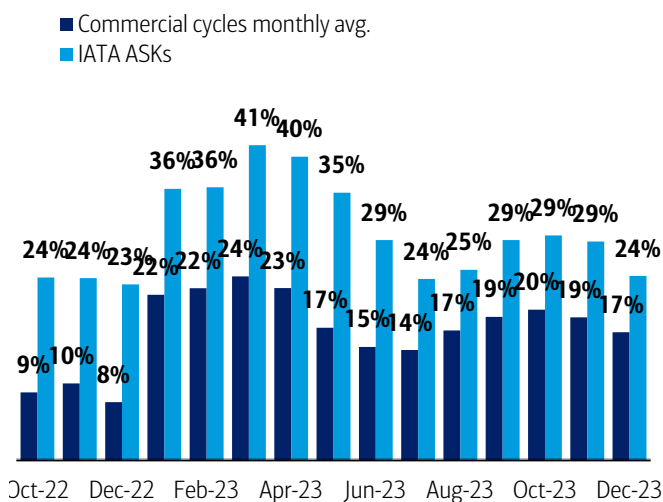


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 41: Commercial aircraft monthly daily cycles avg. YoY % vs IATA ASKs

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

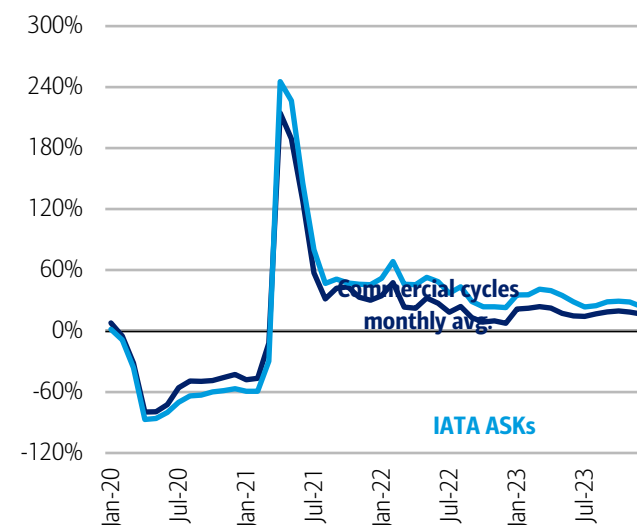


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 42: 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

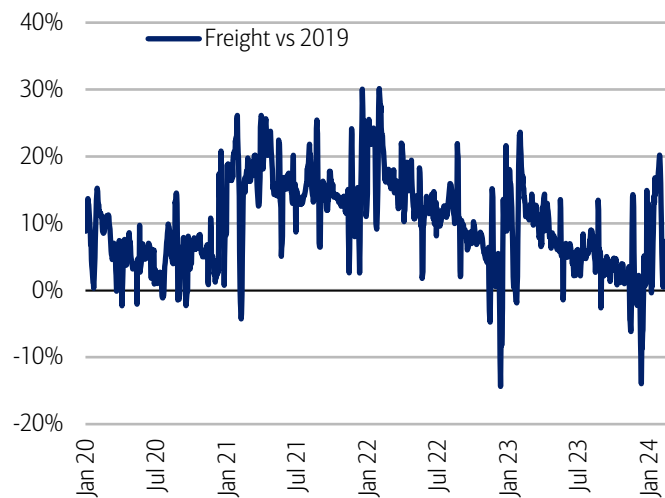
BofA GLOBAL RESEARCH

Global freighter cycles

- **Global dedicated freighter** 7 day avg. daily flights were -3.9% YoY and 7.4% vs 2019 improving 2.9 ppts and improving 1.2 ppts vs -6.8% and 6.2% respectively last week and comparing to a 2020 low of -2.3%.

Exhibit 43: Global dedicated freighter flights tracked 7 day avg. YoY %

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

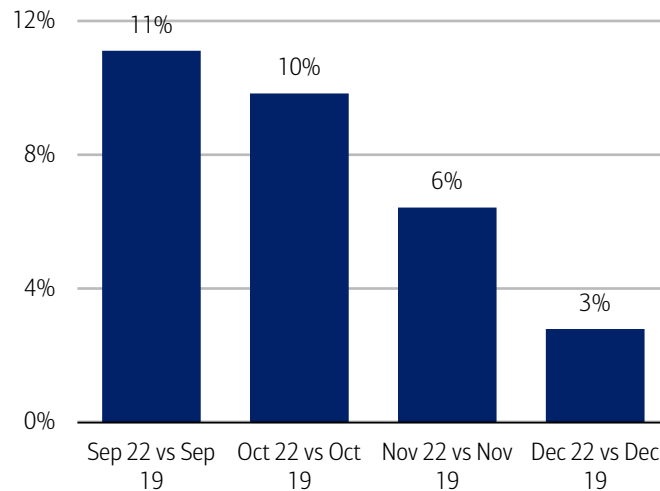


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 44: Freight landings Sep – Dec 2022 vs 2019

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

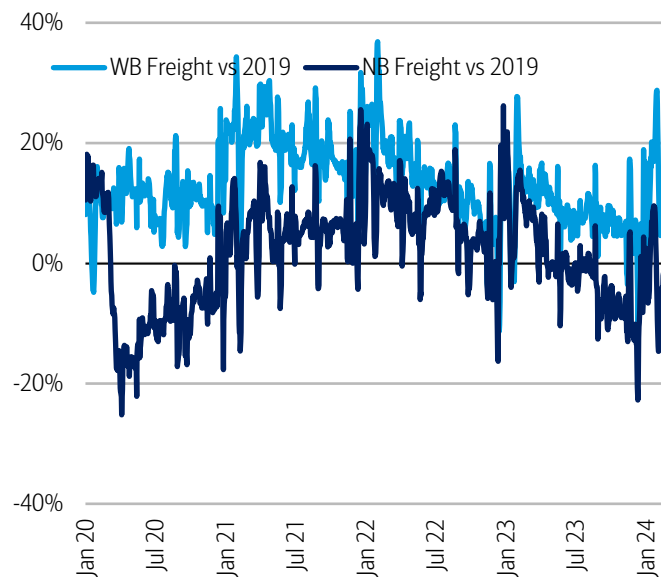


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 45: Narrowbody vs Widebody dedicated freighter flights tracked 7 day avg. YoY %

Narrowbody and Widebody freight have converged through 3Q22

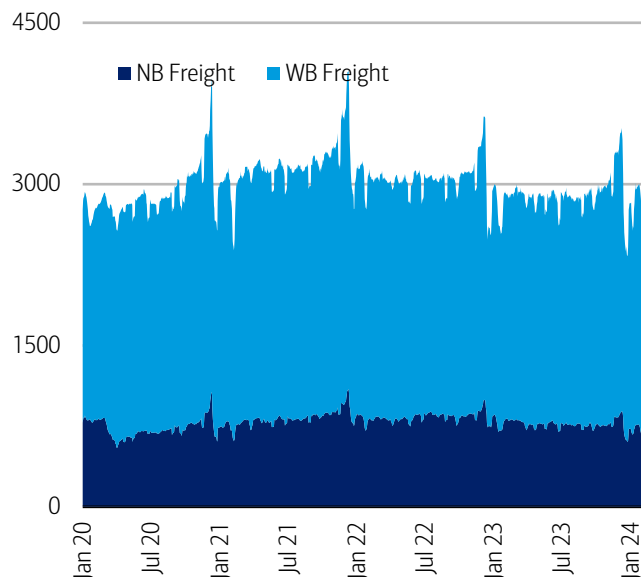


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 46: Narrowbody vs Widebody dedicated freighter flights daily

Freight cycles typically peak around the holiday period in December



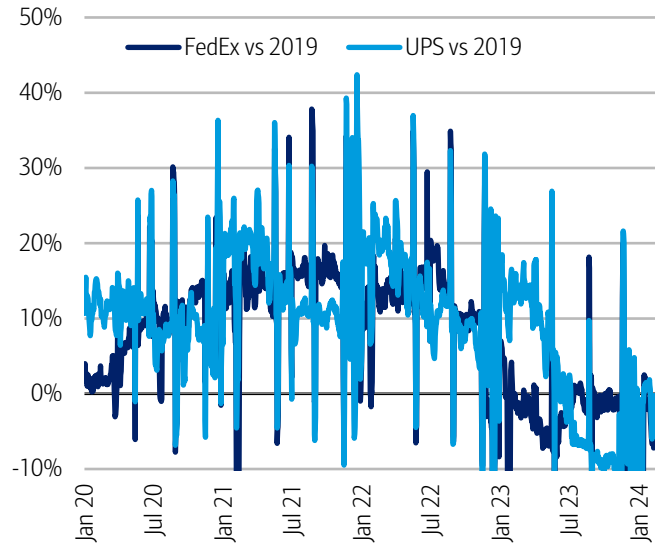
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Cargo airline cycles

Exhibit 47: FedEx & UPS 7 day avg. daily flights vs 2019

Fedex and UPS were the 1st and 2nd largest global cargo airlines in 2019

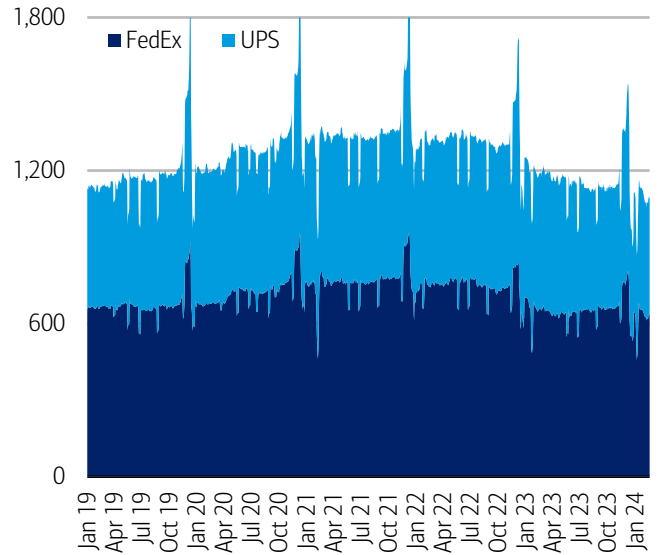


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 48: FedEx & UPS 7 day avg. daily flights total

Freight cycles have reduced slightly through FY22-23



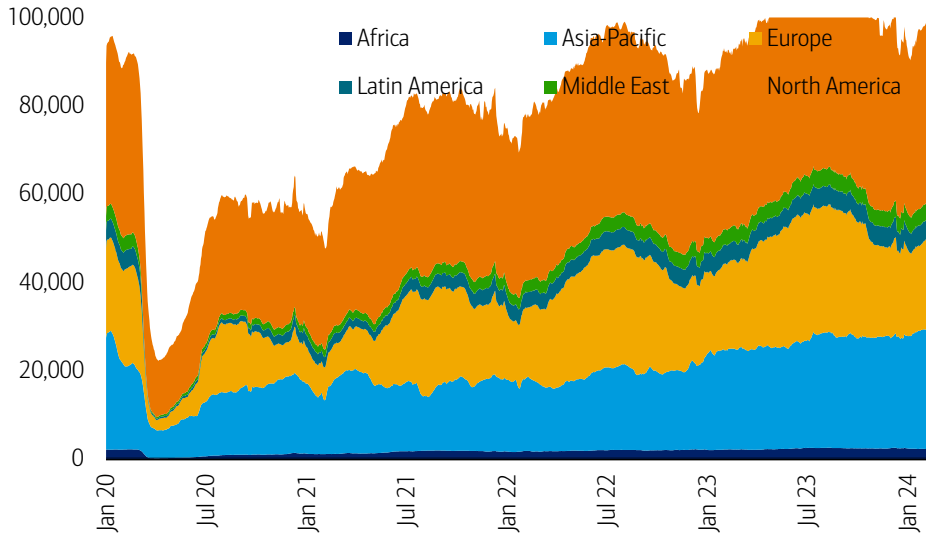
Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Commercial flights regional split

Exhibit 49: Global commercial flights daily tracked 7 day avg. by region

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

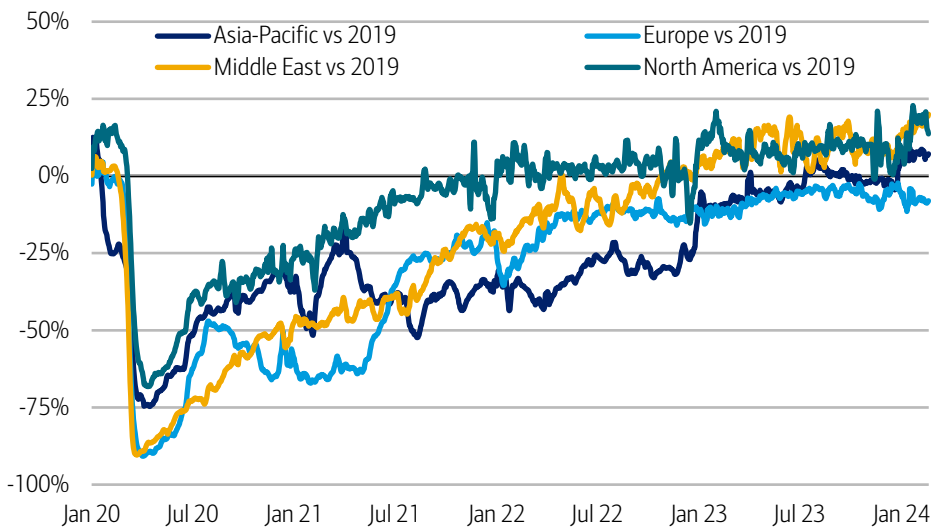


Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 50: 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

BofA GLOBAL RESEARCH

Monthly flight cycles data tables

Exhibit 51: 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% |
| Jan '24 vs '19 | -17% | -11% | -14% | -26% | 274% | 258% | 15% | 9% | 5% | 1% |
| Feb '24 vs '19 | -15% | -10% | -13% | -26% | 276% | 239% | 15% | 7% | 5% | 1% |

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH



Exhibit 52: 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 % | Airbus | | | | | | | | Airbus total |
|----------------|---------|---------|------|------|------|------|------|------|--------------|
| | A320neo | A320ceo | A330 | A340 | A350 | A380 | A300 | A220 | |
| 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% |
| Jan '24 vs '19 | 306% | -18% | -17% | -48% | 144% | -28% | -33% | 281% | 10% |
| Feb '24 vs '19 | 285% | -16% | -16% | -50% | 134% | -24% | -28% | 288% | 12% |

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 53: 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% |
| Jan'24 vs '19 | -26% | -11% | -22% | -20% | -1% | -8% | 51% | -18% | 2% |
| Feb'24 vs '19 | -26% | -10% | -19% | -19% | 1% | -7% | 52% | -19% | 4% |

Source: BofA Global Research, Flightradar24

BofA GLOBAL RESEARCH

Exhibit 54: 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% |

Exhibit 54: 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 |
|----------------|---------|---------|------|------|------|------|------|------|--------------|
| 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

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Exhibit 55: 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



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 56: 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

BofA GLOBAL RESEARCH

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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