Air traffic has been vulnerable to external factors including disease outbreaks.

Source: ICAO Annual Report of the Council
What can we learn from past experience?
SARS, Aviation flu and MERS

History shows that SARS has the most serious impact on traffic. At the height of the outbreak (May 2003), monthly RPKs of Asia-Pacific airlines were 35% lower than their pre-crisis levels. Overall in 2003, Asia-Pacific airlines lost 8% of annual RPKs and $6 billion of revenues.
Chinese international traffic more than doubled since 2003 SARS spread

Total number of passenger moved through Chinese airports
2003-2018
(million of passengers)

Passengers move to/from Chinese airports
2003 vs 2018

Annual average growth rate: ↑9.6%

Source: ICAO-ACI Airport traffic data
Chinese economic size quadrupled since 2003 but growth rate slowed down.

GDP of China (constant 2010 USD, trillion)

GDP Annual Growth of China (%)

Source: World Bank Group
China is more integrated in the global economy

Share of China in world

<table>
<thead>
<tr>
<th>%</th>
<th>2002</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global GDP</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Global trade</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td>Global FDI</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>Global tourists</td>
<td>8%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Value added trade flows between China and key partners

Source: OECD Interim Economic Outlook dated 2 March 2020
The drop in Chinese travellers will hit hard

Source: OECD Interim Economic Outlook dated 2 March 2020
Air connectivity of China in terms of O-D passenger movement

Major international air traffic originating from People's Republic of China in 2018

Source: ICAO-ICM MIDT data
Air connectivity of Wuhan airport in terms of O-D passenger movement

Source: ICAO-ICM MIDT data
COVID-19 outbreak caused a substantial setback in flight bookings for Chinese New Year.
Flight cancellation has exceeded actual operations since 31 January 2020

Note: The above includes a) international from mainland China, Hong Kong SAR of China, Macao SAR of China, Taiwan, Province of China; b) domestic within mainland China, and c) regional between mainland China and Hong Kong SAR, Macao SAR and Taiwan Province
Scenario Analysis:
International Services from/to Mainland China

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
• “International” refers to scheduled international passenger services from/to mainland China excluding:
  – scheduled passenger services between mainland China and Hong Kong Special Administrative Region (SAR) of China, Macao SAR of China and Taiwan, Province of China; and
  – scheduled international passenger services from/to Hong Kong SAR, Macao SAR of China and Taiwan, Province of China

• “Regional” refers to scheduled passenger services:
  – between mainland China and Hong Kong SAR of China
  – between mainland China and Macao SAR of China; and
  – between mainland China and Taiwan, Province of China
Number of seats offered by airlines (monthly, 2019)

Capacity share 2019

- 45%: International by Chinese carriers
- 37%: International by foreign carriers
- 9% Regional (mainland China - Hong Kong SAR)
- 3% Regional (mainland China - Macao SAR)
- 7% Regional (mainland China - Taiwan Province)

Source: OAG Scheduled data
Number of seats offered by airlines (1Q 2020 originally-planned)

**Capacity share 1Q 2020**

- 48%: International by Chinese carriers
- 36%: International by foreign carriers
- 7% Mainland China - Hong Kong SAR
- 3% Mainland China - Macao SAR
- 6% Mainland China - Taiwan Province
Over 130 airlines reduced international services or cancelled all operations from/to mainland China

Source: Routes Online, OAG and airline websites (as of 4 March 2020)

### International (136)

- Aero Mongolia*
- Air Algerie*
- Air Astana*
- Air Busan
- Air Canada*
- Air China
- Air Company SCAT*
- Air France*
- Air India*
- Air Koryo*
- Air Madagascar*
- Air Mauritius*
- Air New Zealand*
- Air Seoul, Inc.*
- AirAsia
- AirAsia X
- All Nippon Airways
- American Airlines*
- Ana Airlines
- Austrian Airlines*
- Azerbaijan Airlines*
- AZUR air*
- Bangkok Airways*
- Batik Air
- Beijing Capital Airlines
- British Airways*
- Cambodia Airways Co. Ltd
- Cambodia Angkor Air*
- Cebu Pacific Air*
- Chengdu Airlines
- China Eastern Airlines
- China Express Airlines
- China Southern Airlines
- China United Airlines
- China West Air*
- Chongqing Airlines*
- Citilink Indonesia
- Delta Air Lines*
- Donghai Airlines*
- Eastar Jet
- EgyptAir**
- El Al Israel Airlines*
- Emirates
- Ethiopian Airlines
- Etihad Airways
- Finnair*
- Garuda Indonesia*
- Guangxi Beibu Gulf Airlines
- Hainan Airlines
- Hebei Airlines*
- Himalaya Airlines*
- Iberia*
- IndiGo*
- IrAero*
- Iraqi Airways*
- Japan Airlines
- JC Cambodia Intl Airlines
- Jeju Airlines
- Jetstar Asia*
- Jetstar Japan*
- Jetstar Pacific Airlines*
- Jin Air*
- Juneyao Airlines
- Kenya Airways*
- KLM-Royal Dutch Airlines*
- Korean Air
- Kungming Airlines
- Lanmei Airlines
- Lao Airlines
- Lion Air
- LOT - Polish Airlines*
- Lucky Air Co. Ltd.
- Malaysia Airlines
- Malindo Airways
- MIAT - Mongolian Airlines*
- Myanmar Airways Intl*
- Myanmar National Airlines*
- Neos Air*
- Nok Air
- NoKSelect Airlines Co Ltd*
- NordStar*
- Okay Airways
- Oman Air*
- Pakistan Intl Airlines*
- PAL Express*
- Peach Aviation Limited*
- Pegas Fly*
- Philippine Airlines*
- Philippine Airlines Asiana Inc.*
- Qantas Airways*
- Qatar Airways*
- Qingdao Airlines Co, Ltd
- Royal Air Maroc*
- Royal Brunei Airlines*
- Royal Flight Airlines*
- Ruili Airlines
- RwandAir*
- SAS Scandinavian Airlines*
- Saudi Arabian Airlines*
- Scoot*
- Shandong Airlines
- Shanghai Airlines
- Shenzhen Airlines
- Siberia Airlines*
- Sichuan Airlines
- SilkAir
- Singapore Airlines
- Sky Angkor Airlines
- Somon Air*
- Spring Airlines
- Spring Airlines Japan
- Srilankan Airlines
- SWISS*
- Thai Air Asia X
- Thai AirAsia
- Thai Airways International
- Thai Lion Air
- Thai Smile Airways*
- Tianjin Airlines
- Donghai Airlines
- Royal Flight Airlines*
- Turkish Airlines*
- Turkish Airlines**
- Turkmenistan Airlines*
- T'way Air*
- Ukraine Inter Airlines*
- United Airlines*
- Ural Airlines
- Urumqi Airlines*
- US-Bangla Airlines
- Uzbekistan Airways*
- Vietnam Airlines*
- Virgin Atlantic Airways*
- Yakutia*
- Zhejiang Loong Airlines
- Hebei Airlines*
- HK Express
- Hong Kong Airlines
- Juneyao Airlines
- Mandarin Airlines
- Shandong Airlines
- Shanghai Airlines
- Sichuan Airlines
- Tigerair Taiwan Co. Ltd
- Uni Airways
- Xiamen Airlines Company
- Zhejiang Loong Airlines*

* Announced since late January 2020; Duration varies

** Airlines with all service cancelled but gradual resumption

*** Airlines with all service cancelled
Scenario analysis of COVID-19 outbreak impact for 1Q 2020

• Baseline (hypothetical situation without COVID-19 outbreak)
  – Seat capacity: used "originally-planned" winter schedule
  – Load factor: used 2018 actual results of airlines

• Scenario 1
  – Seat capacity in January and February: estimated by airlines’ schedule changes
  – Seat capacity in March: estimated by preliminary airlines’ schedules
  – Load factor: used 2018 actual results of airlines except Hong Kong SAR of China

• Scenario 2
  – Seat capacity in January and February: estimated by airlines' schedule changes
  – Seat capacity in March: assumed summer schedules not starting from 29 March
  – Load factor: decreased by 12 - 22% in February and by 7 - 17% in March
## Scenario analysis: Assumptions

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Baseline</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seat capacity reduction from originally-planned</td>
<td>Passenger load factor</td>
<td>Seat capacity reduction from originally-planned</td>
</tr>
<tr>
<td>January 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>0%</td>
<td>78%</td>
<td>-1%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>0%</td>
<td>80%</td>
<td>0%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>0%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>-1%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>0%</td>
<td>80%</td>
<td>-1%</td>
</tr>
<tr>
<td>February 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>0%</td>
<td>78%</td>
<td>-57%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>0%</td>
<td>80%</td>
<td>-64%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>-65%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>-67%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>0%</td>
<td>80%</td>
<td>-60%</td>
</tr>
<tr>
<td>March 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>0%</td>
<td>78%</td>
<td>-73%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>0%</td>
<td>80%</td>
<td>-76%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>-80%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>0%</td>
<td>80%</td>
<td>-64%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>0%</td>
<td>80%</td>
<td>-80%</td>
</tr>
</tbody>
</table>
Baseline:

10% seat capacity increase compared to 1Q 2019

A total of YoY 10% seat capacity increase originally planned for 1Q 2020 despite the reduction of capacity between mainland China and Hong Kong SAR and Taiwan Province.
Scenarios 1 & 2: 45% seat capacity reduction from Baseline

Scenario 1: for 1Q 2020 a total of 39% reduction compared to 1Q 2019 and 45% reduction from Baseline

Scenario 2: for 1Q 2020 a total of 40% reduction compared to 1Q 2019 and 45% reduction from Baseline

Source: ICAO estimates
15.8 to 17.6 million “international” passenger reduction in 1Q 2020 compared to Baseline

**Scenario 1**
15.8 million passenger reduction

- January 2020: 7.12 million
- February 2020: 6.54 million
- March 2020: 6.65 million

**Scenario 2**
17.6 million passenger reduction

- January 2020: 7.12 million
- February 2020: 6.54 million
- March 2020: 6.65 million

Source: ICAO estimates
3.4 to 3.7 million “regional” passenger reduction in 1Q 2020 compared to Baseline

**Scenario 1**
3.4 million passenger reduction

**Scenario 2**
3.7 million passenger reduction

Source: ICAO estimates
Approx. USD 4.7 to 5.2 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 4.7 billion reduction
Scenario 2: USD 5.2 billion reduction

- International (Chinese carriers): calculated with an average fare of USD 250 per passenger based on traffic/financial reports of CA, CZ and MU;
- International (Foreign carriers): assumed 15% higher average fare than Chinese carriers;
- Regional: calculated with an average fare of USD 135 per passenger based on traffic/financial reports of CA, CZ and MU

Source: ICAO estimates
The preliminary estimates indicate the impact in terms of scheduled international passenger traffic from/to mainland China (including between mainland China and Hong Kong SAR of China, Macao SAR of China and Taiwan, Province of China) during 1Q 2020 compared to originally-planned:

- Overall reduction of **45% of seats offered by airlines**
- Overall reduction of **19.3 to 21.4 million passengers**
- Approx. **USD 4.7 to 5.2 billion potential loss** of gross operating revenues of airlines

### Estimated Impact on

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Number of seats offered by airlines (000)</th>
<th>Number of passengers (000)</th>
<th>Gross operating revenues of airlines (USD, million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>-11,100, -42%</td>
<td>-11,300, -43%</td>
<td>-8,600, -42%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>-9,000, -46%</td>
<td>-9,200, -47%</td>
<td>-7,200, -46%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>-1,900, -49%</td>
<td>-1,900, -49%</td>
<td>-1,700, -55%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>-700, -44%</td>
<td>-700, -45%</td>
<td>-500, -44%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>-1,500, -46%</td>
<td>-1,500, -47%</td>
<td>-1,200, -46%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-24,100, -45%</strong></td>
<td><strong>-24,600, -45%</strong></td>
<td><strong>-19,300, -45%</strong></td>
</tr>
</tbody>
</table>

*Source: ICAO estimates*
Scenario Analysis:
Hong Kong SAR of China and Macao SAR of China

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
• “Hong Kong International” refers to scheduled international passenger services from/to Hong Kong Special Administrative Region (SAR) of China excluding:
  – scheduled passenger services between Hong Kong SAR of China and mainland China, Macao SAR of China and Taiwan, Province of China

• “Macao International” refers to scheduled international passenger services from/to Macao SAR of China excluding:
  – scheduled passenger services between Macao SAR of China and mainland China, Hong Kong SAR of China and Taiwan, Province of China

• “Cross-Strait” refers to scheduled passenger services among Hong Kong SAR of China, Macao SAR of China and Taiwan, Province of China excluding:
  – “Regional” already included in the mainland China analysis
Number of seats offered by airlines (monthly, 2019)

Capacity share 2019
- 78%: Hong Kong International
- 6%: Macao International
- 16%: Cross-Strait

Source: OAG Scheduled data
Number of seats offered by airlines (1Q 2020 originally-planned)

Capacity share 1Q 2020
- 76%: Hong Kong International
- 7%: Macao International
- 17%: Cross-Strait

Airlines originally planned to reduce seat capacity slightly due to the impact of Hong Kong protests and the continued trade tension.

Source: OAG Scheduled data
Some 70 airlines cancelled all services or reduced services from/to Hong Kong SAR and Macao SAR

| Hong Kong International (64) | Aeroflot Russian Airlines | El Al Israel Airlines* | Air Astana | Emirates | Air Busan* | Ethiopian Airlines | Air Canada | Etihad Airways* | Air France | EZNIS AIRWAYS LLC* | Air India* | Fiji Airways | Air Mauritius* | Finnair | Air Niugini | Garuda Indonesia | Air Seoul, Inc | HK Express | AirAsia | Hong Kong Airlines | All Nippon Airways | IndiGo* | American Airlines* | Japan Airlines | Asiana Airlines | Jeju Airlines | Bangkok Airways | Jetstar Asia* | British Airways | Jetstar Japan* | Cathay Dragon | Jetstar Pacific Airlines* | Cathay Pacific Airways | KLM-Royal Dutch Airlines | Cebu Pacific Air** | Korean Air* | Eastar Jet | Lanmei Airlines* |
|-----------------------------|--------------------------|-----------------------|------------|----------|------------|-------------------|------------|-----------------|-----------|-----------------|-----------|---------------|--------------|--------|------------|------------------|---------------|-------------|--------|----------------|----------------|-------------|---------------|-------------|---------------|-----------|------------|-----------------|----------------|------------------|-------------|---------------|-----------------|-----------|
|                             | Lufthansa German Airlines | Malaysia Airlines | MIAT - Mongolian Airlines* | Myanmar National Airlines | Peach Aviation Limited | Philippine Airlines* | Philippines AirAsia Inc.* | Qantas Airways | Qatar Airways | Royal Brunei Airlines | Royal Jordanian | SAS Scandinavian Airlines* | Scoot | Siberia Airlines* | Singapore Airlines | South African Airways* | SWISS | Thai AirAsia | Thai Airways International | Turkish Airlines | T'way Air | United Airlines* | Vietjet | Vietnam Airlines | Virgin Atlantic Airways | Virgin Australia Intl* | Cross-Strait (9) | Air Macau | Cathay Dragon | Cathay Pacific Airways | China Airlines | EVA Airways | HK Express | Hong Kong Airlines | Mandarin Airlines* | Tigerair Taiwan Co. Ltd* |

Source: Routes Online, OAG and airline websites (as of 4 March 2020)

Announced since late January 2020; Duration varies

*: Airlines with all service cancelled
*^: Airlines with all service cancelled but gradual resumption

Cross-Strait (9)

- Air Macau
- Cathay Dragon
- Cathay Pacific Airways
- China Airlines
- EVA Airways
- HK Express
- Hong Kong Airlines
- Mandarin Airlines*
- Tigerair Taiwan Co. Ltd*

* Announced since late January 2020; Duration varies
*^ Airlines with all service cancelled but gradual resumption
Scenario analysis of COVID-19 outbreak impact for 1Q 2020

• Baseline (hypothetical situation without COVID-19 outbreak)
  – Seat capacity: used "originally-planned" winter schedule
  – Load factor: used the same percentage as "International from/to mainland China (Foreign carriers)" and "Regional"

• Scenario 1
  – Seat capacity in January and February: estimated by airlines' schedule changes
  – Seat capacity in March: estimated by preliminary airlines’ schedules
  – Load factor: used the same percentage as Baseline

• Scenario 2
  – Seat capacity in January and February: estimated by airlines' schedule changes
  – Seat capacity in March: assumed summer schedules not starting from 29 March
  – Load factor: decreased by 22% in February and by 17% in March
### Scenario analysis: Assumptions

#### January 2020

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Baseline</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
</tr>
<tr>
<td></td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Macao International</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>

#### February 2020

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Baseline</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
</tr>
<tr>
<td></td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>0%</td>
<td>-25%</td>
<td>-25%</td>
</tr>
<tr>
<td>Macao International</td>
<td>0%</td>
<td>-67%</td>
<td>-67%</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>0%</td>
<td>-52%</td>
<td>-52%</td>
</tr>
</tbody>
</table>

#### March 2020

<table>
<thead>
<tr>
<th>Assumptions</th>
<th>Baseline</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
<td>Seat capacity reduction from originally-planned</td>
</tr>
<tr>
<td></td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
<td>Passenger load factor</td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>0%</td>
<td>-55%</td>
<td>-60%</td>
</tr>
<tr>
<td>Macao International</td>
<td>0%</td>
<td>-75%</td>
<td>-77%</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>0%</td>
<td>-83%</td>
<td>-85%</td>
</tr>
</tbody>
</table>
Baseline: 5% seat capacity reduction compared to 1Q 2019

A total of YoY 5% seat capacity reduction originally planned for 1Q 2020 due to the expectation of continued weak demand for Hong Kong SAR and Taiwan Province.

Source: OAG scheduled data
Scenarios 1 & 2: 31 to 32% seat capacity reduction from Baseline

Scenario 1: for 1Q 2020 a total of 34% reduction compared to 1Q 2019 and 31% reduction from Baseline

Scenario 2: for 1Q 2020 a total of 35% reduction compared to 1Q 2019 and 32% reduction from Baseline

Source: ICAO estimates
4.7 to 6.1 million passenger reduction in 1Q 2020 compared to Baseline

Source: ICAO estimates
Approx. USD 1.1 to 1.5 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

**Scenario 1: USD 1.1 billion reduction**
- **Jan 2020**: 0
- **Feb 2020**: -59
- **Mar 2020**: -602

**Scenario 2: USD 1.5 billion reduction**
- **Jan 2020**: 0
- **Feb 2020**: -74
- **Mar 2020**: -745

- **Hong Kong International**: calculated with an average fare of USD 287.6 per passenger (i.e. almost the same as “International (Foreign carriers)”);
- **Macao International**: calculated with an average fare of USD 172 per passenger;
- **Cross-Strait**: calculated with an average fare of USD 135 per passenger (i.e. the same as “Regional”)

**Source**: ICAO estimates
The preliminary estimates indicate the impact in terms of scheduled international passenger traffic from/to Hong Kong SAR of China and Macao SAR of China, as well as scheduled passenger traffic among Hong Kong SAR of China, Macao SAR of China and Taiwan, Province of China, during 1Q 2020 compared to originally-planned:

- Overall reduction ranging from **31% to 32% of seats offered by airlines**
- Overall reduction of **4.7 to 6.1 million passengers**
- Approx. **USD 1.1 to 1.5 billion potential loss** of gross operating revenues of airlines

### Estimated Impact on

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Estimated Impact on</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of seats offered by airlines (000)</td>
</tr>
<tr>
<td></td>
<td>Scenario 1</td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>-3,700</td>
</tr>
<tr>
<td>Macao International</td>
<td>-600</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>-1,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-5,800</strong></td>
</tr>
</tbody>
</table>

*Source: ICAO estimates*
Summary of Scenario Analysis

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
• The direct impact of COVID-19 outbreak is expected to be greater than that caused by SARS in 2003 due to higher scale of flight cancellations and bigger economic size/air travel market of China

• The preliminary estimates indicate the impact in terms of scheduled international passenger traffic from/to China (including Hong Kong SAR of China, Macao SAR of China and cross-strait services from/to Taiwan, Province of China) during 1Q 2020 compared to originally-planned:
  – Overall reduction ranging from **41% to 42% of seats offered by airlines**
  – Overall reduction of **23.9 to 27.5 million passengers**
  – Approx. **USD 5.8 to 6.7 billion potential loss** of gross operating revenues of airlines

• The above estimates exclude, inter alia, the impact of traffic reduction related to air cargo, Chinese domestic, as well as other international services

**Source:** ICAO estimates
Break-down of revenue reduction by region of air carrier registration in 1Q 2020

55% and 85% of revenue reduction is estimated to be attributed to the loss from Chinese carriers and Asia/Pacific carriers (including Chinese carriers), respectively.

Source: ICAO estimates
## Break-down of estimated impact in 1Q 2020

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Number of seats offered by airlines (000)</th>
<th>Number of passengers (000)</th>
<th>Gross operating revenues of airlines (USD, million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>Scenario 2</td>
<td>Scenario 1</td>
<td>Scenario 2</td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>-11,100 -42%</td>
<td>-11,300 -43%</td>
<td>-8,600 -42%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>-9,000 -46%</td>
<td>-9,200 -47%</td>
<td>-7,200 -46%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>-1,900 -49%</td>
<td>-1,900 -49%</td>
<td>-1,700 -55%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>-700 -44%</td>
<td>-700 -45%</td>
<td>-500 -44%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>-1,500 -46%</td>
<td>-1,500 -47%</td>
<td>-1,200 -46%</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>-24,100 -45%</strong></td>
<td><strong>-24,600 -45%</strong></td>
<td><strong>-19,300 -45%</strong></td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>-3,700 -26%</td>
<td>-3,900 -27%</td>
<td>-3,000 -26%</td>
</tr>
<tr>
<td>Macao International</td>
<td>-600 -47%</td>
<td>-600 -47%</td>
<td>-500 -47%</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>-1,500 -45%</td>
<td>-1,500 -45%</td>
<td>-1,200 -45%</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>-5,800 -31%</strong></td>
<td><strong>-6,100 -32%</strong></td>
<td><strong>-4,700 -31%</strong></td>
</tr>
<tr>
<td>Grand total</td>
<td><strong>-29,900 -41%</strong></td>
<td><strong>-30,600 -42%</strong></td>
<td><strong>-23,900 -41%</strong></td>
</tr>
</tbody>
</table>

*Source: ICAO estimates*
Appendix
China Domestic
Tourism by Chinese Passengers
Republic of Korea
Iran (Islamic Republic of)
Mongolia

This section contains a very preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
The preliminary estimates indicate the impact in terms of scheduled domestic passenger traffic within mainland China during 1Q 2020 compared to originally-planned:

- Overall reduction of 40% of seats offered by airlines
- Overall reduction of 66.6 to 76.3 million passengers
- Approx. USD 6.8 to 7.8 billion potential loss of gross operating revenues of airlines

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Estimated Impact on</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic within mainland China</td>
<td>Number of seats offered by airlines (000)</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>Scenario 2</td>
</tr>
<tr>
<td>-76,100</td>
<td>-76,100</td>
</tr>
</tbody>
</table>

**Assumption**
- Seat capacity is reduced by 3% in January 2020 and 60% in February and March 2020 from the originally-planned schedules (baseline)
- Load factor is down from 83% (baseline) to 80% for 1Q 2020
- Load factor is down from 83% (baseline) to 80% in January 2020, 58% in February 2020 and 63% in March 2020

*Calculated with an average fare of USD 102.5 per passenger based on traffic/financial reports of CA, CZ and MU*

*Source: ICAO estimates*
### Potential loss of revenues from Chinese tourists to top 5 States in 1Q 2020

<table>
<thead>
<tr>
<th>Top 5 States that Chinese traveller had the largest share</th>
<th>Baseline</th>
<th></th>
<th>Scenario 1</th>
<th></th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger number</td>
<td>Tourism revenue (in million USD)*</td>
<td>Passenger number</td>
<td>Tourism revenue (in million USD)*</td>
<td>Passenger number</td>
<td>Tourism revenue (in million USD)*</td>
</tr>
<tr>
<td>Australia</td>
<td>460,161</td>
<td>446.36</td>
<td>340,318</td>
<td>330.11</td>
<td>296,616</td>
</tr>
<tr>
<td>Loss</td>
<td>-</td>
<td>-</td>
<td>-119,843</td>
<td>-116.25</td>
<td>-163,545</td>
</tr>
<tr>
<td>France</td>
<td>240,523</td>
<td>233.31</td>
<td>137,867</td>
<td>133.73</td>
<td>120,670</td>
</tr>
<tr>
<td>Loss</td>
<td>-</td>
<td>-</td>
<td>-102,656</td>
<td>-99.58</td>
<td>-119,853</td>
</tr>
<tr>
<td>Japan</td>
<td>3,181,840</td>
<td>3,086.38</td>
<td>2,167,273</td>
<td>2102.25</td>
<td>1,855,034</td>
</tr>
<tr>
<td>Loss</td>
<td>-</td>
<td>-</td>
<td>-1,014,567</td>
<td>-984.13</td>
<td>-1,326,806</td>
</tr>
<tr>
<td>Thailand</td>
<td>2,772,352</td>
<td>2,689.18</td>
<td>1,826,629</td>
<td>1771.83</td>
<td>1,589,458</td>
</tr>
<tr>
<td>Loss</td>
<td>-</td>
<td>-</td>
<td>-945,723</td>
<td>-917.35</td>
<td>-1,182,894</td>
</tr>
<tr>
<td>United States</td>
<td>888,102</td>
<td>861.46</td>
<td>505,096</td>
<td>489.94</td>
<td>446,707</td>
</tr>
<tr>
<td>Loss</td>
<td>-</td>
<td>-</td>
<td>-383,006</td>
<td>-371.52</td>
<td>-441,395</td>
</tr>
</tbody>
</table>

- Data excludes Special Administrative Regions (SAR) of China (Hong Kong SAR and Macao SAR) and Taiwan, Province of China
- Calculated with average international tourism spending of China (USD 970) per tourist reported by UNWTO

Source: ICAO estimates
ICAO estimates

International passenger services from/to Republic of Korea in 1Q 2020

23% seat capacity reduction from originally-planned level in 1Q 2020

Source: ICAO estimates
International passenger services from/to Republic of Korea in Feb 2020

1.3 to 1.5 million passenger reduction in February 2020 compared to originally-planned

- From/to mainland China including Hong Kong/Macao SARs: extracted the impact involving Republic of Korea from scenarios 1 and 2;
- Other internal destinations: assumed 80% load factor

Source: ICAO estimates
USD 204 to 232 million potential loss of airline revenues in February 2020 compared to originally-planned

- From/to mainland China including Hong Kong/Macao SARs: extracted the impact involving Republic of Korea from scenarios 1 and 2;
- Other internal destinations: calculated with an average fare of USD 287.6 per passenger (ranging from USD 155 to 485 by destination);
International passenger services from/to Iran (Islamic Republic of) in Feb 2020

12% seat capacity reduction from originally-planned level in February 2020 due to COVID-19

- -6%: Iranian carriers
- -25%: Foreign carriers

*: Capacity change was announced and implemented before COVID-19 outbreak

Source: OAG Scheduled data and ICAO estimates
International passenger services from/to Iran (Islamic Republic of) in Feb 2020

0.11 million passenger reduction in February 2020 compared to originally-planned due to COVID-19

- From/to mainland China: extracted the impact involving Republic of Korea from scenarios 1 and 2;
- Other internal destinations: assumed 80% load factor

Source: ICAO estimates
International passenger services from/to Iran (Islamic Republic of) in Feb 2020

USD 22 million potential loss of airline revenues in February 2020 compared to originally-planned due to COVID-19

- From/to mainland China: extracted the impact involving Republic of Korea from scenarios 1 and 2;
- Other internal destinations: calculated with an average fare of USD 160 per passenger

* Capacity change was announced and implemented before COVID-19 outbreak

Source: ICAO estimates
International passenger services from/to Mongolia in Feb 2020

42% seat capacity reduction from originally-planned level in February 2020

-53%: Mongolian carriers
-59%: Chinese carriers
-19%: Korean carriers
-2%: Other foreign carriers

Source: OAG Scheduled data and ICAO estimates
International passenger services from/to Mongolia in Feb 2020

34,000 passenger reduction in February 2020 compared to originally-planned

- From/to mainland China: extracted the impact involving Mongolia from scenarios 1 and 2;
- From/to Republic of Korea and other internal destinations: assumed 80% load factor

Source: ICAO estimates
USD 6.1 million potential loss of airline revenues in February 2020 compared to originally-planned

- From/to mainland China and Hong Kong SAR: extracted the impact involving Mongolia from scenarios 1 and 2;
- From/to Republic of Korea and other internal destinations: calculated with an average fare of USD 135 to 155 per passenger

Source: ICAO estimates
Arrangement for the prevention and Management of Public Health Events in Civil Aviation (CAPSCA)

- [https://www.capsca.org/CoronaVirusRefs.html](https://www.capsca.org/CoronaVirusRefs.html)

Aviation and COVID-19

- [https://www.icao.int/Security/COVID-19/Pages/default.aspx](https://www.icao.int/Security/COVID-19/Pages/default.aspx)

Updated analysis of the effects of the Novel Coronavirus (COVID-19) on air transport