Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis

Montréal, Canada
23 March 2020
• Introduction and Background

• Summary of Analysis Results

• Scenario Analysis:
  – Mainland China
  – Hong Kong and Macao SARs of China and Taiwan, Province of China
  – Summary and Additional Estimates: China
  – Republic of Korea
  – Italy
  – Iran (Islamic Republic of)

• Preliminary Analysis:
  – Transatlantic between United States and Schengen Area + United Kingdom/Ireland
Introduction and Background
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.

Source: IATA Economics’ Chart of the Week (24 January 2020)
Desease outbreak directly impacts air traffic and revenues of aviation industry

Number of cases / countries affected
- Flights cancellations
- Aircraft groundings
- Travel bans
- Border closures

Traffic decline
- Fewer flights
- Lower load factors
- Impact on yield

Revenue loss
- Proportionate to traffic loss
- Decline in unit revenues, especially in non-aeronautical (airports)

Source: The Impact of COVID-19 on the Airport Business (ACI)
COVID-19 outbreak has impacted air traffic for China starting from January 2020

- Number of originally-planned flights
- Number of actual operations
- Number of cancellation

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

Source: CARNOC.com (retrieved on 9 March 2020)
A surge of COVID-19 confirmed cases occurred in several States by late February 2020.

In February 2020, international passenger capacity reduced by 8%, mainly related to traffic from/to States experiencing an early outbreak.

*State/Territory with 100 or more confirmed cases*
*State/Territory with 1,000 or more confirmed cases*
*State/Territory with 10,000 or more confirmed cases*

<table>
<thead>
<tr>
<th>Country/Territory</th>
<th>Capacity change from originally-planned</th>
<th>March 2020 excluding from/to China, Iran, Italy and Korea</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>-14,475,500-79%</td>
<td>Germany - 1,955,429 -11%</td>
</tr>
<tr>
<td>Italy</td>
<td>-6,699,500-59%</td>
<td>Saudi Arabia - 1,303,216 -23%</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>-6,415,100-69%</td>
<td>Singapore - 1,243,194 -21%</td>
</tr>
<tr>
<td>Hong Kong SAR of China (CN)</td>
<td>-5,134,300-74%</td>
<td>United Arab Emirates - 1,193,185 -10%</td>
</tr>
<tr>
<td>Japan</td>
<td>-5,052,500-45%</td>
<td>Thailand - 1,183,063 -19%</td>
</tr>
<tr>
<td>Thailand</td>
<td>-3,784,500-38%</td>
<td>Turkey - 1,014,835 -14%</td>
</tr>
<tr>
<td>Taiwan, Province of China (CN)</td>
<td>-3,744,400-54%</td>
<td>United Kingdom - 947,093 -5%</td>
</tr>
<tr>
<td>Germany</td>
<td>-2,934,400-16%</td>
<td>France - 848,278 -7%</td>
</tr>
<tr>
<td>Singapore</td>
<td>-2,347,200-32%</td>
<td>United States - 831,779 -4%</td>
</tr>
<tr>
<td>United States</td>
<td>-2,184,900-4%</td>
<td>Malaysia - 829,067 -18%</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>-2,178,600-46%</td>
<td>India - 740,271 -11%</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>-1,821,200-14%</td>
<td>Switzerland - 665,891 -12%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-1,687,600-7%</td>
<td>Israel - 615,961 -30%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>-1,679,600-28%</td>
<td>Indonesia - 591,437 -16%</td>
</tr>
<tr>
<td>Turkey</td>
<td>-1,503,300-19%</td>
<td>Spain - 571,114 -4%</td>
</tr>
<tr>
<td>France</td>
<td>-1,453,000-11%</td>
<td>Japan - 530,996 -12%</td>
</tr>
<tr>
<td>Philippines</td>
<td>-1,326,000-36%</td>
<td>Austria - 439,987 -12%</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>-1,325,200-23%</td>
<td>Viet Nam - 437,389 -19%</td>
</tr>
<tr>
<td>Spain</td>
<td>-1,157,400-8%</td>
<td>Kuwait - 434,701 -23%</td>
</tr>
<tr>
<td>India</td>
<td>-1,004,700-14%</td>
<td>Iraq - 315,701 -37%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-919,900-23%</td>
<td>Belgium - 298,866 -10%</td>
</tr>
<tr>
<td>Macao SAR of China (CN)</td>
<td>-919,400-77%</td>
<td>Egypt - 293,603 -11%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>-816,500-14%</td>
<td>Sweden - 282,410 -9%</td>
</tr>
<tr>
<td>Israel</td>
<td>-763,900-34%</td>
<td>Denmark - 279,838 -9%</td>
</tr>
<tr>
<td>Austria</td>
<td>-582,300-15%</td>
<td>Czechia - 270,966 -18%</td>
</tr>
<tr>
<td>Australia</td>
<td>-579,600-13%</td>
<td>Qatar - 263,775 -6%</td>
</tr>
<tr>
<td>Iran Islamic Republic of</td>
<td>-536,600-53%</td>
<td>Bahrain - 263,420 -23%</td>
</tr>
<tr>
<td>Belgium</td>
<td>-519,000-15%</td>
<td>Morocco - 240,183 -11%</td>
</tr>
<tr>
<td>Qatar</td>
<td>-517,300-11%</td>
<td>Netherlands - 235,611 -3%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>467,500-8%</td>
<td>Lebanon - 215,511 -27%</td>
</tr>
<tr>
<td>World total</td>
<td>-84,259,600-22%</td>
<td>World total - 23,109,304 -8%</td>
</tr>
</tbody>
</table>

In March 2020, international passenger capacity so far reduced by 22%, with significant reduction not only in States experiencing an early outbreak but also at the global scale. Air traffic reduction no longer limited to initial outbreak countries.
Summary of Analysis Results
Estimated impact of COVID-19 outbreak on scheduled international passenger traffic during **1Q 2020** compared to originally-planned:

- **China (including Hong Kong/Macao SARs and Taiwan Province):** 40% seat capacity reduction, 30.8 to 32.6 million passenger reduction, USD 6.9 to 7.3 billion loss of gross operating revenues of airlines

- **Republic of Korea:** 29% seat capacity reduction, 7.8 to 8.6 million passenger reduction, USD 1.5 to 1.7 billion loss of gross operating revenues of airlines

- **Italy:** 23% seat capacity reduction, 6.7 to 7.1 million passenger reduction, USD 0.8 to 0.9 billion loss of gross operating revenues of airlines

- **Iran (Islamic Republic of):** 25% seat capacity reduction, 730,000 to 810,000 passenger reduction, USD 120 to 130 million loss of gross operating revenues of airlines

*Coronavirus Disease 2019 (COVID-19) Situation Report by WHO as of 15 March 2020*
Scenario Analysis: 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
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: applied 78% for Chinese carriers, 80% for foreign carriers and 87% for LCCs (both Chinese and foreign)

• Scenario 1 (mild)
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January; 15 and 12 percentage points lower than baseline in February and March, respectively (30 and 25 percentage points lower for “Regional”; 15 percentage points lower in March for Korea, Iran and Italy)

• Scenario 2 (severe)
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January, 25 and 22 percentage points lower than baseline in February and March, respectively (40 and 33 percentage points lower for “Regional”; 25 percentage points lower in March for Korea, Iran and Italy)
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.

Impact of Hong Kong protests

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

Source: OAG Scheduled data
Scenarios 1 & 2: 47% seat capacity reduction from Baseline.

Source: ICAO estimates based on OAG, Routes Online and airline websites.
18.2 to 19.0 million “international” passenger reduction in 1Q 2020 compared to Baseline

**Scenario 1**
18.2 million passenger reduction

**Scenario 2**
19.0 million passenger reduction

**Source:** ICAO estimates
3.8 to 3.9 million “regional” passenger reduction in 1Q 2020 compared to Baseline

Source: ICAO estimates
Approx. USD 4.9 to 5.1 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 4.9 billion reduction
Scenario 2: USD 5.1 billion reduction

- International: calculated with an average fare of USD 250 per passenger based on traffic/financial reports of CA, CZ and MU with wide variations by destination (20% lower for LCCs);
- Regional: calculated with an average fare of USD 135 per passenger based on traffic/financial reports of CA, CZ and MU (20% lower for LCCs)
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 **47% of seats offered by airlines**
- Overall reduction of **21.9 to 22.9 million passengers**
- Approx. **USD 4.9 to 5.1 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></td>
<td>Number of seats offered by airlines</td>
</tr>
<tr>
<td></td>
<td>(000)</td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>Scenario 1</td>
</tr>
<tr>
<td></td>
<td>-11,700</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>-9,400</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>-2,000</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>-800</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>-1,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-25,300</strong></td>
</tr>
</tbody>
</table>

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

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
Scope of analysis: Hong Kong and Macao SARs and Taiwan Province

- **“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

- **“Taiwan International”** refers to scheduled international passenger services from/to Taiwan, Province of China excluding:
  - scheduled passenger services between Taiwan, Province of China and mainland China, Hong Kong SAR of China and Macao SAR 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
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: applied 80% (87% for LCCs)

• Scenario 1 (mild)
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January; 15 and 12 percentage points lower than baseline in February and March, respectively (8 and 6 percentage points lower for Taiwan; 30 and 25 percentage points lower for Cross-strait; 15 percentage points lower in March for Korea and Italy)

• Scenario 2 (severe)
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January; 25 and 22 percentage points lower than baseline in February and March, respectively (13 and 11 percentage points lower for Taiwan; 40 and 33 percentage points lower for Cross-strait; 25 percentage points lower in March for Korea, Iran and Italy)
Baseline:

1% seat capacity increase compared to 1Q 2019

A total of YoY 1% seat capacity increase originally planned for 1Q 2020 with the expectation of continued weak demand for Hong Kong SAR and Cross-strait services.

Impact of Hong Kong protests:

<table>
<thead>
<tr>
<th>Month</th>
<th>Hong Kong International</th>
<th>Macao International</th>
<th>Taiwan International</th>
<th>Cross-Strait</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2019</td>
<td>14%</td>
<td>8%</td>
<td>4%</td>
<td>-4%</td>
<td>-4%</td>
</tr>
<tr>
<td>Feb 2019</td>
<td>9%</td>
<td>5%</td>
<td>5%</td>
<td>-3%</td>
<td>-3%</td>
</tr>
<tr>
<td>Mar 2019</td>
<td>9%</td>
<td>6%</td>
<td>2%</td>
<td>-3%</td>
<td>-3%</td>
</tr>
<tr>
<td>Apr 2019</td>
<td>7%</td>
<td>2%</td>
<td>2%</td>
<td>-1%</td>
<td>-1%</td>
</tr>
<tr>
<td>May 2019</td>
<td>4%</td>
<td>3%</td>
<td>1%</td>
<td>-1%</td>
<td>-1%</td>
</tr>
<tr>
<td>Jun 2019</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>-1%</td>
<td>-1%</td>
</tr>
<tr>
<td>Jul 2019</td>
<td>2%</td>
<td>1%</td>
<td>-3%</td>
<td>-3%</td>
<td>-3%</td>
</tr>
<tr>
<td>Aug 2019</td>
<td>15%</td>
<td>12%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Sep 2019</td>
<td>12%</td>
<td>12%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Oct 2019</td>
<td>17%</td>
<td>17%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Nov 2019</td>
<td>18%</td>
<td>18%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Dec 2019</td>
<td>12%</td>
<td>12%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Jan 2020</td>
<td>19%</td>
<td>19%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Feb 2020</td>
<td>15%</td>
<td>15%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Mar 2020</td>
<td>10%</td>
<td>10%</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

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

Capacity share 1Q 2020
- 45%: Hong Kong International
- 4%: Macao International
- 41%: Taiwan International
- 10%: Cross-Strait

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

Source: OAG Scheduled data
Scenarios 1 & 2: 29% seat capacity reduction from Baseline

Source: ICAO estimates
8.8 to 9.7 million passenger reduction in 1Q 2020 compared to Baseline

Source: ICAO estimates
Approx. USD 2.1 to 2.3 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 2.1 billion reduction

Scenario 2: USD 2.3 billion reduction

- Hong Kong International: calculated with an average fare of USD 287.6 per passenger with wide variations by destination (20% lower for LCCs);
- Macao International: calculated with an average fare of USD 172 per passenger (ditto);
- Cross-Strait: calculated with an average fare of USD 135 per passenger (ditto)

Source: ICAO estimates
The preliminary estimates indicate the impact in terms of scheduled international passenger traffic from/to Hong Kong SAR of China, Macao SAR of China and Taiwan, Province 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 of **29% of seats offered by airlines**
- Overall reduction of **8.8 to 9.7 million passengers**
- Approx. **USD 2.1 to 2.3 billion potential loss** of gross operating revenues of airlines

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of seats offered by airlines (000)</td>
<td>Number of passengers (000)</td>
<td>Gross operating revenues of airlines (USD, million)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>-4,400</td>
<td>-4,400</td>
<td>-4,300</td>
<td>-4,800</td>
<td>-$1,200</td>
<td>-$1,340</td>
</tr>
<tr>
<td>Macao International</td>
<td>-700</td>
<td>-700</td>
<td>-600</td>
<td>-600</td>
<td>-$110</td>
<td>-$110</td>
</tr>
<tr>
<td>Taiwan International</td>
<td>-2,500</td>
<td>-2,500</td>
<td>-2,500</td>
<td>-2,800</td>
<td>-$550</td>
<td>-$620</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>-1,500</td>
<td>-1,500</td>
<td>-1,400</td>
<td>-1,500</td>
<td>-$190</td>
<td>-$190</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>-9,200</strong></td>
<td><strong>-9,200</strong></td>
<td><strong>-8,800</strong></td>
<td><strong>-9,700</strong></td>
<td><strong>-$2,050</strong></td>
<td><strong>-$2,270</strong></td>
</tr>
</tbody>
</table>

**Source:** ICAO estimates
Summary of Scenario Analysis: China
+ Additional Estimates

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, Taiwan, Province of China, and cross-strait services) during 1Q 2020 compared to originally-planned:

- Overall reduction of 40% of seats offered by airlines
- Overall reduction of 30.8 to 32.6 million passengers
- Approx. USD 6.9 to 7.3 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 estimated impact in 1Q 2020

<table>
<thead>
<tr>
<th>Scope of analysis</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(000)</td>
<td>(000)</td>
<td>(USD, million)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International from/to mainland China (Chinese carriers)</td>
<td>-11,700</td>
<td>-45%</td>
<td>-11,700</td>
<td>-45%</td>
<td>-9,900</td>
<td>-48%</td>
</tr>
<tr>
<td>International from/to mainland China (Foreign carriers)</td>
<td>-9,400</td>
<td>-49%</td>
<td>-9,400</td>
<td>-49%</td>
<td>-8,200</td>
<td>-51%</td>
</tr>
<tr>
<td>Regional between mainland China and Hong Kong SAR of China</td>
<td>-2,000</td>
<td>-51%</td>
<td>-2,000</td>
<td>-51%</td>
<td>-1,700</td>
<td>-57%</td>
</tr>
<tr>
<td>Regional between mainland China and Macao SAR of China</td>
<td>-800</td>
<td>-49%</td>
<td>-800</td>
<td>-49%</td>
<td>-700</td>
<td>-55%</td>
</tr>
<tr>
<td>Regional between mainland China and Taiwan, Province of China</td>
<td>-1,500</td>
<td>-45%</td>
<td>-1,500</td>
<td>-45%</td>
<td>-1,400</td>
<td>-52%</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>-25,300</strong></td>
<td><strong>-47%</strong></td>
<td><strong>-25,300</strong></td>
<td><strong>-47%</strong></td>
<td><strong>-21,900</strong></td>
<td><strong>-50%</strong></td>
</tr>
<tr>
<td>Hong Kong International</td>
<td>-4,400</td>
<td>-31%</td>
<td>-4,400</td>
<td>-31%</td>
<td>-4,300</td>
<td>-37%</td>
</tr>
<tr>
<td>Macao International</td>
<td>-700</td>
<td>-50%</td>
<td>-700</td>
<td>-50%</td>
<td>-600</td>
<td>-53%</td>
</tr>
<tr>
<td>Taiwan International</td>
<td>-2,500</td>
<td>-20%</td>
<td>-2,500</td>
<td>-20%</td>
<td>-2,500</td>
<td>-24%</td>
</tr>
<tr>
<td>Cross-Strait</td>
<td>-1,500</td>
<td>-46%</td>
<td>-1,500</td>
<td>-46%</td>
<td>-1,400</td>
<td>-53%</td>
</tr>
<tr>
<td><strong>Sub-total</strong></td>
<td><strong>-9,200</strong></td>
<td><strong>-29%</strong></td>
<td><strong>-9,200</strong></td>
<td><strong>-29%</strong></td>
<td><strong>-8,800</strong></td>
<td><strong>-34%</strong></td>
</tr>
<tr>
<td><strong>Grand total</strong></td>
<td><strong>-34,500</strong></td>
<td><strong>-40%</strong></td>
<td><strong>-34,500</strong></td>
<td><strong>-40%</strong></td>
<td><strong>-30,800</strong></td>
<td><strong>-44%</strong></td>
</tr>
</tbody>
</table>

Source: ICAO estimates
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 75.8 million passengers**
- Approx. **USD 6.7 to 7.6 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>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic within mainland China</td>
<td>Number of seats offered by airlines (000)</td>
<td>Number of passengers (000)</td>
</tr>
<tr>
<td></td>
<td>Scenario 1</td>
<td>Scenario 2</td>
</tr>
<tr>
<td></td>
<td>76,100</td>
<td>-40%</td>
</tr>
<tr>
<td><strong>Assumption</strong></td>
<td>Seat capacity is reduced by 3% in January 2020 and 60% in February and March 2020 from the originally-planned schedules (baseline)</td>
<td>Load factor is down from 83% (baseline) to 80% for 1Q 2020</td>
</tr>
</tbody>
</table>

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>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Passenger number</td>
<td>Tourism revenue (in million USD)*</td>
<td>Passenger number</td>
</tr>
<tr>
<td>Australia</td>
<td>460,161</td>
<td>446.36</td>
<td>340,318</td>
</tr>
<tr>
<td></td>
<td>Loss</td>
<td>-</td>
<td>-119,843</td>
</tr>
<tr>
<td>France</td>
<td>240,523</td>
<td>233.31</td>
<td>137,867</td>
</tr>
<tr>
<td>Japan</td>
<td>3,181,840</td>
<td>3,086.38</td>
<td>2,167,273</td>
</tr>
<tr>
<td></td>
<td>Loss</td>
<td>-</td>
<td>-1,014,567</td>
</tr>
<tr>
<td>Thailand</td>
<td>2,772,352</td>
<td>2,689.18</td>
<td>1,826,629</td>
</tr>
<tr>
<td></td>
<td>Loss</td>
<td>-</td>
<td>-945,723</td>
</tr>
<tr>
<td>United States</td>
<td>888,102</td>
<td>861.46</td>
<td>505,096</td>
</tr>
<tr>
<td></td>
<td>Loss</td>
<td>-</td>
<td>-383,006</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
Scenario Analysis: Republic of Korea

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
• Scope: scheduled international passenger services from/to Republic of Korea

• Baseline (hypothetical situation without COVID-19 outbreak)*
  – Seat capacity: used "originally-planned" winter schedule
  – Load factor: applied 80% (78% for Chinese carriers, 87% for LCCs)

• Scenario 1 (mild)*
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January; 8 and 15 percentage points lower than baseline in February and March, respectively (15 and 20 percentage points lower for China and Hong Kong/Macao SARs)

• Scenario 2 (severe)*
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January; 13 and 25 percentage points lower than baseline in February and March, respectively (25 percentage points lower in February for China and Hong Kong/Macao SARs)

* Between Republic of Korea and China, Hong Kong/Macao SARs of China, as well as Taiwan, Province of China: extracted the impacts involving Korea from the respective scenarios of China, Hong Kong/Macao SARs and Taiwan Province
29% seat capacity reduction in 1Q 2020 from Baseline

COVID-19 has started to impact airline operations from late February 2020 (except China routes)

Source: ICAO estimates based on OAG, Routes Online and airline websites
7.8 to 8.6 million passenger reduction in 1Q 2020 compared to Baseline

Scenario 1
7.8 million passenger reduction

Scenario 2
8.6 million passenger reduction

Source: ICAO estimates
Approx. USD 1.5 to 1.7 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 1.5 billion reduction
- January 2020: -165 million USD
- February 2020: -187 million USD
- March 2020: -853 million USD

Scenario 2: USD 1.7 billion reduction
- January 2020: -233 million USD
- February 2020: -208 million USD
- March 2020: -908 million USD

Source: ICAO estimates

- Between Korea and China, Hong Kong/Macao SARs, as well as Taiwan Province: extracted the impact involving Korea from scenarios 1 and 2 of China etc.;
- Other internal destinations: calculated with an average fare ranging from USD 155 to 485 by destination (20% lower for LCCs)
Scenario Analysis:
Italy

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
Scenario analysis of COVID-19 outbreak impact for 1Q 2020

• Scope: scheduled international passenger services from/to Republic of Korea

• Baseline (hypothetical situation without COVID-19 outbreak)*
  – Seat capacity: used "originally-planned" winter schedule
  – Load factor: applied 80% (78% for Chinese carriers, 87% for LCCs)

• Scenario 1 (mild)*
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January and February (15 and 8 percentage points lower than baseline in February for China/Hong Kong SAR and Korea/Iran, respectively); 15 percentage points lower than baseline in March

• Scenario 2 (severe)*
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January and February (25 and 13 percentage points lower than baseline in February for China/Hong Kong SAR and Korea/Iran, respectively); 25 percentage points lower than baseline in March
23% seat capacity reduction in 1Q 2020 from Baseline

COVID-19 has started to impact airline operations from late February 2020 (except China routes)

Source: ICAO estimates
Between Italy and China including Hong Kong SAR, Republic of Korea, and Iran (Islamic Republic of) and between Italy and other international destinations.

ICAO estimates

6.7 to 7.1 million passenger reduction in 1Q 2020 compared to Baseline.

Source: ICAO estimates
Approx. USD 0.8 to 0.9 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

- Between Italy and China, Hong Kong SAR and Macao SAR of China, as well as Republic of Korea: extracted the impacts involving Italy from the respective scenarios of China, Hong Kong/Macao SARs and Korea;

- Other internal destinations: calculated with an average fare ranging from USD 60 to 485 by destination (20% lower for LCCs)

Source: ICAO estimates
Scenario Analysis:
Iran (Islamic Republic of)

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.
• **Scope:** scheduled international passenger services from/to Republic of Korea

• **Baseline (hypothetical situation without COVID-19 outbreak)***
  – Seat capacity: used "originally-planned" winter schedule
  – Load factor: applied 80% (78% for Chinese carriers, 87% for LCCs)

• **Scenario 1 (mild)***
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January and February (15 and 8 percentage points lower than baseline in February for China and Korea, respectively); 15 percentage points lower than baseline in March

• **Scenario 2 (severe)***
  – Seat capacity: estimated by airlines' schedule changes
  – Load factor: applied the same % as baseline in January and February (25 and 13 percentage points lower than baseline in February for China and Korea, respectively); 25 percentage points lower than baseline in March

* Between Iran (Islamic Republic of) and China, as well as Italy: extracted the impacts involving Iran from the respective scenarios of China and Italy
ICAO estimates

COVID-19 has started to impact airline operations from late February 2020 (except China routes)

Note: Some capacity change was announced and implemented before COVID-19 outbreak

Source: ICAO estimates
ICAO estimates

Between Iran and China, Italy

730,000 to 810,000 passenger reduction in 1Q 2020 compared to Baseline

Source: ICAO estimates
Approx. USD 120 to 130 million potential loss of airline revenues for 1Q 2020 compared to Baseline

**Scenario 1: USD 120 million reduction**
- January 2020: -2 million
- February 2020: 0 million
- March 2020: -69 million

**Scenario 2: USD 130 million reduction**
- January 2020: -9 million
- February 2020: -30 million
- March 2020: -76 million

**Source:** ICAO estimates

- Between Italy and China, Italy: extracted the impacts involving Iran from the respective scenarios of China and Italy;
- Other internal destinations: calculated with an average fare ranging from USD 105 to 370 by destination (20% lower for LCCs)
Preliminary Analysis:
Transatlantic between United States and Schengen Area +
United Kingdom/Ireland

This section contains a very preliminary analysis. Figures and estimates herein will be updated
with the situation evolving and more information available.
51% capacity reduction so far since the announcement of U.S. travel policy

The U.S. travel policy would affect a maximum of approx. 5.5 million passengers for one month if all the flights were suspended.

Source: OAG Scheduled data and estimates using ICAO-ICM MIDT data


https://www.icao.int/Security/COVID-19/Pages/default.aspx

http://www.capsca.org/CoronaVirusRefs.html