

# **Asia Pacific Aviation Nowcast**

# Nowcast #99: High frequency travel trends tracker across China & Asia

**Industry Overview** 

### Real time tracking of Asian travel trends

Our 99<sup>th</sup> Nowcast shows high frequency travel trends across Asia. Chinese domestic and international air travel spending recovered to 148%/76% of 2019 levels in February. Domestic revenue outperformance was helped by peak seasonality and CNY calendar shifts so we expect March/April revenue outperformance to be less stellar until the next major public holiday. Internationally, we expect easing visa policies by short-haul destinations and continued restoration of US-China flights to provide ongoing support for traffic recovery in 2024.

### China domestic: Revenue at 148% of 2019 levels

Chinese domestic air travel spending trended at 48% above 2019 levels in February 2024, with traffic and domestic yields at 26%/17% above 2019 levels for the month while seat loads sustained at 84% post-CNY. Travel demand remains robust after CNY with domestic flight executed 3.6% higher MoM, and cancellations averaged at 9% in 2H Feb – lower than 10% in 1H Feb. However, we expect relatively weaker outperformance v. 2019 for March/April until the next long public holiday (Labor Day holiday).

### China international: Revenue at 76% of 2019 levels

Chinese international air travel spending trended at 76% of 2019 levels in February, with traffic and yields at 81%/94% of 2019 levels. Thailand saw the most additions of flights post-CNY as the permanent visa-free program provides strong tailwind for ongoing demand. However, ticket pricing for some short haul routes (Beijing to Japan) is showing signs of weakness as visa, macro, and business demand lag, although a recent acceleration of Japanese visa processing should help with demand. Additionally, the US Department of Transportation recently approved 100 weekly flights between US and China from late March, up from 70 currently (but only 66 executed), and we expect continued recovery of transpacific flights to help repair airline profitability.

### Japan: Strong start for inbound traffic

Inbound traffic in January was 100% of normal and now we have seen four consecutive months of inbound traffic growth. The Japanese Yen has weakened back to 150 USDJPY which is likely to continue to support inbound growth. Japanese outbound and Chinese inbound still remain 50-60% of normal but we expect to see gradual improvements in 2024. Railway traffic could see some pick up especially on commuter traffic in March/April as Japanese fiscal year is starting soon.

05 March 2024

Equity Asia-Pacific Airlines

Nathan Gee, CFA >> Research Analyst Merrill Lynch (Singapore) +65 6678 0418 nathan.gee@bofa.com

Isabella Zeng >> Research Analyst Merrill Lynch (Singapore) +65 6678 5390 isabella.zeng@bofa.com

Hiro Nakakura, CFA >> Research Analyst Merrill Lynch (Singapore) +65 6678 0972 hiro.nakakura@bofa.com

CNY: Chinese New Year

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 10 to 12.

<sup>&</sup>gt;> Employed by a non-US affiliate of BofAS and is not registered/qualified as a research analyst under the FINRA rules.

Refer to "Other Important Disclosures" for information on certain BofA Securities entities that take responsibility for the information herein in particular jurisdictions.

# Chinese air travel trends - February 2024

# Domestic Rev +48%, Traffic +26%, Yield +17% of 2019

#### Exhibit 1: China domestic air travel revenue as a % of 2019

Feb industry revenue exceeded 2019 levels by +48%, +31% for Jan



Exhibit 3: Chinese Big 3 domestic yield & unit revenue growth vs 2019

Unit revenue at 105% and yield at 106% of 2019 levels in February

Unit revenue

Source: ESI, BofA Global Research

30%

20%

10%

0%

-10%

-20%

-30%

-40%

-50%

BofA GLOBAL RESEARCH

# Exhibit 4: Chinese Big 3 airlines unit revenue (RASK) growth vs 2019

Unit revenue is 101-109% of 2019 levels for the Big 3 airlines in January



Exhibit 2: Chinese domestic air traffic and capacity growth vs 2019

Domestic air traffic at 126% and supply at 129% of normal in Feb

Air China CEA

30%
20%
10%
0%
-10%
-20%

-60% — Jan-23 Mar-23 May-23 Jul-23 Sep-23 Nov-23 Jan-24

Source: ESI, BofA Global Research

-30%

-40%

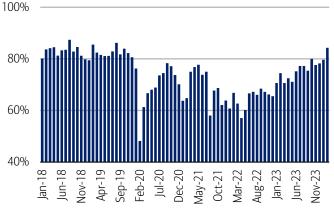
-50%

BofA GLOBAL RESEARCH

# Jan-23 Mar-23 May-23 Jul-23 Sep-23 Nov-23 Jan-24 Source: ESI, BofA Global Research

### BofA GLOBAL RESEARCH

**Exhibit 5: Big 3 Chinese airlines – domestic seat load factors (%)**Domestic seat loads further improves to 84.3% in Feb, up from 79.6% in Jan

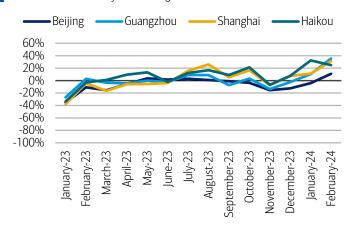


Source: ESI, BofA Global Research

BofA GLOBAL RESEARCH

# Exhibit 6: Chinese airports domestic traffic growth vs 2019

HNIA led traffic recovery at 21%+ higher than 2019 in Feb

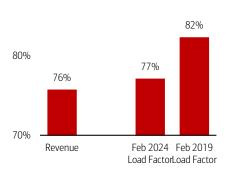


Source: ESI, BofA Global Research

# Int'l: Revenue 76%, Volume 81%, Yield 94% of 2019

### Exhibit 7: China int'l air travel revenue as a % of Feb 2019

Chinese international air travel revenue has recovered to 76% of pre-Covid levels



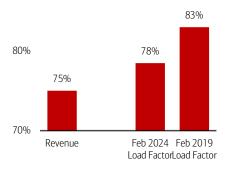
Source: ESI. BofA Global Research

BofA GLOBAL RESEARCH

#### Exhibit 10: Big three air travel revenue as a % of Feb 2019

Big three international air travel revenue has recovered to 75% of pre-Covid levels

90%

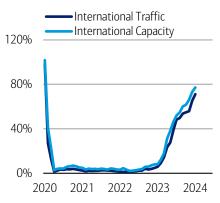


Source: ESI, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 13: Air China international traffic and capacity as % of 2019 levels, 2020-24

Int'l traffic at 71% of 2019 levels in January 2024

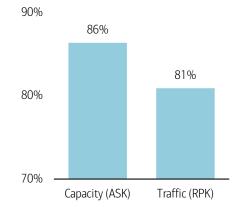


Source: Company reports, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 8: China int'l air travel capacity and traffic as a % of Feb 2019

Chinese international air travel traffic has recovered to 81% of pre-Covid levels



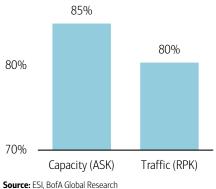
Source: ESI, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 11: Big three int'l air travel capacity & traffic as a % of Feb 2019

Big three international air travel traffic has recovered to 80% of pre-Covid levels

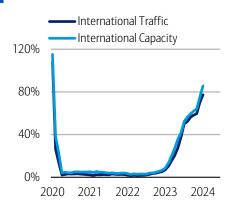
90%



BofA GLOBAL RESEARCH

### Exhibit 14: China Eastern - international traffic and capacity as % of 2019 levels

Int'l traffic at 77% of 2019 levels in Dec 2023



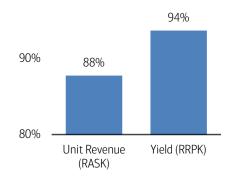
Source: Company reports, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 9: China int'l air travel unit revenue & yield as a % of Feb 2019

Chinese international air travel yield has recovered to 94% of pre-Covid levels

100%



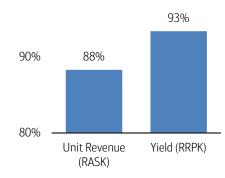
Source: ESI, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 12: Big three int'l air travel unit rev & yield as a % of Feb 2019

Big three international air travel yield has recovered to 93% of pre-Covid levels

100%

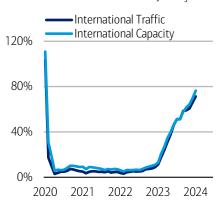


Source: ESI, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 15: China Southern - international traffic and capacity as % of 2019 levels

Int'l traffic at 71% of 2019 levels in January 2024



Source: Company reports, BofA Global Research



### Exhibit 16: China short-haul outbound by seats, 2023-24

Seat recovery led by shorter haul flights

	Thailand	Japan	Singapore	Malaysia	HK	Korea	Indonesia	Taiwan	Cambodia	Viet Nam	Philippines	Macau
2024-01	54%	75%	99%	57%	68%	77%	51%	53%	25%	71%	54%	100%
2024-02	63%	79%	106%	84%	72%	81%	54%	51%	26%	74%	63%	104%
2024-03	59%	78%	99%	77%	74%	79%	55%	55%	26%	77%	62%	100%

Source: OAG, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 17: China long-haul outbound by seats, 2023-24

Seat recovery is slow to North America, and fastest to Italy and UK

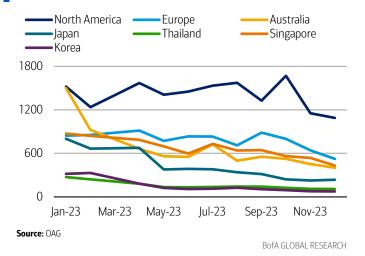
	USA	Australia	Canada	France	Germany	UAE	UK	Russia	NZ	Netherlands	Italy	Qatar
2024-01	22%	86%	12%	59%	92%	98%	129%	78%	95%	81%	159%	126%
2024-02	24%	87%	13%	65%	98%	95%	130%	84%	109%	83%	171%	130%
2024-03	22%	89%	12%	64%	86%	88%	123%	90%	79%	82%	157%	125%

Source: OAG, BofA Global Research

BofA GLOBAL RESEARCH

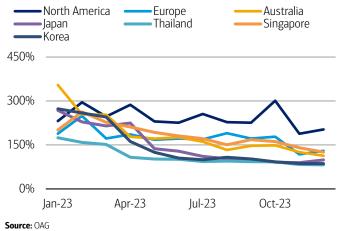
#### Exhibit 18: China international airfare in USD, 2023

China-North America airfare still at over \$1000 in December



# Exhibit 19: China int'l airfare (% of 2019), 2023

China-US airfare at 200% of pre-Covid levels in December



BofA GLOBAL RESEARCH

### CNY season air traffic +15%; total traffic +8% of 2019

According to the Ministry of Transport, accumulative Chinese passenger movements during CNY flight season as of March  $3^{\rm rd}$  by all modes of transportation was 8% above 2019 levels and 10% above 2023 levels. The CNY flight season is defined as the 40-day-window from 15 days prior to the first day of CNY until the  $25^{\rm th}$  day after. Total air traffic grew by 15% v. 2019 levels and 52% v. 2023 levels. Daily average traffic during the 2024 public holidays was 25% above 2019 holidays, and same-day air traffic was 16% above 2019 levels for the month following the CNY flight season.

Air traffic was above 2019 levels throughout the entire CNY in 2024, and daily traffic pattern resembles previous years even though 2024 public holidays started from the first day of CNY, rather than normally the day prior. However, air traffic growth wasn't as significant as rail traffic growth, which was 20% above 2019 levels.

Exhibit 22: Chinese passenger movements during CNY flight season by all modes of transportation, 2024 v. 2023 v. 2019 (1st day of CNY in blue)

Accumulative air traffic is up by 18% relative to 2019 CNY flight season; daily average during public holidays (Orange highlighted) is up by 25% relative to 2019 levels

Pax-times in mn			Public I	1st da	y of CNY							
			202	24		•			2024 v. 2019	9		Air travel
Day	Date	Rail	Road	Waterway	Air	Total	Rail	Road	Waterway	Air	Total	Same day 2024 v. 2019
1	26-Jan-24	11.06	175.64	0.58	2.07	189.35	16%	6%	-45%	24%	6.7%	13.9%
2	27-Jan-24	12.14	174.83	0.59	2.02	189.58	36%	6%	-51%	21%	7.3%	13.3%
3	28-Jan-24	11.73	178.64	0.63	2.03	193.03	29%	5%	-45%	17%	5.9%	16.5%
4	29-Jan-24	12.07	176.72	0.64	2.01	191.44	29%	5%	-50%	13%	5.8%	14.6%
5	30-Jan-24	10.99	183.31	0.60	2.03	196.93	11%	8%	-45%	14%	7.5%	12.7%
6	31-Jan-24	11.49	178.96	0.55	2.11	193.11	10%	-1%	-53%	16%	-0.2%	13.8%
7	1-Feb-24	12.08	182.23	0.56	2.11	196.97	19%	0%	-55%	18%	1.2%	13.1%
8	2-Feb-24	12.14	185.19	0.59	2.10	200.02	17%	1%	-60%	21%	1.5%	13.6%
9	3-Feb-24	12.82	187.93	0.60	2.10	203.45	30%	-6%	-45%	20%	-4.1%	17.2%
10	4-Feb-24	12.27	178.95	0.64	2.05	193.90	24%	-8%	-60%	14%	-6.9%	42.5%
11	5-Feb-24	12.20	200.93	0.59	2.15	215.87	19%	2%	-55%	16%	2.9%	35.4%
12	6-Feb-24	12.89	217.13	0.68	2.17	232.88	23%	0%	-51%	17%	1.1%	23.3%
13	7-Feb-24	12.97	229.77	0.68	2.21	245.62	26%	8%	-39%	20%	8.5%	18.7%
14	8-Feb-24	12.45	255.53	0.64	2.16	270.78	34%	34%	-60%	21%	33.4%	12.9%
15	9-Feb-24	8.26	184.62	0.57	1.80	195.24	50%	29%	-61%	25%	28.4%	-10.0%
16	10-Feb-24	5.57	186.43	0.58	1.93	194.51	32%	28%	-51%	21%	27.4%	-4.9%
17	11-Feb-24	8.97	261.64	0.98	2.17	273.75	18%	24%	-52%	23%	23.4%	7.4%
18	12-Feb-24	11.24	269.91	1.26	2.24	284.65	23%	22%	-53%	21%	21.2%	12.5%
19	13-Feb-24	12.93	284.79	1.38	2.29	301.39	29%	27%	-42%	20%	25.8%	17.4%
20	14-Feb-24	14.25	288.91	1.49	2.34	306.99	27%	25%	-42%	17%	24.4%	25.6%
21	15-Feb-24	15.16	296.54	1.32	2.37	315.38	20%	22%	-38%	17%	21.8%	23.6%
22	16-Feb-24	15.29	289.61	1.22	2.35	308.46	20%	36%	-43%	17%	34.1%	25.3%
23	17-Feb-24	16.07	288.72	1.12	2.31	308.21	33%	50%	-42%	16%	47.5%	24.0%
24	18-Feb-24	15.61	196.59	1.06	2.31	215.57	33%	5%	-39%	18%	6.3%	29.9%
25	19-Feb-24	14.04	176.08	0.87	2.27	193.27	23%	-2%	-47%	22%	-0.8%	31.7%
26	20-Feb-24	13.39	159.00	0.81	2.13	175.32	18%	-5%	-50%	11%	-3.3%	9.4%
27	21-Feb-24	12.01	137.93	0.72	1.99	152.65	7%	-22%	-50%	6%	-19.9%	4.7%
28	22-Feb-24	11.42	134.89	0.60	2.03	148.94	7%	-21%	-60%	9%	-19.3%	6.4%
29	23-Feb-24	12.32	150.45	0.54	2.06	165.36	19%	-7%	-58%	16%	-5.3%	10.0%
30	24-Feb-24	13.18	155.28	0.51	1.98	170.95	51%	0%	-57%	15%	2.2%	15.8%
31	25-Feb-24	15.21	194.35	0.51	2.20	212.26	36%	5%	-44%	13%	6.4%	•
32	26-Feb-24	14.23	171.80	0.55	2.12	188.70	24%	-1%	-55%	12%	0.4%	
33	27-Feb-24	11.63	165.55	0.50	2.02	179.71	-3%	-9%	-59%	6%	-8.9%	
34	28-Feb-24	10.52	157.43	0.51	2.02	170.48	-20%	-11%	-58%	8%	-12.1%	
35	29-Feb-24	10.02	150.66	0.50	1.99	163.17	-19%	-13%	-57%	8%	-13.2%	
36	1-Mar-24	11.34	168.13	0.44	2.03	181.94	4%	6%	-61%	13%	5.7%	
37	2-Mar-24	12.47	167.98	0.52	1.86	182.83	32%	1%	-45%	4%	1.9%	
38	3-Mar-24	11.55	168.33	0.67	1.90	182.45	28%	4%	-44%	6%	4.5%	
	Sum	465.92	7,511.38	27.82	80.01	8,085.13	20%	7%	-50%	15%	7.7%	

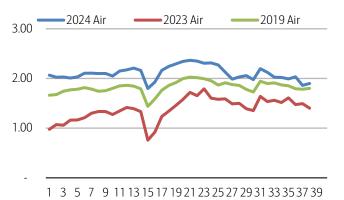
BofA GLOBAL RESEARCH



**Source:** Ministry of Transport. Data in passenger-times in millions.

### Exhibit 21: Chinese air passenger movements for CNY flight season

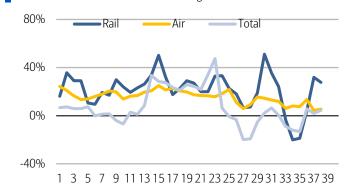
2024 CNY air traffic has been consistently higher than previous years



**Source:** Ministry of Transport, BofA Global Research

BofA GLOBAL RESEARCH

# **Exhibit 22: Total passenger traffic for CNY flight season, 2024 v. 2019**Rail traffic recovered better than air during CNY

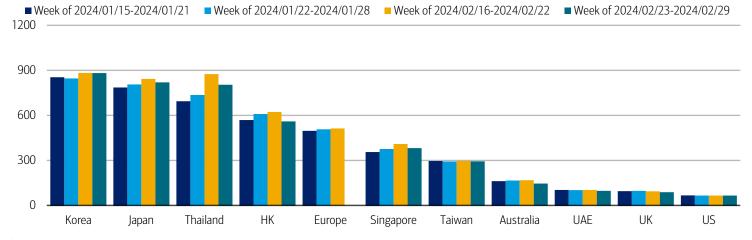


Source: Ministry of Transport, BofA Global Research

BofA GLOBAL RESEARCH

### Exhibit 23: Pre- and Post-CNY international travel recovery by destinations, number of flights

Thailand saw biggest additions of flights post-CNY

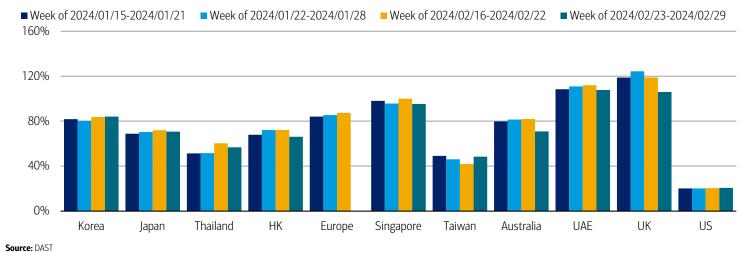


Source: DAST

BofA GLOBAL RESEARCH

## Exhibit 24: Pre- and Post-CNY international travel recovery by destinations, flight recovery v. 2019

Korea and Thailand saw strong post-CNY flight recovery



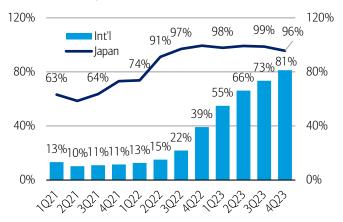


# Japan travel trends

Off peak travel season in January/February mostly back to normal. Japanese Yen to weaken again likely to provide tailwind to inbound tourism in 2024.

### Exhibit 25: Japan international capacity as % of 2019, 2021-23

International ramping to 80% of normal

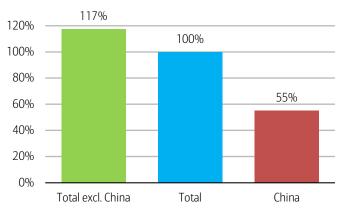


Source: Diio

BofA GLOBAL RESEARCH

### Exhibit 27: Japan inbound tourism % of normal, January 2024

Inbound volume in January fully back to normal. Exc. Chinese 117% of normal

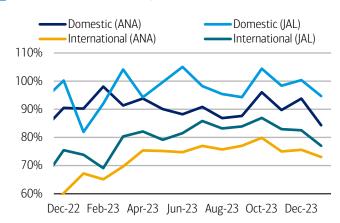


Source: JNTO

BofA GLOBAL RESEARCH

### Exhibit 26: JAL & ANA traffic % of normal, 2023-24

JAL continue to lead the recovery. Domestic back to normal in December

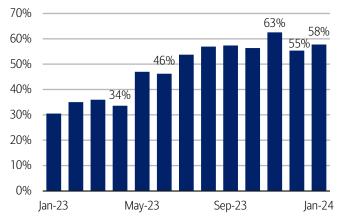


**Source:** Company reports

BofA GLOBAL RESEARCH

### Exhibit 28: Japan outbound tourism % of normal, 2023-24

Japanese outbound has been 50-60% of normal since summer of 2023



Source: JNTO

BofA GLOBAL RESEARCH

### Exhibit 29: Japan short-haul outbound by ASK, 2023-24

Flights to China are quickly restoring

	China	Thailand	HK	Taiwan	Singapore	Korea	Viet Nam	Philippines	Malaysia	Indonesia	India
2024-01	76%	64%	90%	100%	102%	104%	114%	105%	87%	60%	93%
2024-02	80%	65%	92%	101%	107%	109%	116%	105%	94%	69%	111%
2024-03	78%	61%	89%	98%	106%	99%	111%	101%	82%	64%	108%

**Source:** OAG, BofA Global Research

BofA GLOBAL RESEARCH

#### Exhibit 30: Japan long-haul outbound by ASK, 2023-24

Long-haul flights to Australia and Canada are fastest to recover

	USA	Germany	Australia	France	UAE	UK	Canada	Finland	Qatar	Netherlands	Italy
2024-01	98%	69%	119%	68%	107%	79%	141%	76%	89%	76%	49%
2024-02	101%	68%	129%	73%	112%	88%	146%	76%	93%	76%	50%
2024-03	97%	66%	130%	75%	109%	87%	145%	67%	138%	71%	71%

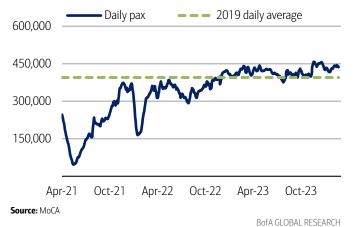
Source: OAG, BofA Global Research

# Indian air travel trends

Indian domestic air traffic up since reopening.

# Exhibit 31: Indian domestic air passengers (# 7D MA), 2021-23

Indian domestic air passengers remained > 2019 levels in February 2024



# **Exhibit 32: Indian domestic air passengers YoY growth (# 7D MA), 2023** Indian domestic air passengers grew on a yoy basis since 2023 although speed of growth declined



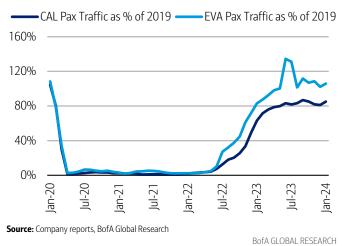
BofA GLOBAL RESEARCH

# Taiwan air travel trends

Taiwan's air traffic is still strong in January 2024 but normalizing:

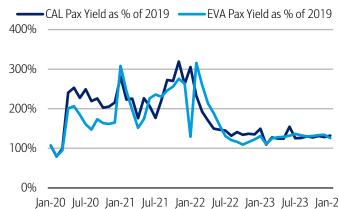
# Exhibit 33: CAL & EVA - Passenger Traffic as % of 2019, 2020-2023

CAL/EVA's passenger traffic at 85/106% of normal in January 2024



## Exhibit 34: CAL & EVA - Passenger Yield as % of 2019, 2020-2023

CAL/EVA's passenger yield at 132%/126% of normal in January 2024



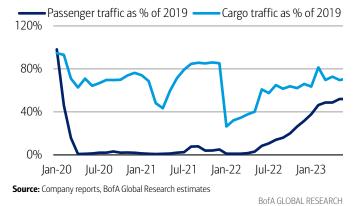
**Source:** Company reports, BofA Global Research

# Long haul travel trends

CX back to 59% of normal while SIA 102% of normal in January 2024.

### Exhibit 35: CX- Passenger & cargo as % of 2019, 2020-2022

CX traffic back to 59% of normal in January 2023



### Exhibit 36: SIA - passenger & cargo as % of 2019, 2020-2022

SIA traffic at 102% of normal in January 2024

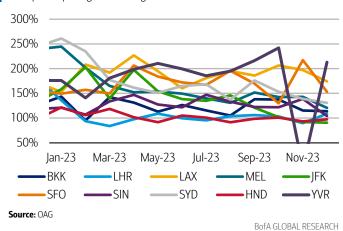


**Source:** Company reports, BofA Global Research estimates

BofA GLOBAL RESEARCH

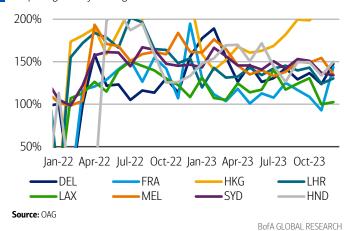
### Exhibit 37: CX key route airfare (% of 2019), 2023

Transpacific pricing normalizing a little



### Exhibit 38: SIA – key route airfare as % of 2019, 2023

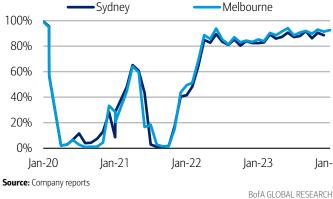
SIA pricing broadly holding



# Australia travel trends

Melbourne domestic/international traffic has recovered to around 93%/100% of normal:

### Exhibit 39: SYD & MEL airport domestic traffic as % of 2019 Domestic traffic at Melbourne at 93% of normal in January 2024



### Exhibit 40: SYD & MEL airport international traffic as % of 2019 International traffic at Melbourne at 100% of normal in January 2024



### **Special Disclosures**

BofA Securities is currently acting as Financial Advisor to Tata Sons Pvt Ltd in connection with the proposed merger of Air India and Tata SIA Airlines Limited (in which SIA owns 49% stake) which was announced on 29 Nov 2022.

# **Disclosures**

### **Important Disclosures**

FUNDAMENTAL EQUITY OPINION KEY: Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. VOLATILITY RISK RATINGS, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. INVESTMENT RATINGS reflect the analyst's assessment of both a stock's absolute total return potential as well as its attractiveness for investment relative to other stocks within its Coverage Cluster (defined below). Our investment ratings are: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. An investment rating of 6 (No Rating) indicates that a stock is no longer trading on the basis of fundamentals. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster <sup>R1</sup>
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Undernerform	N/Δ	> 20%

R1 Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

INCOME RATINGS, indicators of potential cash dividends, are: 7 - same/higher (dividend considered to be secure), 8 - same/lower (dividend not considered to be secure) and 9 - pays no cash dividend. Coverage Cluster is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Global Research report referencing the stock.

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

## **Other Important Disclosures**

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments. Refer to BofA Global Research policies relating to conflicts of interest.

\*BofA Securities\* includes BofA Securities, Inc. (\*BofAS\*) and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. \*BofA Securities\* is a global brand for BofA Global Research.

Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at www.bofaml.com/BofASEdisclaimer; BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch (Hong Kong): Merr (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Canada): Merrill Lynch (Mexico): Merrill Mexico): Merrill Lynch (Mexico): Merrill Lynch (Mexico): Merrill Lynch (Mexico): Merrill Lynch (Me de Bolsa, regulated by the Comisión Nacional Bancaría y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch (I Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch (Brazil): Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.



This information: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securit

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

#### General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information. In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

#### Copyright and General Information:

Copyright 2024 Bank of America Corporation. All rights reserved. iQdatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities. Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public inform

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing

such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.

