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

Montréal, Canada

6 March 2020





- Introduction and Background
- Scenario Analysis: Mainland China
- Scenario Analysis: Hong Kong SAR of China and Macao SAR of China
- Summary of Scenario Analysis: China
- Scenario Analysis: Republic of Korea
- Scenario Analysis: Italy
- Preliminary Analysis: Iran (Islamic Republic of) and Mongolia

Estimated impact of COVID-19 outbreak on scheduled international passenger traffic during 1Q 2020 compared to originally-planned:

- **China (including Hong Kong/Macao SARs):** 41 to 42% seat capacity reduction, 23.9 to 27.5 million passenger reduction, USD 5.8 to 6.7 billion loss of gross operating revenues of airlines
- **Republic of Korea:** 24% seat capacity reduction, 5.3 to 6.0 million passenger reduction, USD 1.1 to 1.2 billion loss of gross operating revenues of airlines
- **Italy:** 8% seat capacity reduction, 1.9 to 2.9 million passenger reduction, USD 0.26 to 0.37 billion loss of gross operating revenues of airlines
- **Iran (Islamic Republic of)*:** 12% seat capacity reduction, 0.11 million passenger reduction, USD 22 million loss of gross operating revenues of airlines

* February 2020 only



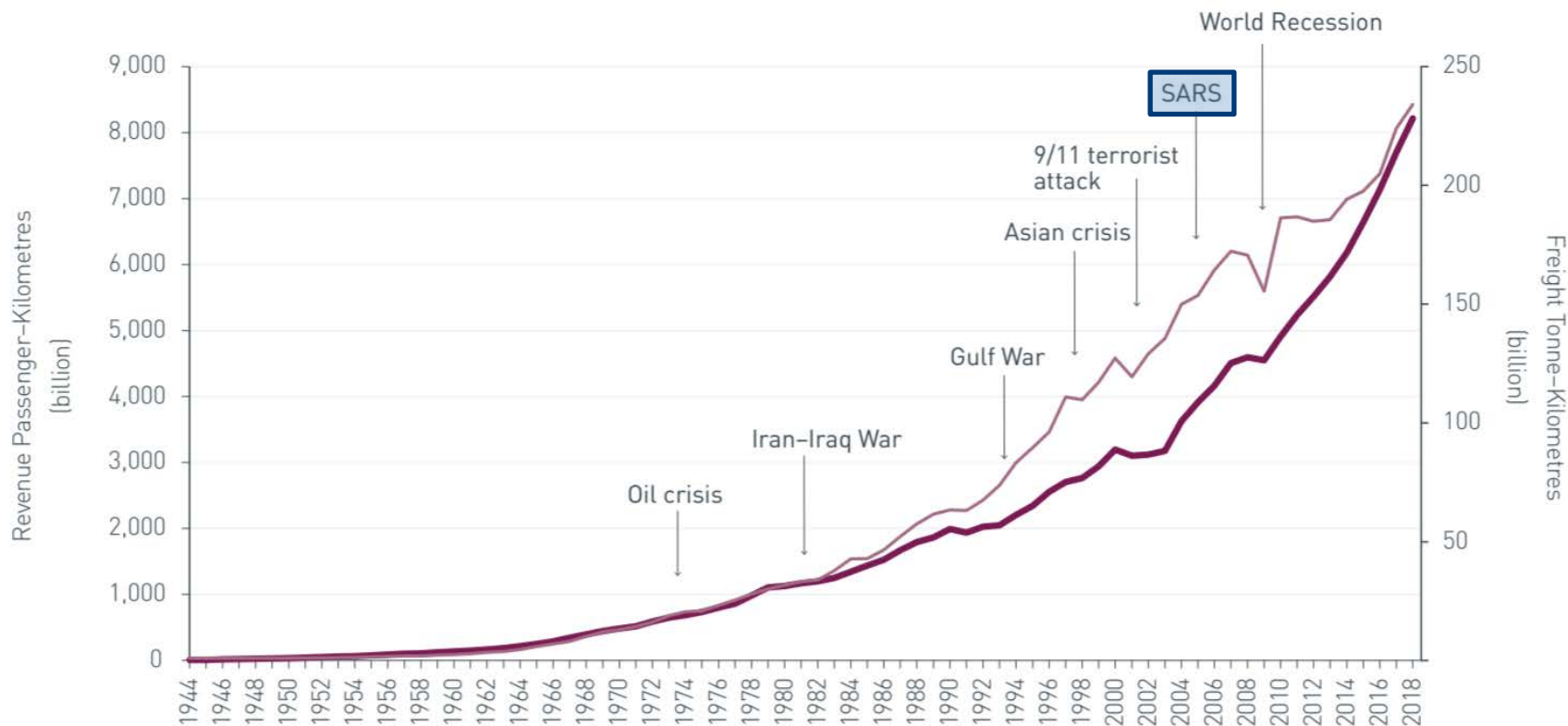
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Introduction and Background

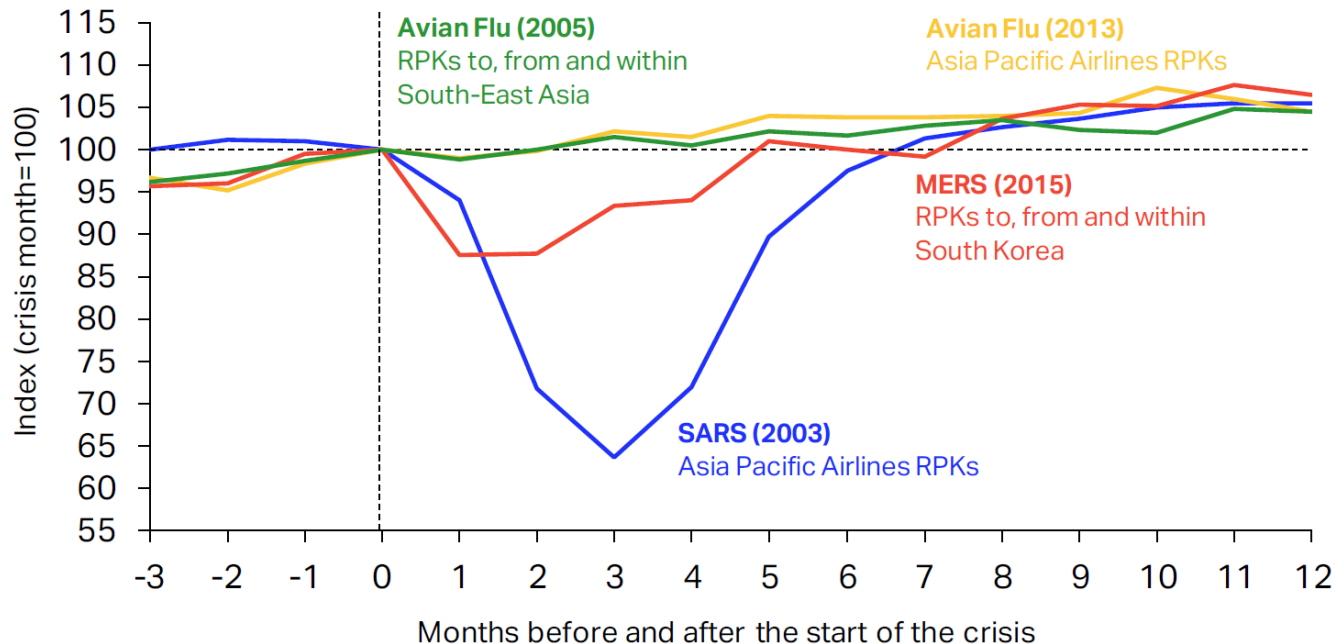


Air traffic has been vulnerable to external factors including disease outbreaks



What can we learn from past experience? SARS, Aviation flu and MERS

Impact of past outbreaks on aviation



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

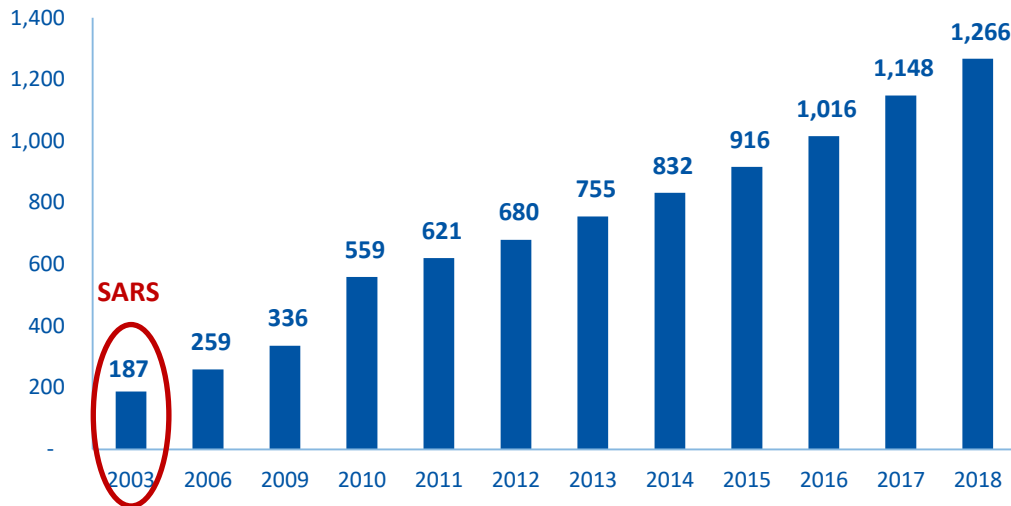


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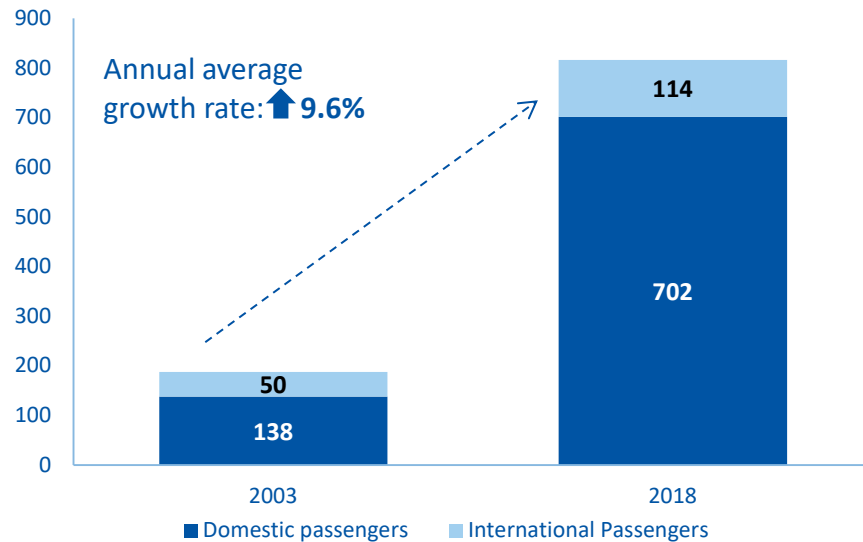
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Chinese international traffic more than doubled since 2003 SARS spread

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

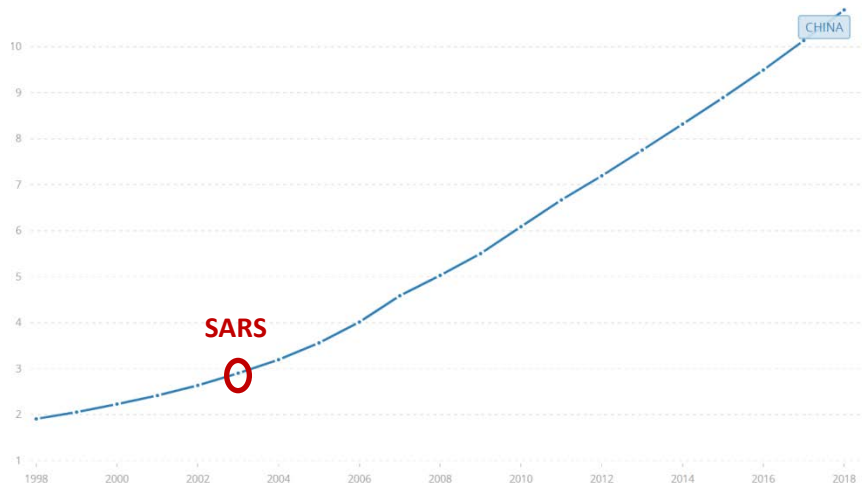


Passengers move to/from Chinese airports
2003 vs 2018



Chinese economic size quadrupled since 2003 but growth rate slowed down

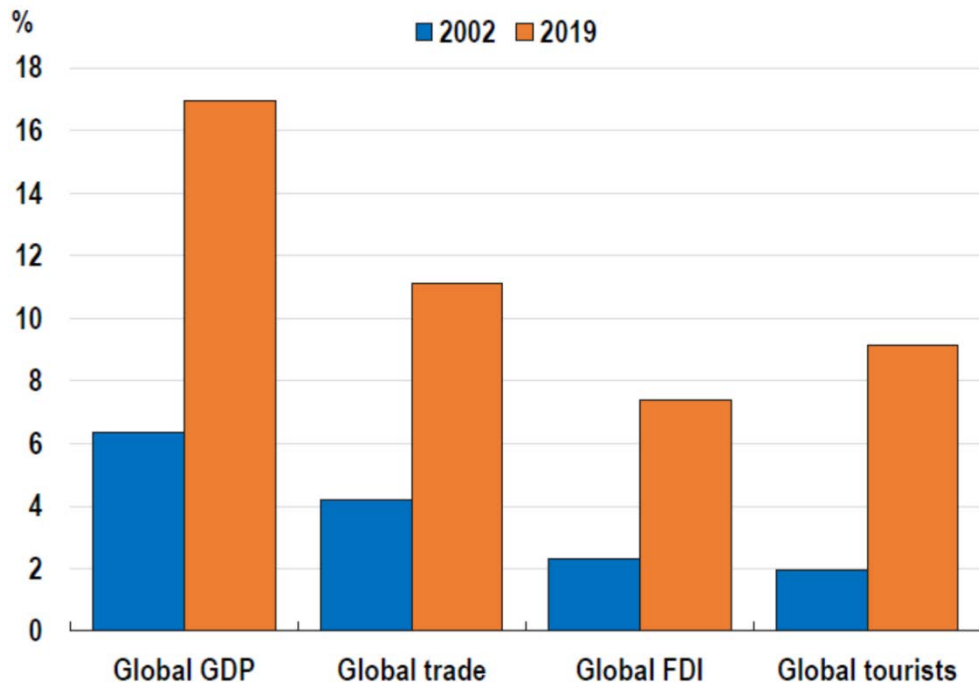
GDP of China
(constant 2010 USD, trillion)



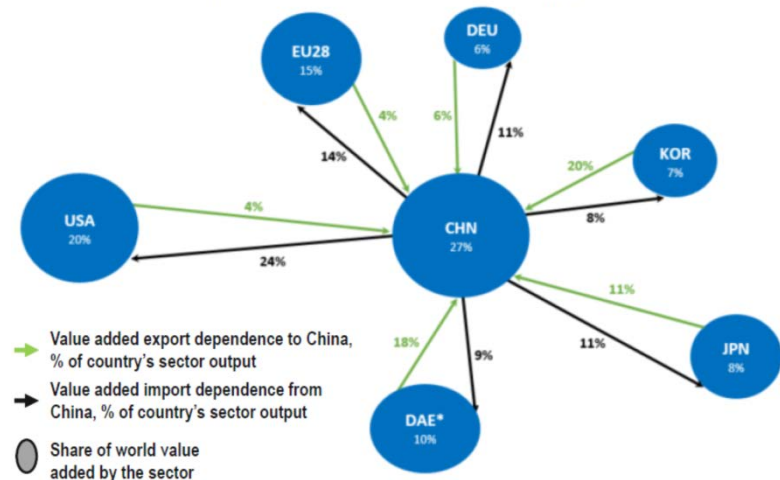
GDP Annual Growth of China
(%)



Share of China in world



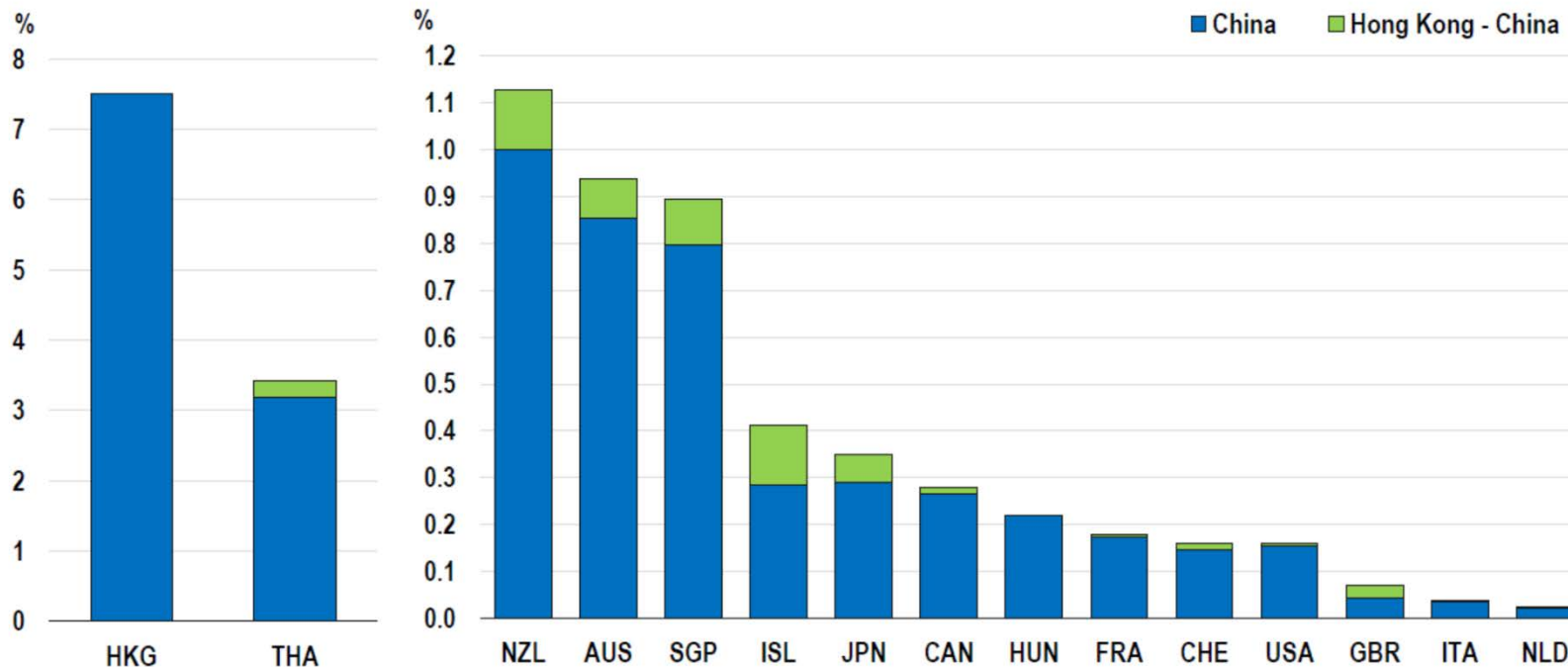
Computers, electronics and electrical equipment sector



Value added trade flows between China and key partners

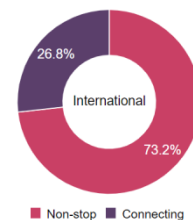
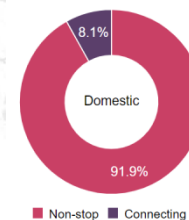
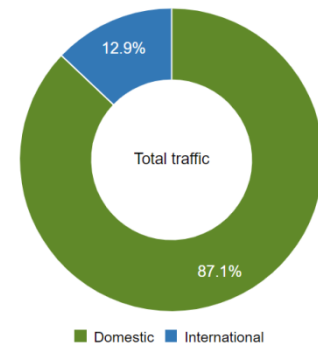
Travel services to China and Hong Kong-China, as a share of GDP

2018



Air connectivity of China in terms of O-D passenger movement

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



Air connectivity of Wuhan airport in terms of O-D passenger movement



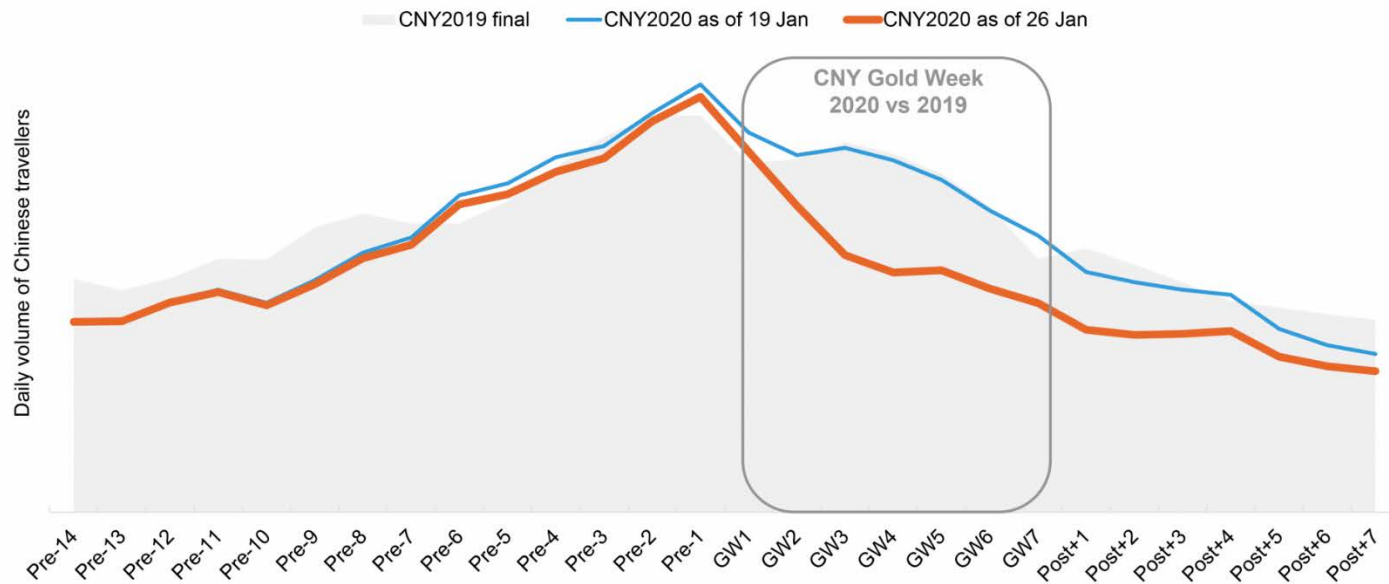
24,073,870
Total traffic



COVID-19 outbreak caused a substantial setback in flight bookings for Chinese New Year

Chinese air arrivals in worldwide regions for Chinese New Year, before vs one week after the travel restrictions

10 January – 6 February, Bookings made as of 19 January and 26 January 2020. Volumes of arrivals.



Travel dates from 10 January to 6 February 2020 vs. 21 January to 17 February 2020, according to bookings issued as of 19 January and 26 January 2020.



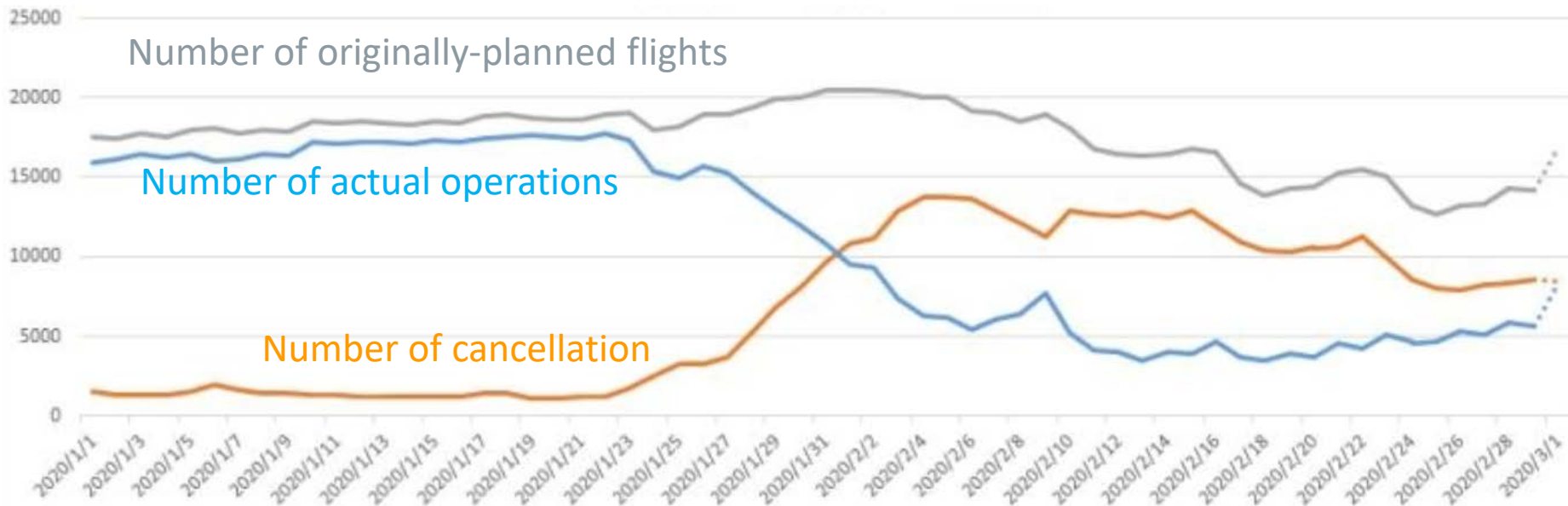
Only considered pax staying 1 to 21 nights at destinations.



Source: ForwardKeys air reservation data.

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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

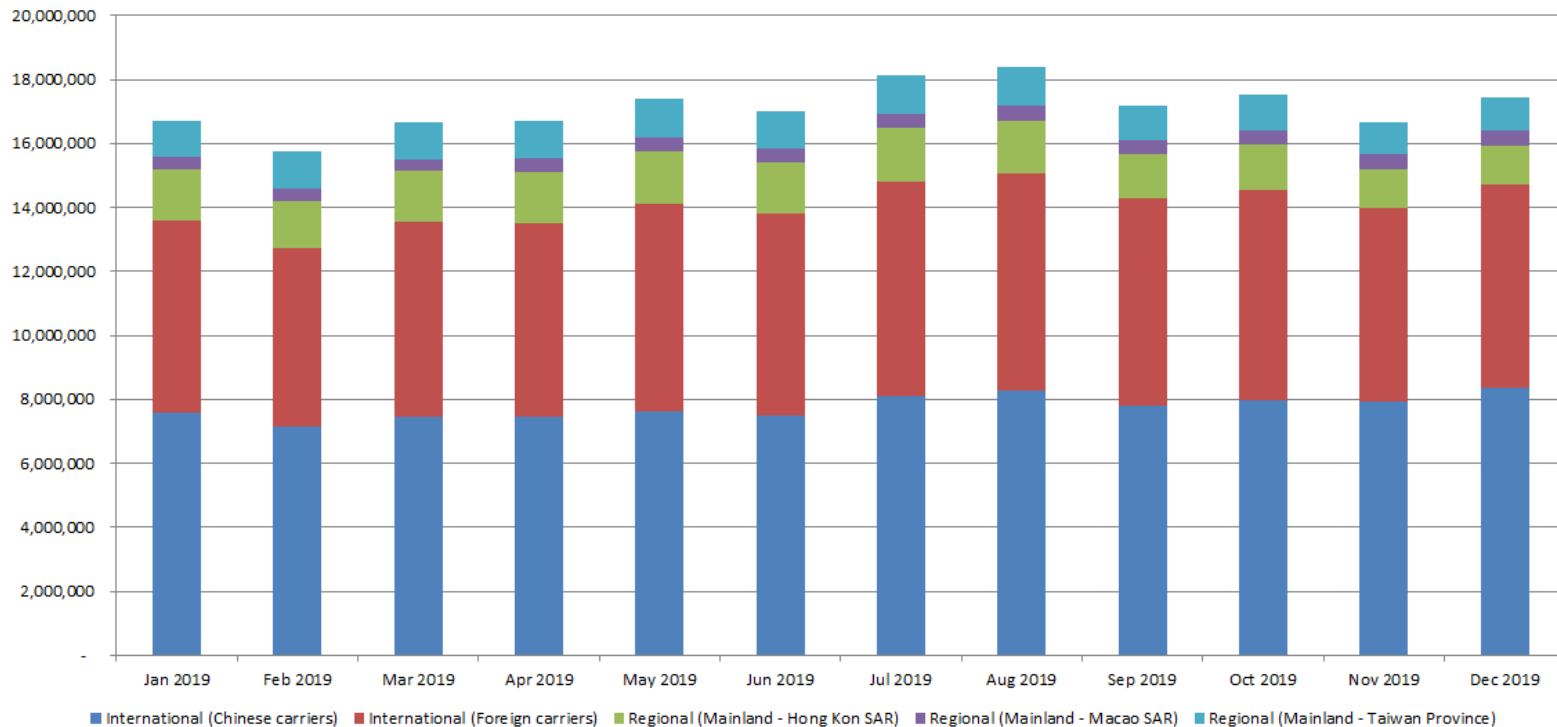


Scenario Analysis: Mainland China

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

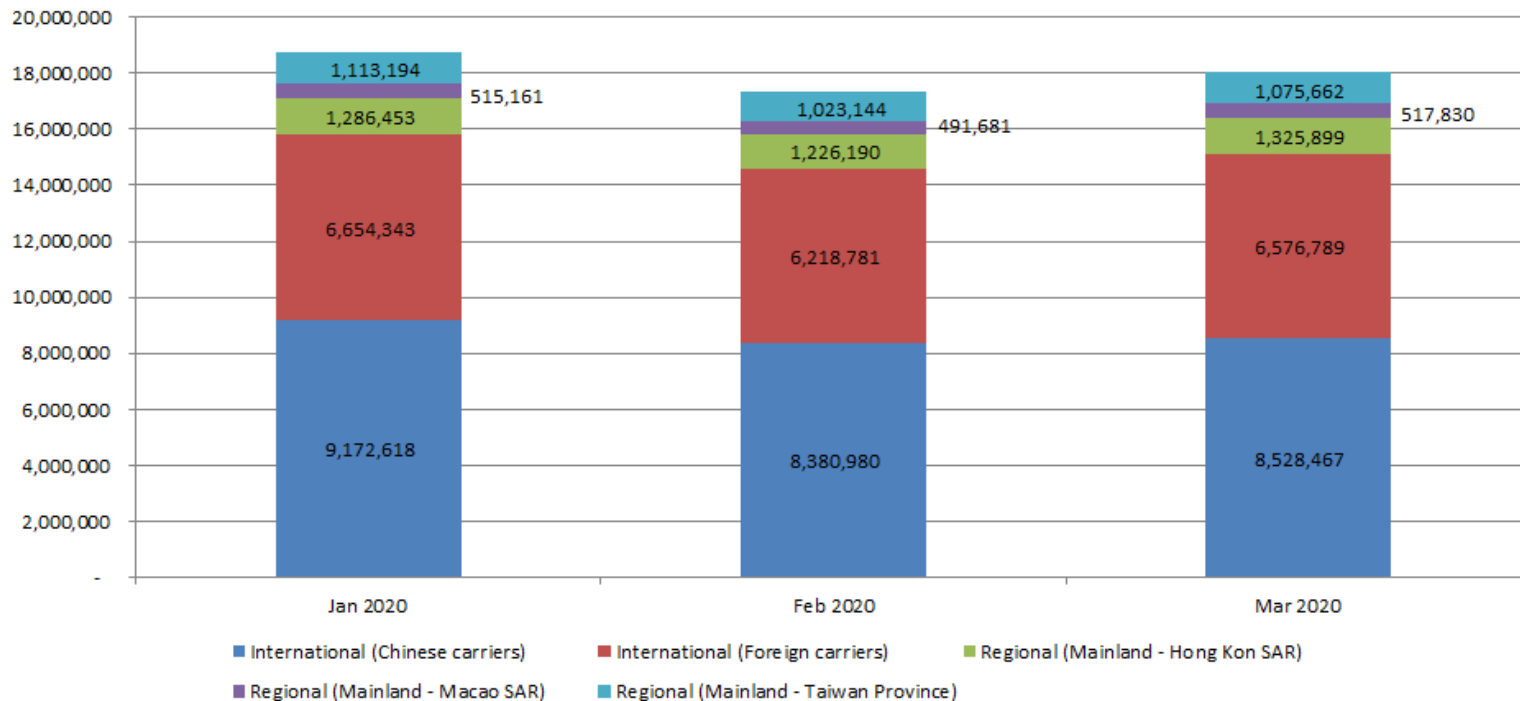
Number of seats offered by airlines (monthly, 2019)



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)

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



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Over 130 airlines reduced international services or cancelled all operations from/to mainland China

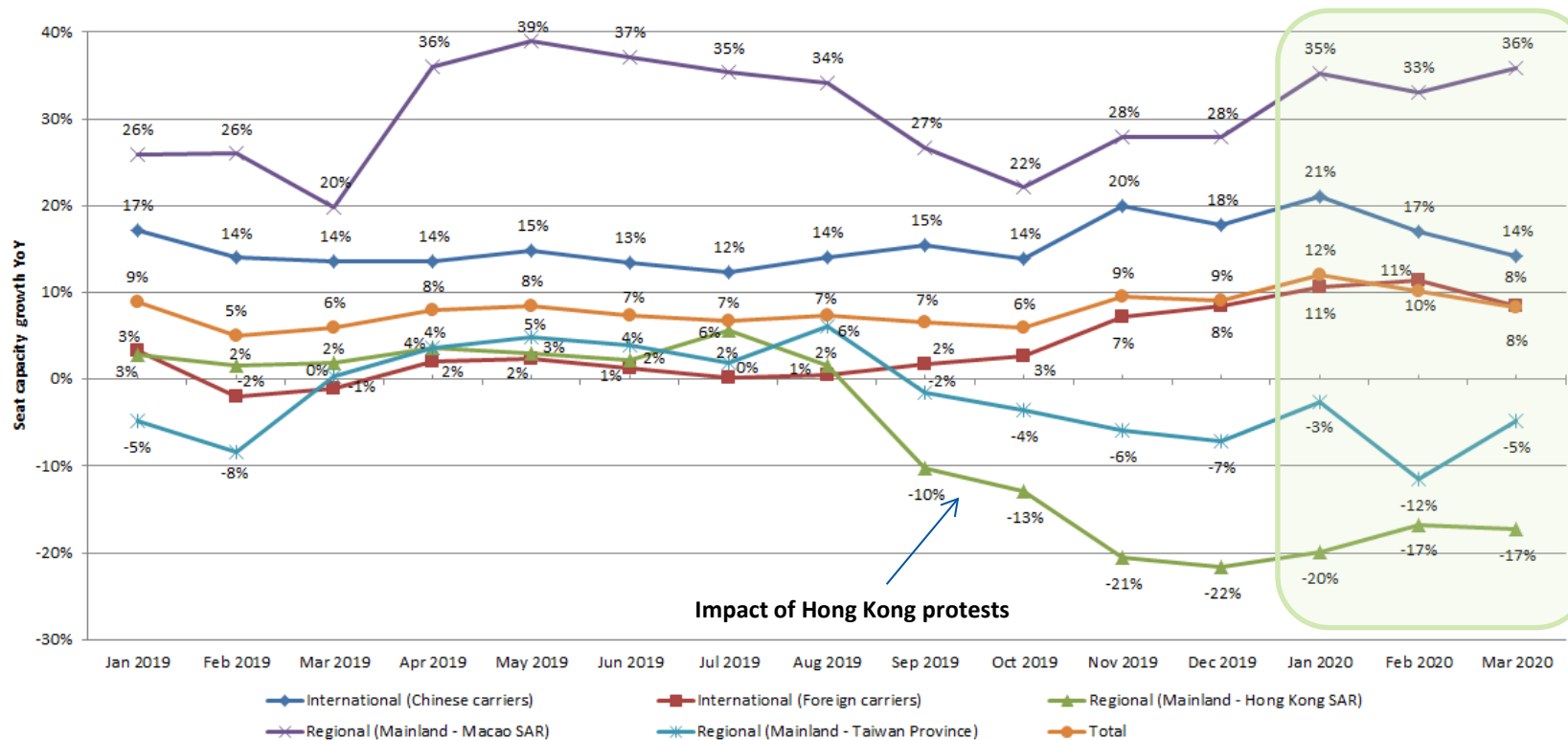
International (136)	Beijing Capital Airlines	Hebei Airlines*	Malaysia Airlines	SAS Scandinavian Airlines*	T'way Air*	Hebei Airlines*
Aero Mongolia*	British Airways*	Himalaya Airlines*	Malindo Airways	Saudi Arabian Airlines*	Ukraine Interl Airlines*	HK Express
Air Algeria**	Cambodia Airways Co. Ltd	Iberia*	MIAT - Mongolian Airlines*	Scoot*	United Airlines*	Hong Kong Airlines
Air Astana*	Cambodia Angkor Air*	IndiGo*	Myanmar Airways Intl*	Shandong Airlines	Ural Airlines	Juneyao Airlines
Air Busan	Cebu Pacific Air*	IrAero*	Myanmar National Airlines*	Shanghai Airlines	Urumqi Airlines*	Mandarin Airlines
Air Canada*	Chengdu Airlines	Iraqi Airways*	Neos Air*	Shenzhen Airlines	US-Bangla Airlines	Shandong Airlines
Air China	China Eastern Airlines	Japan Airlines	Nok Air	Siberia Airlines*	Uzbekistan Airways*	Shanghai Airlines
Air Company SCAT*	China Express Airlines	JC Cambodia Intl Airlines	NokScoot Airlines Co Ltd*	Sichuan Airlines	Vietnam Airlines*	Shenzhen Airlines
Air France*	China Southern Airlines	Jeju Airlines	NordStar*	SilkAir	Virgin Atlantic Airways*	Sichuan Airlines
Air India*	China United Airlines	Jetstar Asia*	Okay Airways	Singapore Airlines	Xiamen Airlines Company	Tigerair Taiwan Co. Ltd
Air Koryo*	China West Air*	Jetstar Japan*	Oman Air*	Sky Angkor Airlines	Yakutia*	Uni Airways
Air Madagascar*	Chongqing Airlines*	Jetstar Pacific Airlines*	Pakistan Intl Airlines*	Somon Air*	Zhejiang Loong Airlines	Xiamen Airlines Company
Air Mauritius*	Citilink Indonesia	Jin Air*	PAL Express*	Spring Airlines	Regional (25)	Zhejiang Loong Airlines*
Air New Zealand*	Delta Air Lines*	Juneyao Airlines	Peach Aviation Limited*	Spring Airlines Japan	Air China	Announced since late January 2020; Duration varies *: Airlines with all service Cancelled **^: Airlines with all service cancelled but gradual resumption
Air Seoul, Inc*	Donghai Airlines*	Kenya Airways*	Pegas Fly*	Srilankan Airlines	Air Macau	
AirAsia	Eastar Jet	KLM-Royal Dutch Airlines*	Philippine Airlines*	SWISS*	Cathay Dragon	
Airasia X	Egyptair**	Korean Air	Philippines AirAsia Inc.*	Thai Air Asia X	Cathay Pacific Airways	
All Nippon Airways	El Al Israel Airlines*	Kunming Airlines	Qantas Airways*	Thai AirAsia	China Airlines	
American Airlines*	Emirates	Lanmei Airlines	Qatar Airways*	Thai Airways International	China Eastern Airlines	
Asiana Airlines	Ethiopian Airlines	Lao Airlines	Qingdao Airline Co, Ltd	Thai Lion Air	China Southern Airlines	
Austrian Airlines*	Etihad Airways	Lion Air	Royal Air Maroc*	Thai Smile Airways*	Chongqing Airlines	
Azerbaijan Airlines*	Finnair*	LOT - Polish Airlines*	Royal Brunei Airlines*	TianJin Airlines	Donghai Airlines	
AZUR air*	Garuda Indonesia*	Lucky Air Co. Ltd.	Royal Flight Airlines*	Tibet Airlines*	EVA Airways	
Bangkok Airways*	Guangxi Beibu Gulf Airlines	Lufthansa German Airlines*	Ruili Airlines	Turkish Airlines**	Far Eastern Air Transport*	
Batik Air	Hainan Airlines	Mahan Air*	RwandAir*	Turkmenistan Airlines*	Hainan Airlines	

- **Baseline (hypothetical situation without COVID-19 outbreak)**
 - Seat capacity: used "originally-planned" winter schedule
 - Load factor: used 2018 actual results of airlines (average)
- **Scenario 1 (mild)**
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: used 2018 actual results of airlines except Hong Kong SAR of China
- **Scenario 2 (severe)**
 - 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: 12 – 22 and 7 – 17 percentage points lower in February and March from January, respectively

Assumptions		Baseline		Scenario 1		Scenario 2	
		Seat capacity reduction from originally-planned	Passenger load factor	Seat capacity reduction from originally-planned	Passenger load factor	Seat capacity reduction from originally-planned	Passenger load factor
January 2020	International from/to mainland China (Chinese carriers)	0%	78%	-1%	78%	-1%	78%
	International from/to mainland China (Foreign carriers)	0%	80%	0%	80%	0%	80%
	Regional between mainland China and Hong Kong SAR of China	0%	80%	0%	70%	0%	70%
	Regional between mainland China and Macao SAR of China	0%	80%	-1%	80%	-1%	80%
	Regional between mainland China and Taiwan, Province of China	0%	80%	-1%	80%	-1%	80%
February 2020	International from/to mainland China (Chinese carriers)	0%	78%	-57%	78%	-57%	58%
	International from/to mainland China (Foreign carriers)	0%	80%	-64%	80%	-64%	65%
	Regional between mainland China and Hong Kong SAR of China	0%	80%	-65%	70%	-65%	58%
	Regional between mainland China and Macao SAR of China	0%	80%	-67%	80%	-67%	58%
	Regional between mainland China and Taiwan, Province of China	0%	80%	-60%	80%	-60%	58%
March 2020	International from/to mainland China (Chinese carriers)	0%	78%	-73%	78%	-76%	63%
	International from/to mainland China (Foreign carriers)	0%	80%	-76%	80%	-78%	70%
	Regional between mainland China and Hong Kong SAR of China	0%	80%	-80%	70%	-82%	63%
	Regional between mainland China and Macao SAR of China	0%	80%	-64%	80%	-67%	63%
	Regional between mainland China and Taiwan, Province of China	0%	80%	-80%	80%	-82%	63%

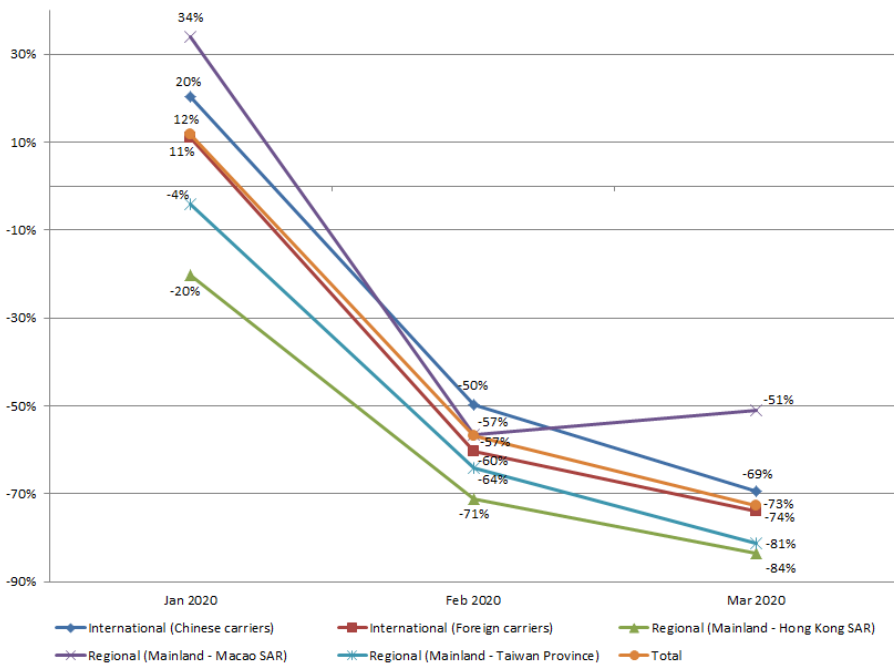


Baseline: 10% seat capacity increase compared to 1Q 2019

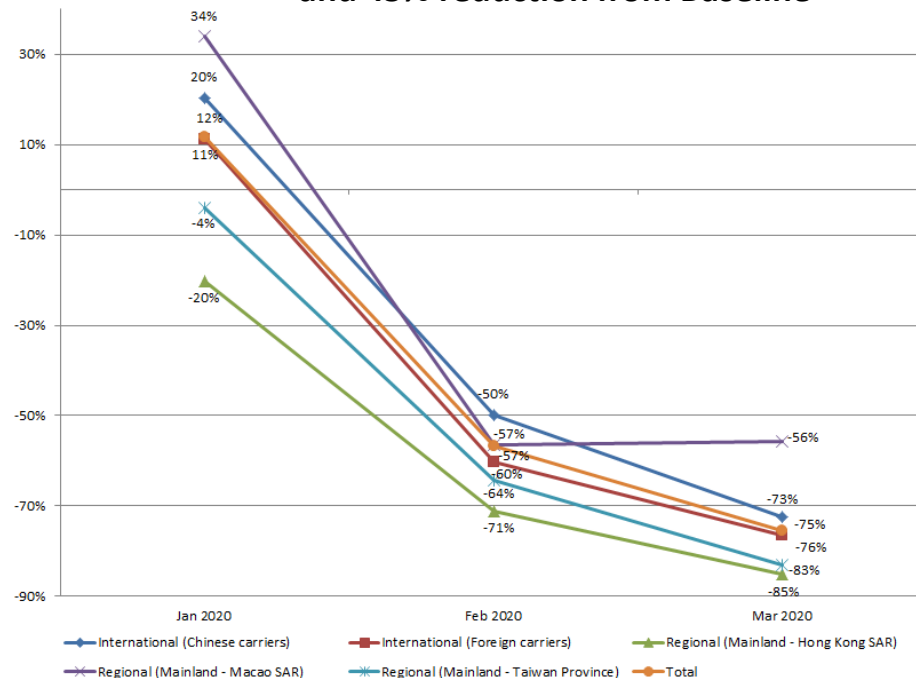


Scenarios 1 & 2: 45% seat capacity reduction from Baseline

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



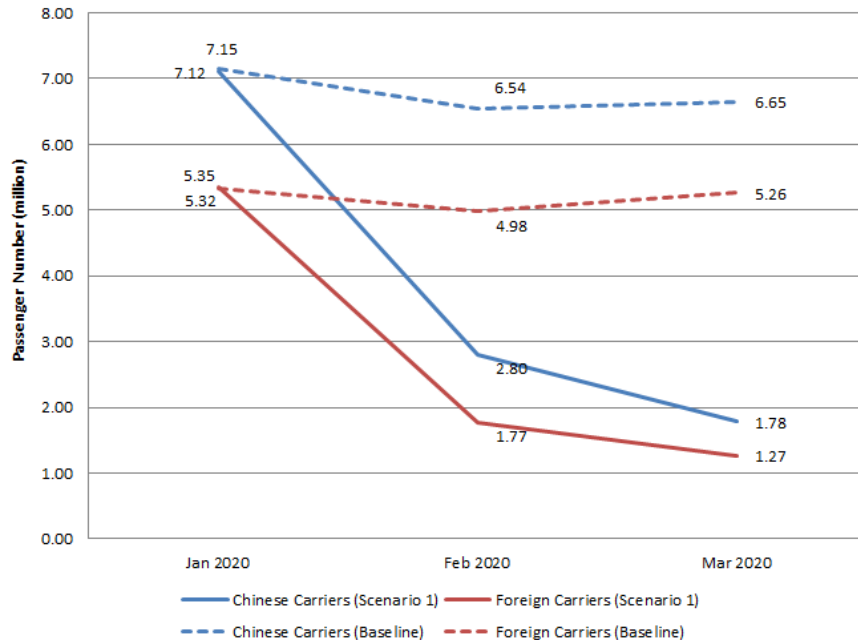
Scenario 2: for 1Q 2020 a total of 40% reduction compared to 1Q 2019 and 45% reduction from Baseline



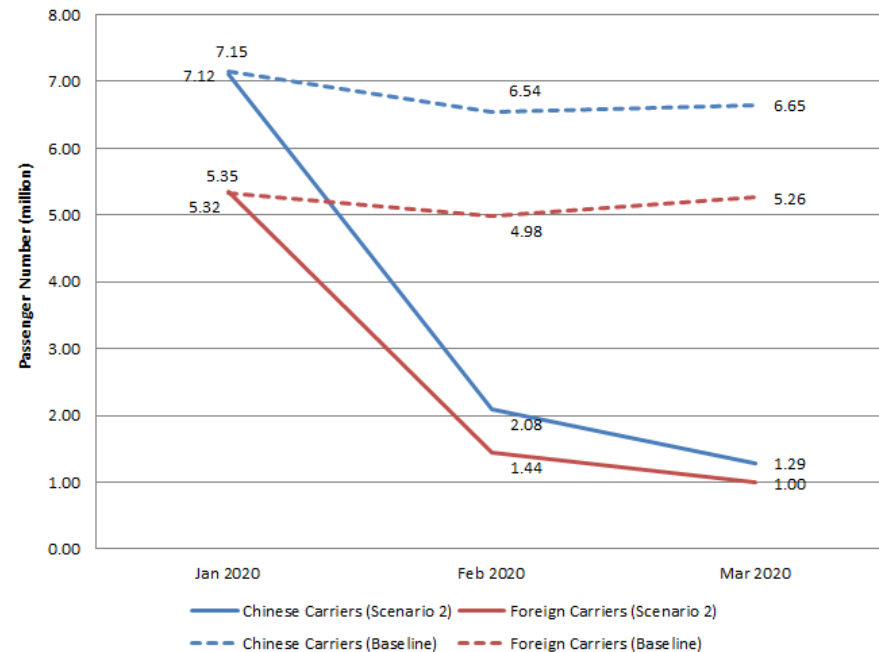


15.8 to 17.6 million “international” passenger reduction in 1Q 2020 compared to Baseline

Scenario 1
15.8 million passenger reduction



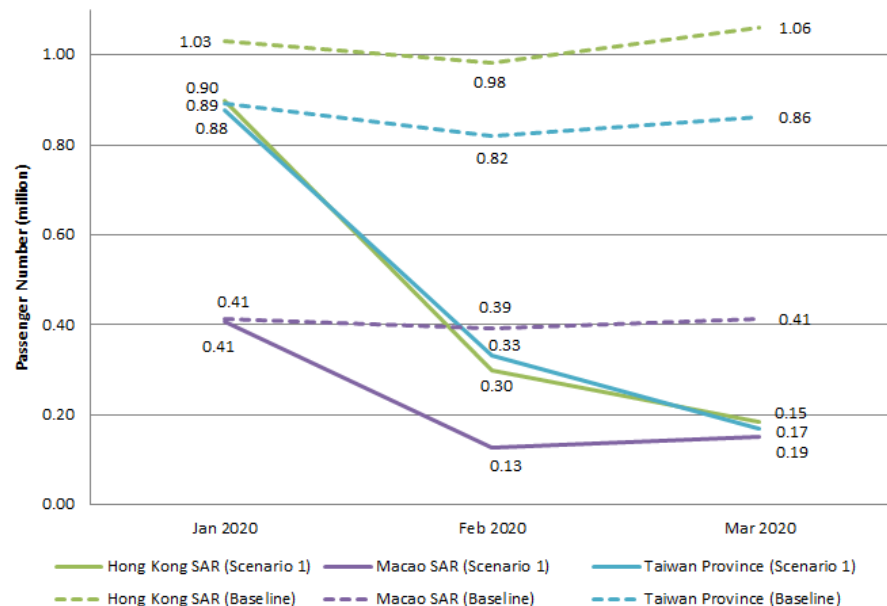
Scenario 2
17.6 million passenger reduction



3.4 to 3.7 million “regional” passenger reduction in 1Q 2020 compared to Baseline

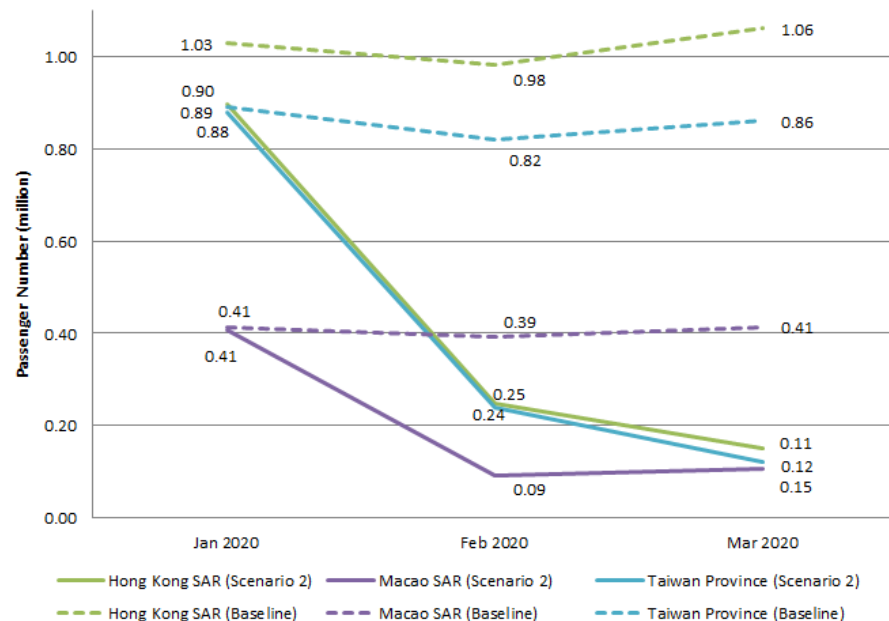
Scenario 1

3.4 million passenger reduction



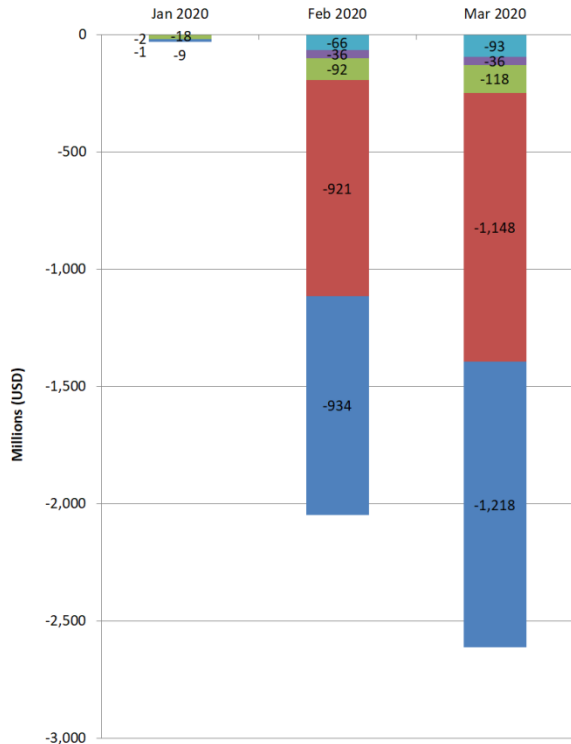
Scenario 2

3.7 million passenger reduction

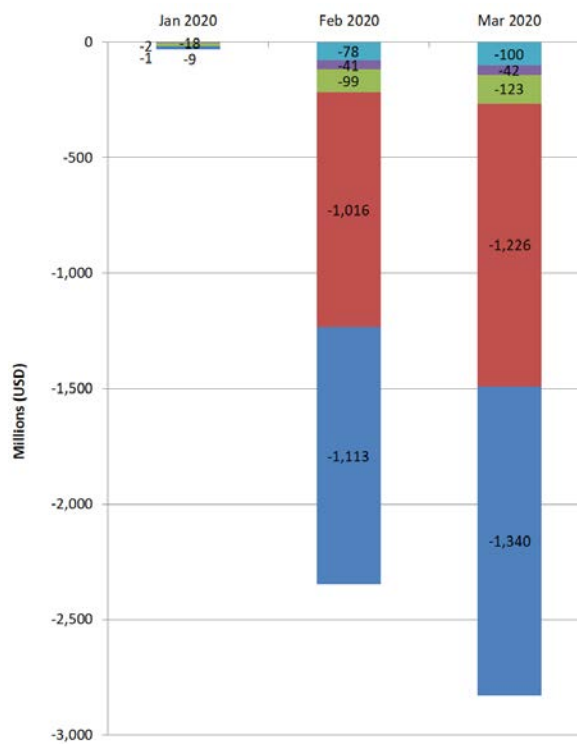


Approx. USD 4.7 to 5.2 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 4.7 billion reduction



Scenario 2: USD 5.2 billion reduction



- International (Chinese carriers)
- International (Foreign carriers)
- Regional (Mainland - Hong Kong SAR)
- Regional (Mainland - Macao SAR)
- Regional (Mainland - Taiwan Province)

- 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

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

Scope of analysis	Estimated Impact on									
	Number of seats offered by airlines (000)				Number of passengers (000)				Gross operating revenues of airlines (USD, million)	
	Scenario 1		Scenario 2		Scenario 1		Scenario 2		Scenario 1	Scenario 2
International from/to mainland China (Chinese carriers)	-11,100	-42%	-11,300	-43%	-8,600	-42%	-9,900	-48%	-\$2,160	-\$2,460
International from/to mainland China (Foreign carriers)	-9,000	-46%	-9,200	-47%	-7,200	-46%	-7,800	-50%	-\$2,070	-\$2,240
Regional between mainland China and Hong Kong SAR of China	-1,900	-49%	-1,900	-49%	-1,700	-55%	-1,800	-58%	-\$230	-\$240
Regional between mainland China and Macao SAR of China	-700	-44%	-700	-45%	-500	-44%	-600	-50%	-\$70	-\$80
Regional between mainland China and Taiwan, Province of China	-1,500	-46%	-1,500	-47%	-1,200	-46%	-1,300	-52%	-\$160	-\$180
Total	-24,100	-45%	-24,600	-45%	-19,300	-45%	-21,400	-50%	-\$4,690	-\$5,210

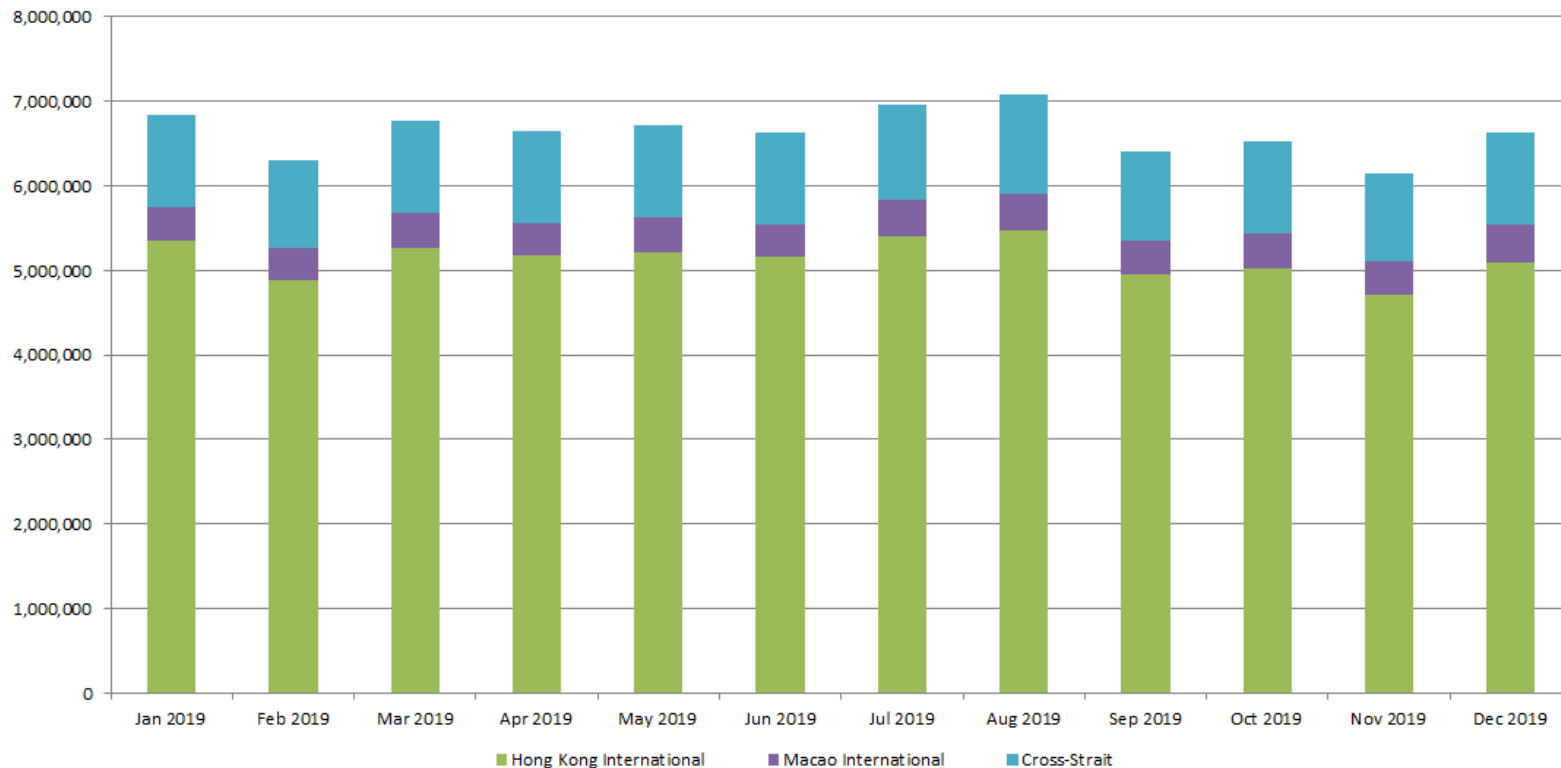


Scenario Analysis: Hong Kong SAR of China and Macao SAR of China

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)

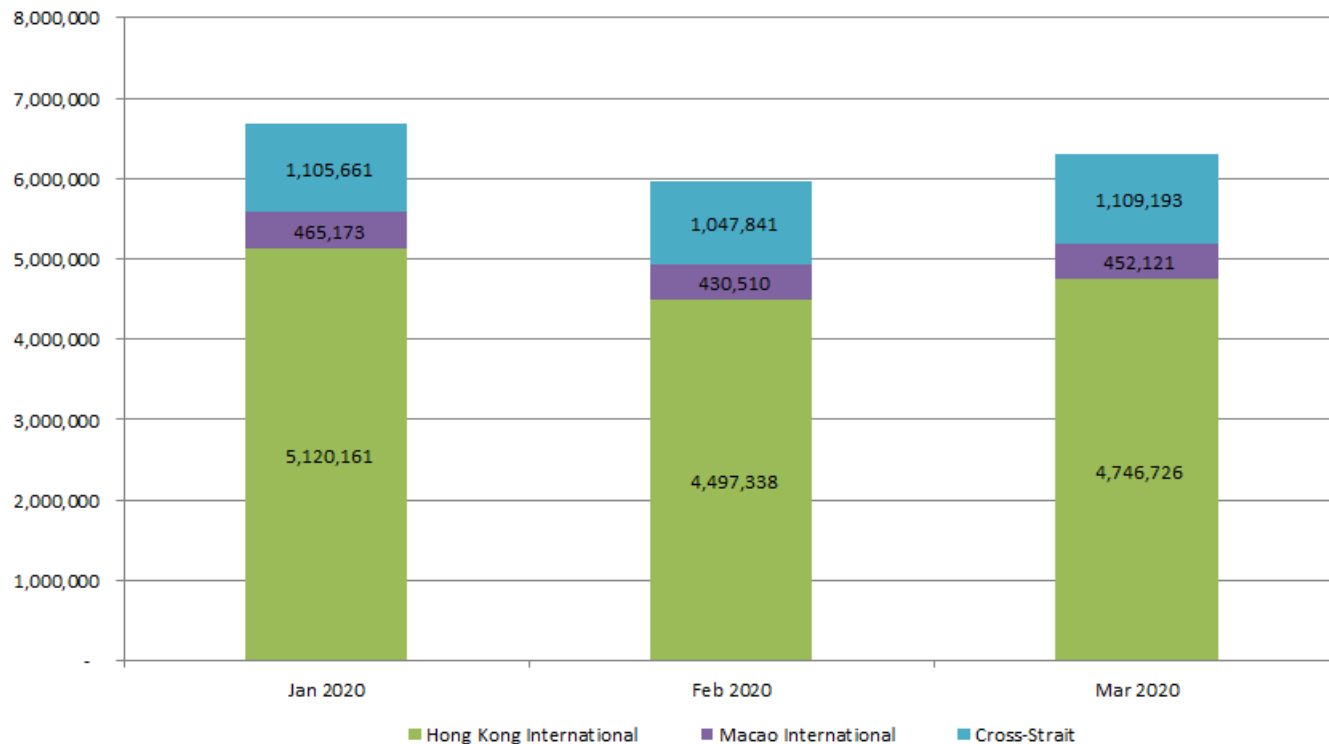


Capacity share 2019

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



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.



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Some 70 airlines cancelled all services or reduced services from/to Hong Kong SAR and Macao SAR

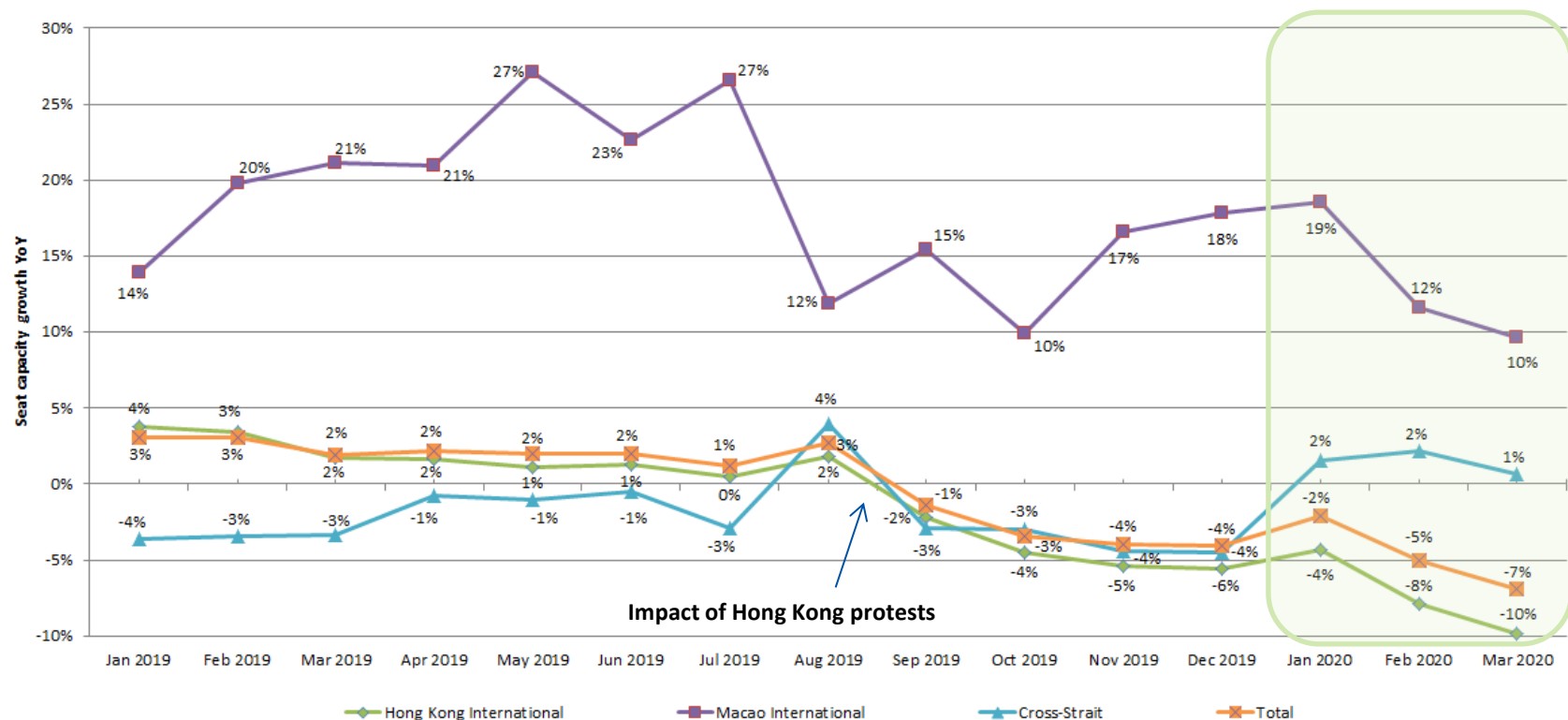
Hong Kong International (64)		Egyptair	Lufthansa German Airlines	T'way Air	Scoot
Aeroflot Russian Airlines	El Al Israel Airlines*	Malaysia Airlines	United Airlines*	Thai AirAsia	
Air Astana	Emirates	MIAT - Mongolian Airlines*	Vietjet	T'way Air*	
Air Busan*	Ethiopian Airlines	Myanmar National Airlines	Vietnam Airlines	Vietnam Airlines*	
Air Canada	Etihad Airways*	Peach Aviation Limited	Virgin Atlantic Airways	Cross-Strait (9)	
Air France	EZNIS AIRWAYS LLC*	Philippine Airlines*	Virgin Australia Intl*	Air Macau	
Air India*	Fiji Airways	Philippines AirAsia Inc.*	Macao International (17)	Cathay Dragon	
Air Mauritius*	Finnair	Qantas Airways	Air Busan*	Cathay Pacific Airways	
Air Niugini	Garuda Indonesia	Qatar Airways	Air Macau	China Airlines	
Air Seoul, Inc	HK Express	Royal Brunei Airlines	AirAsia	EVA Airways	
AirAsia	Hong Kong Airlines	Royal Jordanian	Bamboo Airways*	HK Express	
All Nippon Airways	IndiGo*	SAS Scandinavian Airlines*	Cambodia Airways Co. Ltd*	Hong Kong Airlines	
American Airlines*	Japan Airlines	Scoot	Cambodia Angkor Air*	Mandarin Airlines*	
Asiana Airlines	Jeju Airlines	Siberia Airlines*	Cebu Pacific Air*	Tigerair Taiwan Co. Ltd*	
Bangkok Airways	Jetstar Asia*	Singapore Airlines	Eastar Jet*	Announced since late January 2020; Duration varies	
British Airways	Jetstar Japan*	South African Airways*	Jeju Airlines		
Cathay Dragon	Jetstar Pacific Airlines*	SWISS	Jin Air*		
Cathay Pacific Airways	KLM-Royal Dutch Airlines	Thai AirAsia	Lanmei Airlines*	*: Airlines with all service cancelled *^: Airlines with all service cancelled but gradual resumption	
Cebu Pacific Air*^	Korean Air*	Thai Airways International	Philippine Airlines*		
Eastar Jet	Lanmei Airlines*	Turkish Airlines	Philippines AirAsia Inc.*		

- **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 (mild)**
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: used the same percentage as Baseline
- **Scenario 2 (severe)**
 - 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: 22 and 17 percentage points lower in February and March from January, respectively

Assumptions		Baseline		Scenario 1		Scenario 2	
		Seat capacity reduction from originally-planned	Passenger load factor	Seat capacity reduction from originally-planned	Passenger load factor	Seat capacity reduction from originally-planned	Passenger load factor
January 2020	Hong Kong International	0%	80%	0%	80%	0%	80%
	Macao International	0%	80%	0%	80%	0%	80%
	Cross-Strait	0%	80%	1%	80%	1%	80%
February 2020	Hong Kong International	0%	80%	-25%	80%	-25%	58%
	Macao International	0%	80%	-67%	80%	-67%	58%
	Cross-Strait	0%	80%	-52%	80%	-52%	58%
March 2020	Hong Kong International	0%	80%	-55%	80%	-60%	63%
	Macao International	0%	80%	-75%	80%	-77%	63%
	Cross-Strait	0%	80%	-83%	80%	-85%	63%



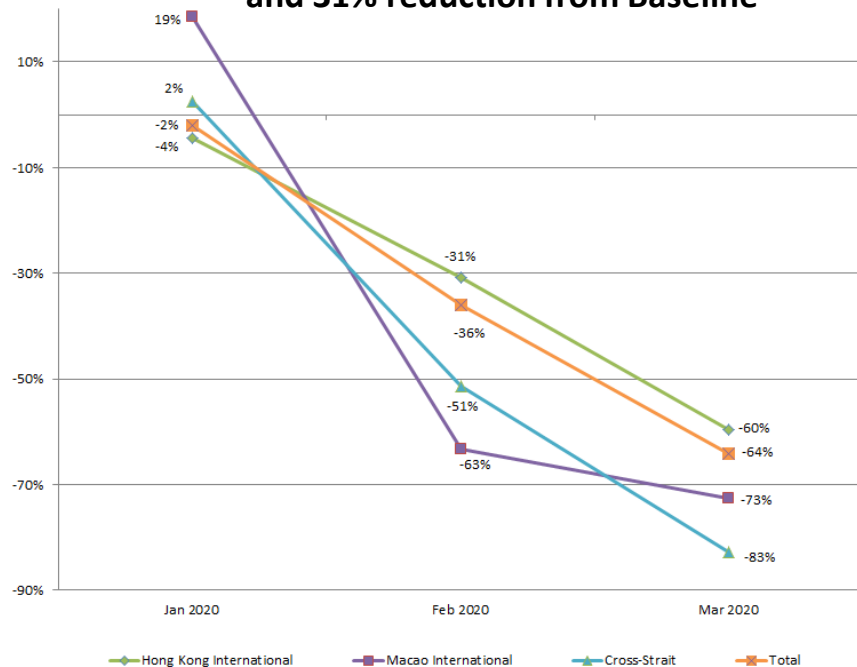
Baseline: 5% seat capacity reduction compared to 1Q 2019



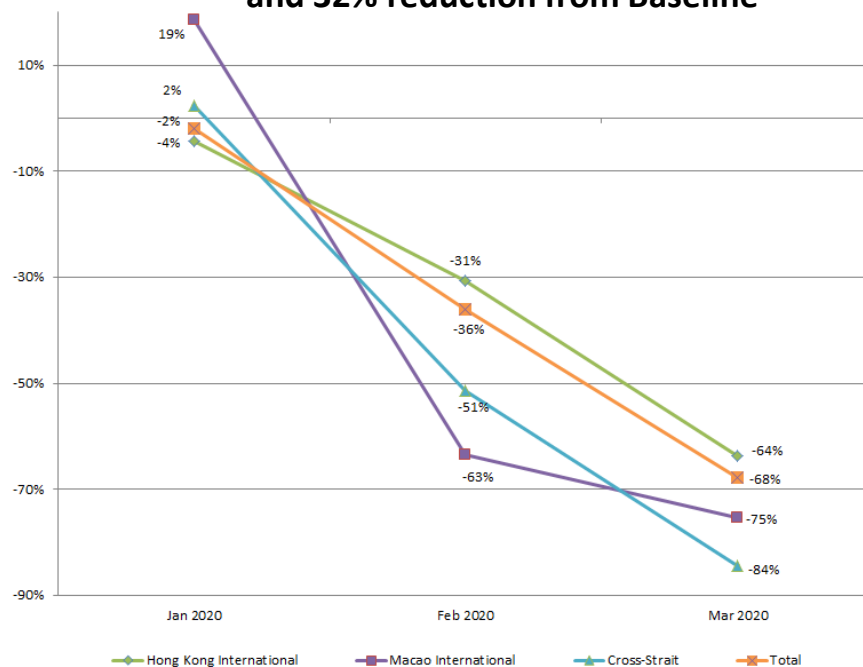
A total of YoY 5% seat capacity reduction originally - planned for 1Q 2020 due to the expectation of continued weak demand for Hong Kong SAR and Taiwan Province

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

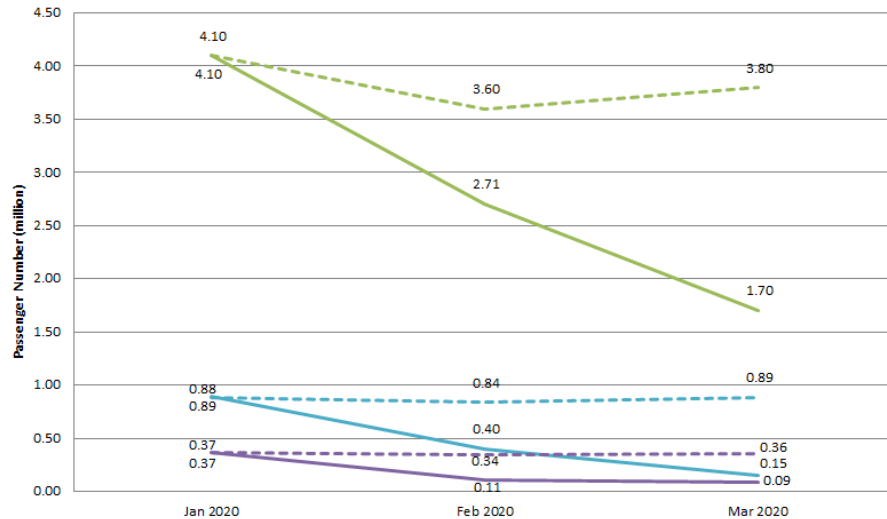


Scenario 2: for 1Q 2020 a total of 35% reduction compared to 1Q 2019 and 32% reduction from Baseline



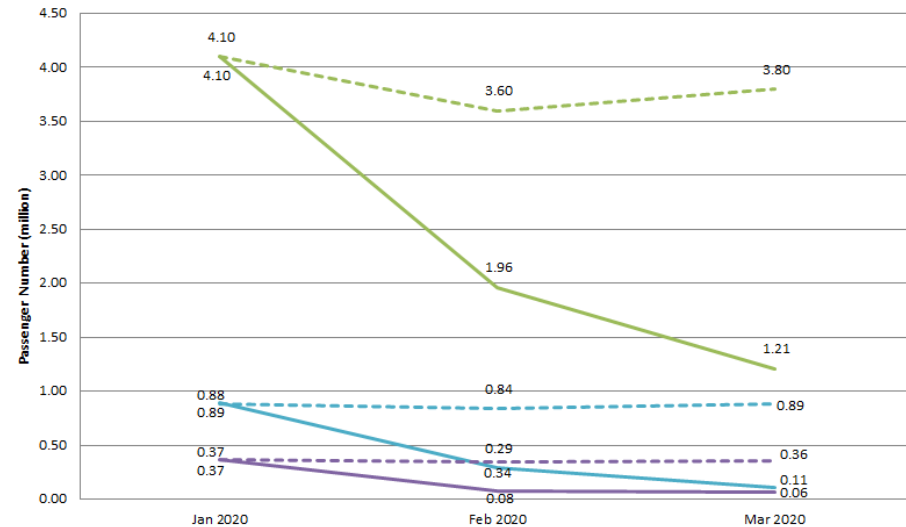
4.7 to 6.1 million passenger reduction in 1Q 2020 compared to Baseline

Scenario 1: a total of 4.7 million passenger reduction for 1Q 2020 from Baseline



— Hong Kong International (Scenario 1) — Macao International (Scenario 1) — Cross-Strait (Scenario 1)
 - - Hong Kong International (Baseline) - - Macao International (Baseline) - - Cross-Strait (Baseline)

Scenario 2: a total of 6.1 million passenger reduction for 1Q 2020 from Baseline



— Hong Kong International (Scenario 2) — Macao International (Scenario 2) — Cross-Strait (Scenario 2)
 - - Hong Kong International (Baseline) - - Macao International (Baseline) - - Cross-Strait (Baseline)

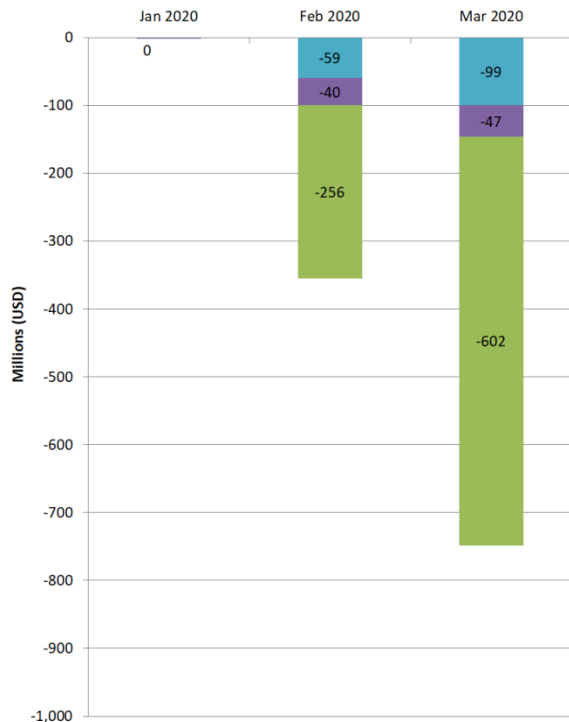


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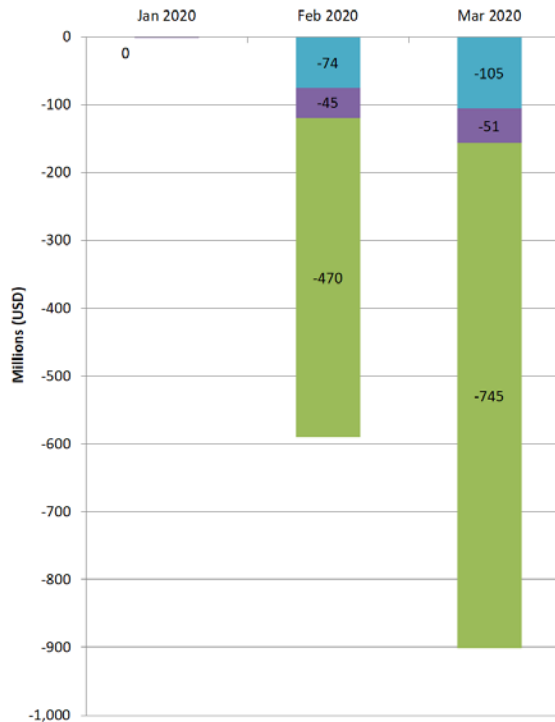
UNITING AVIATION

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



Scenario 2: USD 1.5 billion reduction



- Hong Kong International
- Macao International
- Cross-Strait

- 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”)

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

Scope of analysis	Estimated Impact on									
	Number of seats offered by airlines (000)				Number of passengers (000)				Gross operating revenues of airlines (USD, million)	
	Scenario 1		Scenario 2		Scenario 1		Scenario 2		Scenario 1	Scenario 2
Hong Kong International	-3,700	-26%	-3,900	-27%	-3,000	-26%	-4,200	-37%	-\$860	-\$1,220
Macao International	-600	-47%	-600	-47%	-500	-47%	-600	-52%	-\$90	-\$100
Cross-Strait	-1,500	-45%	-1,500	-45%	-1,200	-45%	-1,300	-51%	-\$160	-\$180
Total	-5,800	-31%	-6,100	-32%	-4,700	-31%	-6,100	-40%	-\$1,100	-\$1,490



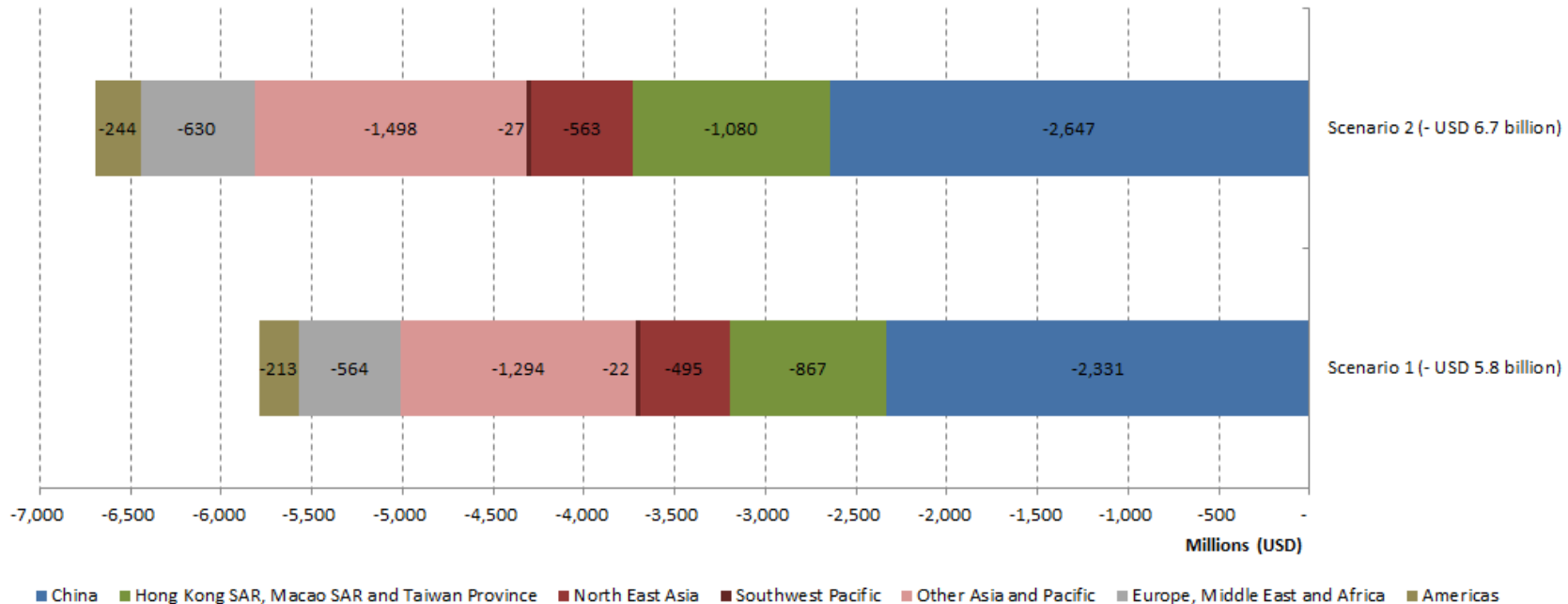
Summary of Scenario Analysis: China

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

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

Break-down of estimated impact in 1Q 2020

Scope of analysis	Estimated Impact on									
	Number of seats offered by airlines (000)				Number of passengers (000)				Gross operating revenues of airlines (USD, million)	
	Scenario 1		Scenario 2		Scenario 1		Scenario 2		Scenario 1	Scenario 2
International from/to mainland China (Chinese carriers)	-11,100	-42%	-11,300	-43%	-8,600	-42%	-9,900	-48%	-\$2,160	-\$2,460
International from/to mainland China (Foreign carriers)	-9,000	-46%	-9,200	-47%	-7,200	-46%	-7,800	-50%	-\$2,070	-\$2,240
Regional between mainland China and Hong Kong SAR of China	-1,900	-49%	-1,900	-49%	-1,700	-55%	-1,800	-58%	-\$230	-\$240
Regional between mainland China and Macao SAR of China	-700	-44%	-700	-45%	-500	-44%	-600	-50%	-\$70	-\$80
Regional between mainland China and Taiwan, Province of China	-1,500	-46%	-1,500	-47%	-1,200	-46%	-1,300	-52%	-\$160	-\$180
Sub-total	-24,100	-45%	-24,600	-45%	-19,300	-45%	-21,400	-50%	-\$4,690	-\$5,210
Hong Kong International	-3,700	-26%	-3,900	-27%	-3,000	-26%	-4,200	-37%	-\$860	-\$1,220
Macao International	-600	-47%	-600	-47%	-500	-47%	-600	-52%	-\$90	-\$100
Cross-Strait	-1,500	-45%	-1,500	-45%	-1,200	-45%	-1,300	-51%	-\$160	-\$180
Sub-total	-5,800	-31%	-6,100	-32%	-4,700	-31%	-6,100	-40%	-\$1,100	-\$1,490
Grand total	-29,900	-41%	-30,600	-42%	-23,900	-41%	-27,500	-47%	-\$5,800	-\$6,700

Domestic passenger services in mainland China in 1Q 2020

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

	Estimated Impact on									
	Number of seats offered by airlines (000)				Number of Passengers (000)				Gross operating revenues of airlines (USD, million)	
Scope of analysis	Scenario 1		Scenario 2		Scenario 1		Scenario 2		Scenario 1	Scenario 2
Domestic within mainland China	-76,100	-40%	-76,100	-40%	-66,600	-42%	-76,300	-48%	-\$6,830	-\$7,825
PRELIMINARY 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	

Potential loss of revenues from Chinese tourists to top 5 States in 1Q 2020

Top 5 States that Chinese traveller had the largest share		Baseline		Scenario 1		Scenario 2	
		Passenger number	Tourism revenue (in million USD)*	Passenger number	Tourism revenue (in million USD)*	Passenger number	Tourism revenue (in million USD)*
Australia		460,161	446.36	340,318	330.11	296,616	287.72
	Loss	-	-	-119,843	-116.25	-163,545	-158.64
France		240,523	233.31	137,867	133.73	120,670	117.05
	Loss	-	-	-102,656	-99.58	-119,853	-116.26
Japan		3,181,840	3,086.38	2,167,273	2102.25	1,855,034	1,799.38
	Loss	-	-	-1,014,567	-984.13	-1,326,806	-1287.00
Thailand		2,772,352	2,689.18	1,826,629	1771.83	1,589,458	1,541.77
	Loss	-	-	-945,723	-917.35	-1,182,894	-1147.41
United States		888,102	861.46	505,096	489.94	446,707	433.31
	Loss	-	-	-383,006	-371.52	-441,395	-428.15

- 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



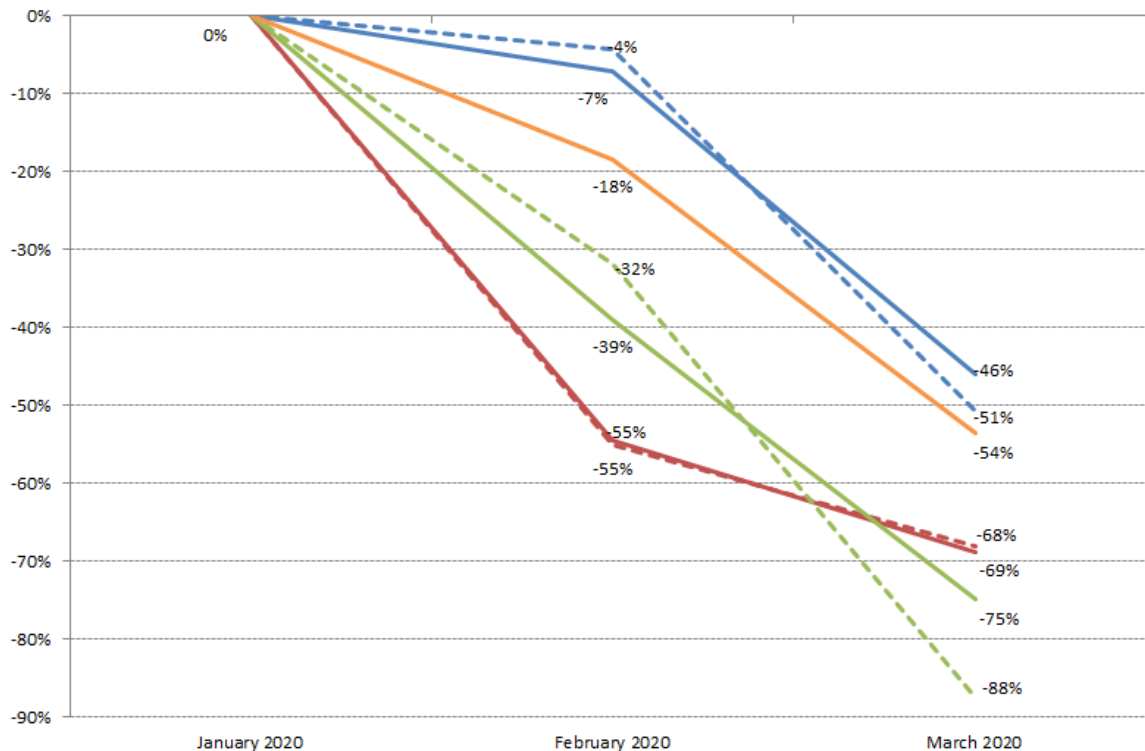
Scenario Analysis: Republic of Korea

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: 80%
- Scenario 1 (mild)*
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: used the same percentage as Baseline
- Scenario 2 (severe)*
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: 10 percentage points lower in March (i.e. 70%)

*** Between Republic of Korea and China, Hong Kong SAR and Macao SAR of China:**
extracted the impacts involving Republic of Korea from the respective scenarios of China and Hong Kong/Macao SARs

24% seat capacity reduction in 1Q 2020 from Baseline

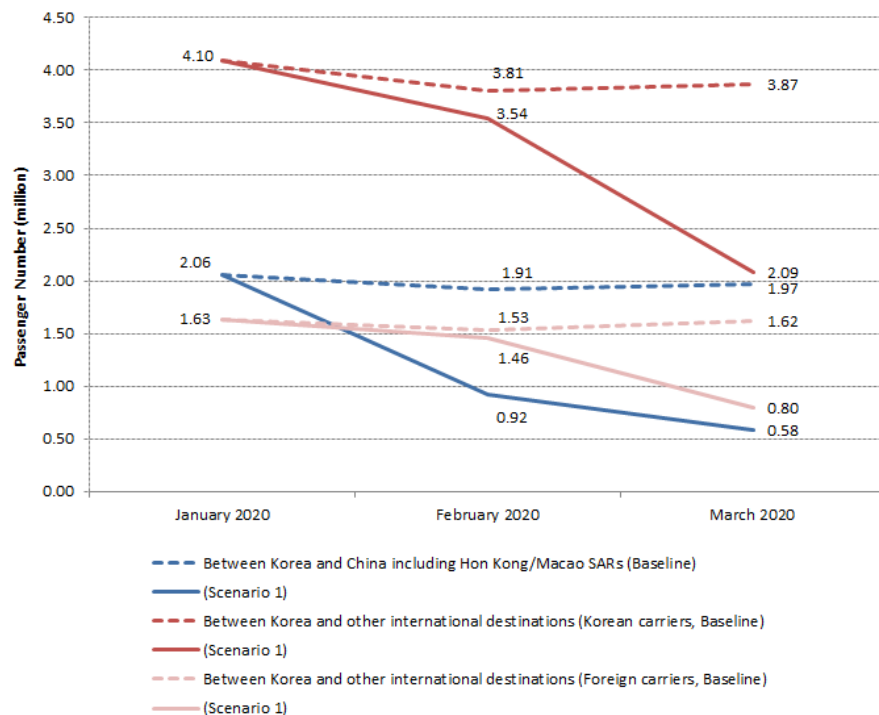


COVID-19 has started to impact airline operations from late February 2020 (except China routes)

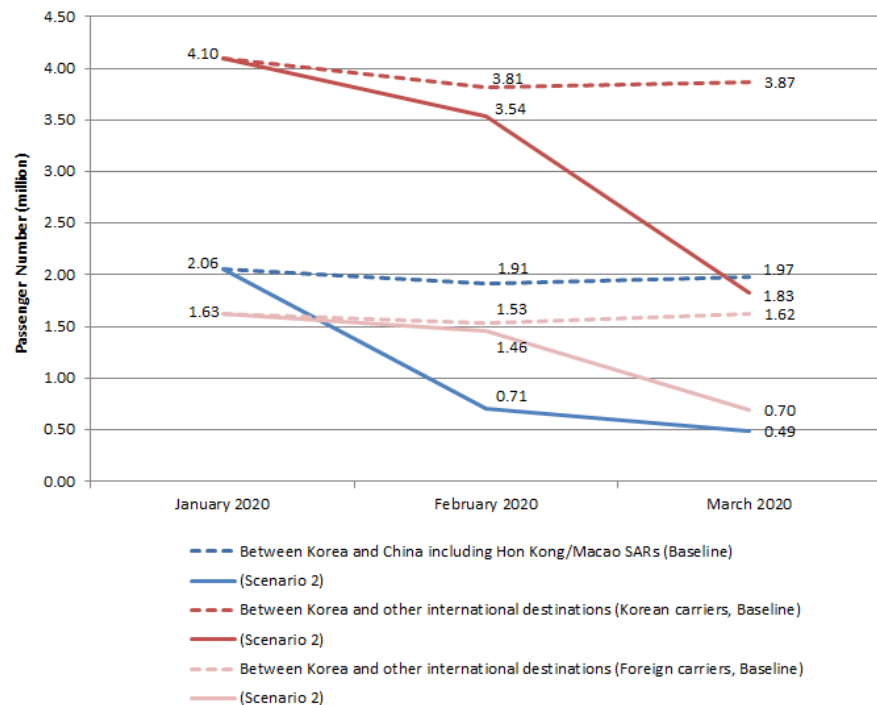
- Between Korea and China (Korean carriers)
- - Between Korea and China (Foreign carriers)
- Between Korea and Hong Kong/Macao SARs of China (Korean carriers)
- - Between Korea and Hong Kong/Macao SARs of China (Foreign carriers)
- Between Korea and other international destinations (Korean carriers)
- - Between Korea and other international destinations (Foreign carriers)
- Total

5.3 to 6.0 million passenger reduction in 1Q 2020 compared to Baseline

Scenario 1: a total of 5.3 million passenger reduction for 1Q 2020 from Baseline



Scenario 2: a total of 6.0 million passenger reduction for 1Q 2020 from Baseline



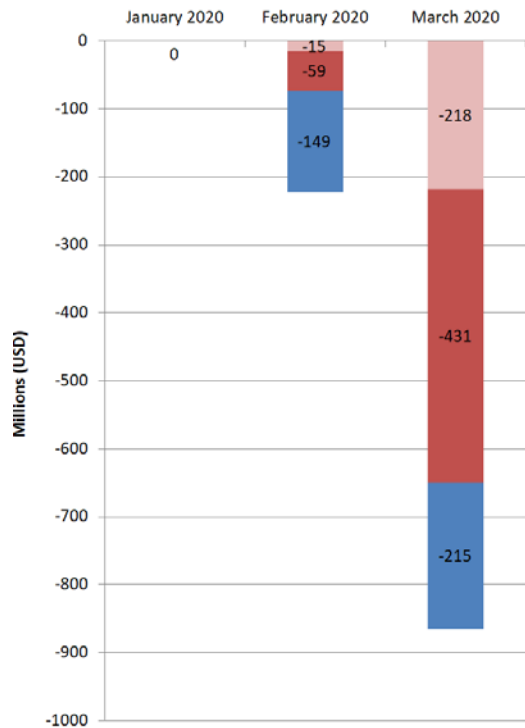


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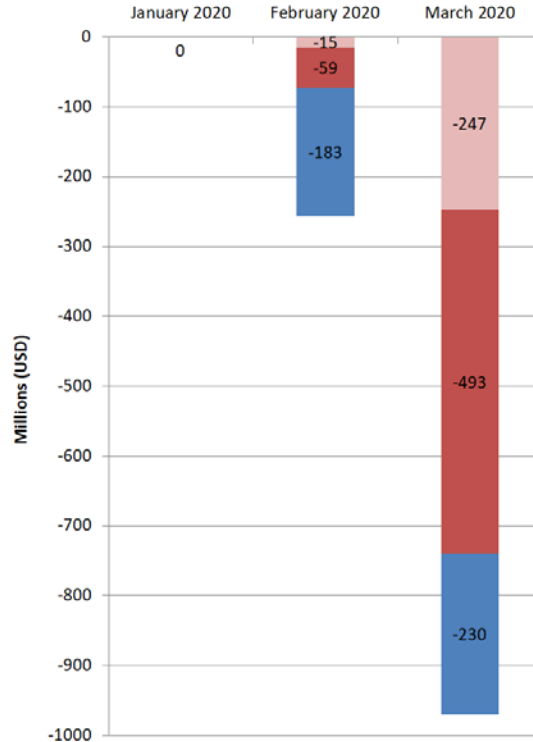
UNITING AVIATION

Approx. USD 1.1 to 1.2 billion potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 1.1 billion reduction



Scenario 2: USD 1.2 billion reduction



- Between Korea and China including Hon Kong/Macao SARs
- Between Korea and other international destinations (Korean carriers)
- Between Korea and other international destinations (Foreign carriers)

- Between Korea and China including Hong Kong SAR: extracted the impact involving Korea from scenarios 1 and 2 of China;
- Other internal destinations: Other internal destinations: calculated with an average fare of USD 287.6 per passenger (ranging from USD 155 to 485 by destination)



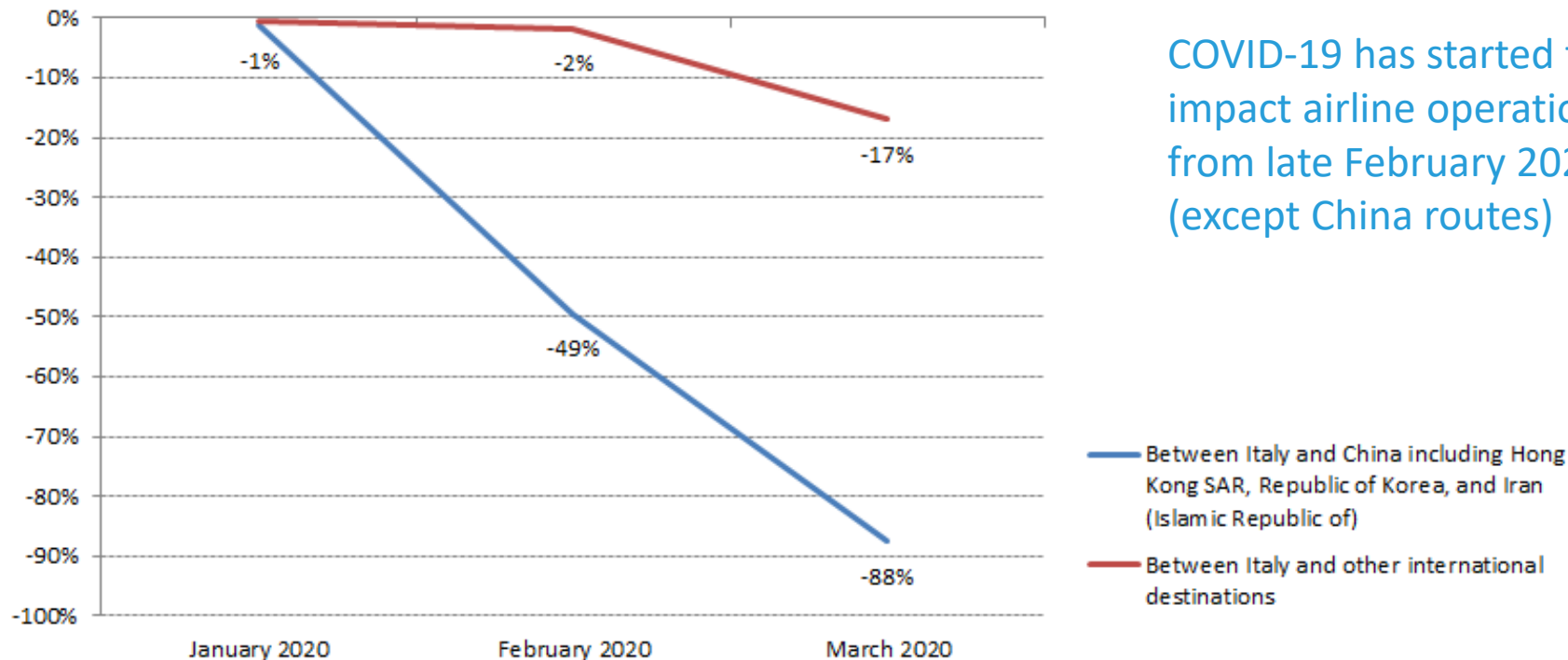
Scenario Analysis: Italy

This is a preliminary analysis. Figures and estimates herein will be updated with the situation evolving and more information available.

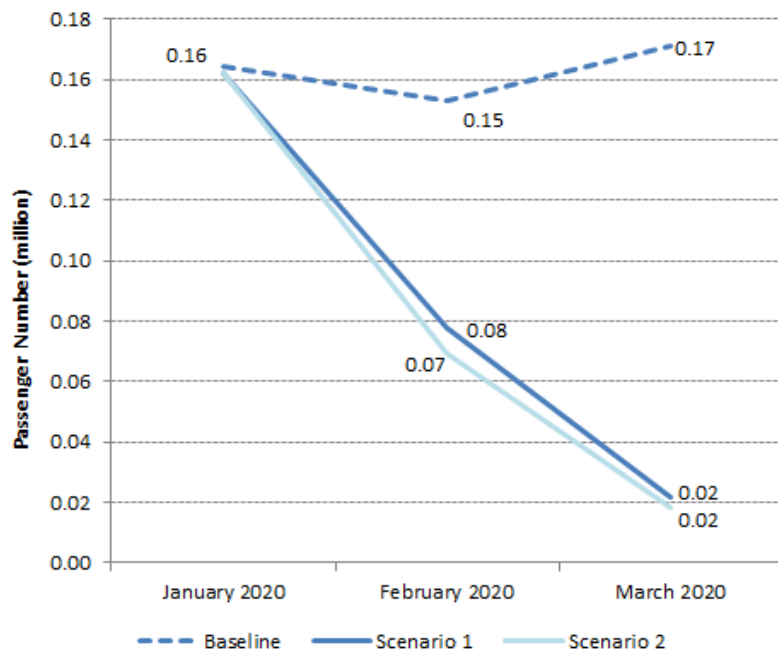
- Scope: scheduled international passenger services from/to Italy
- Baseline (hypothetical situation without COVID-19 outbreak)*
 - Seat capacity: used "originally-planned" winter schedule
 - Load factor: 80%
- Scenario 1 (mild)*
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: used the same percentage as Baseline
- Scenario 2 (severe)*
 - Seat capacity: estimated by airlines' schedule changes
 - Load factor: 10 percentage points lower in March (i.e. 70%)

*** Between Republic of Korea 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

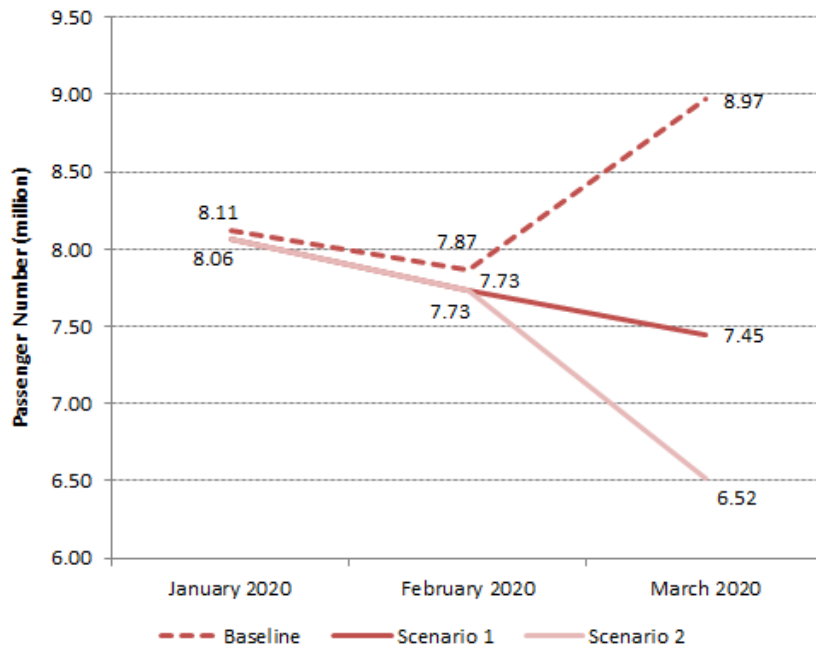
8% seat capacity reduction in 1Q 2020 from Baseline



1.9 to 2.9 million passenger reduction in 1Q 2020 compared to Baseline



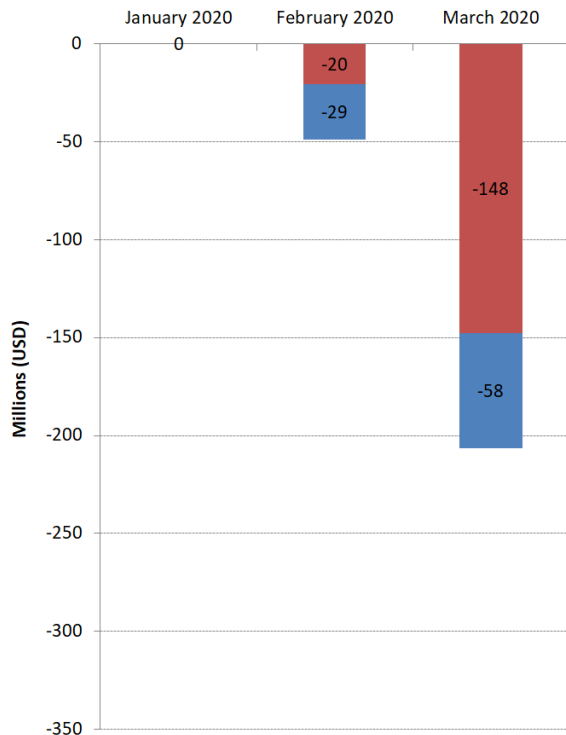
Between Italy and China including Hong Kong SAR, Republic of Korea, and Iran (Islamic Republic of)



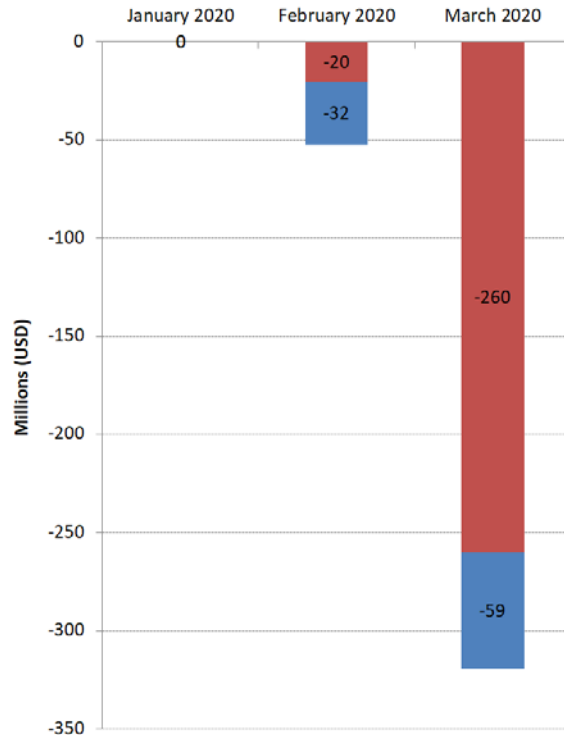
Between Italy and other international destinations

Approx. USD 260 to 370 million potential loss of airline revenues for 1Q 2020 compared to Baseline

Scenario 1: USD 260 million reduction



Scenario 2: USD 370 million reduction



- Between Italy and China including Hong Kong SAR, Republic of Korea, and Iran (Islamic Republic of)
- Between Italy and other international destinations

- 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 of USD 287.6 per passenger (ranging from USD 60 to 485 by destination)

Preliminary Analysis:

**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.

International passenger services from/to Iran (Islamic Republic of) in Feb 2020

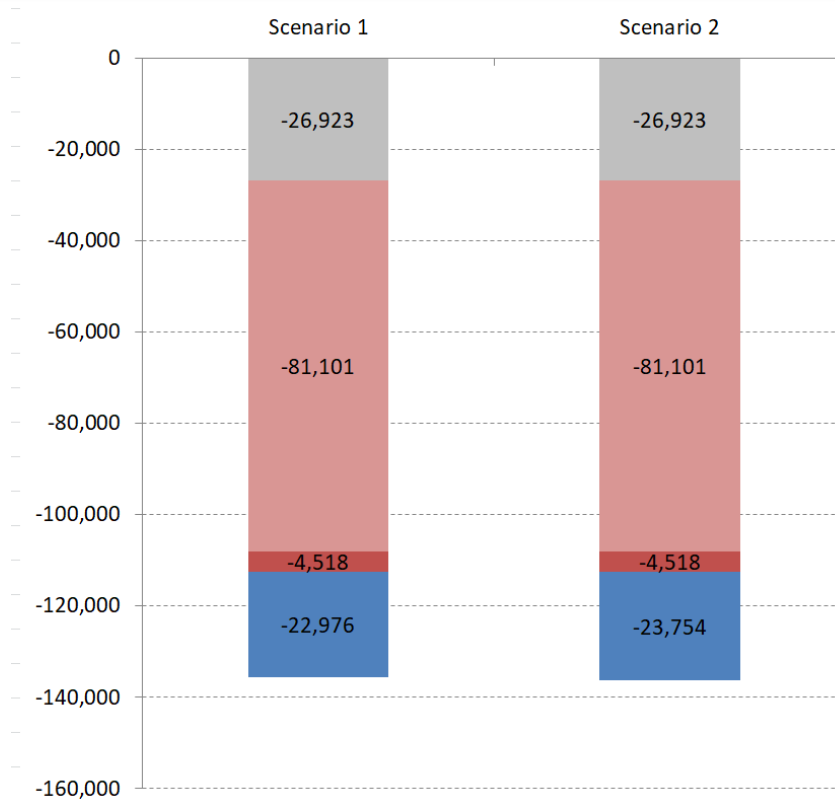


12% seat capacity reduction from originally-planned level in February 2020 due to COVID-19

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

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

International passenger services from/to Iran (Islamic Republic of) in Feb 2020



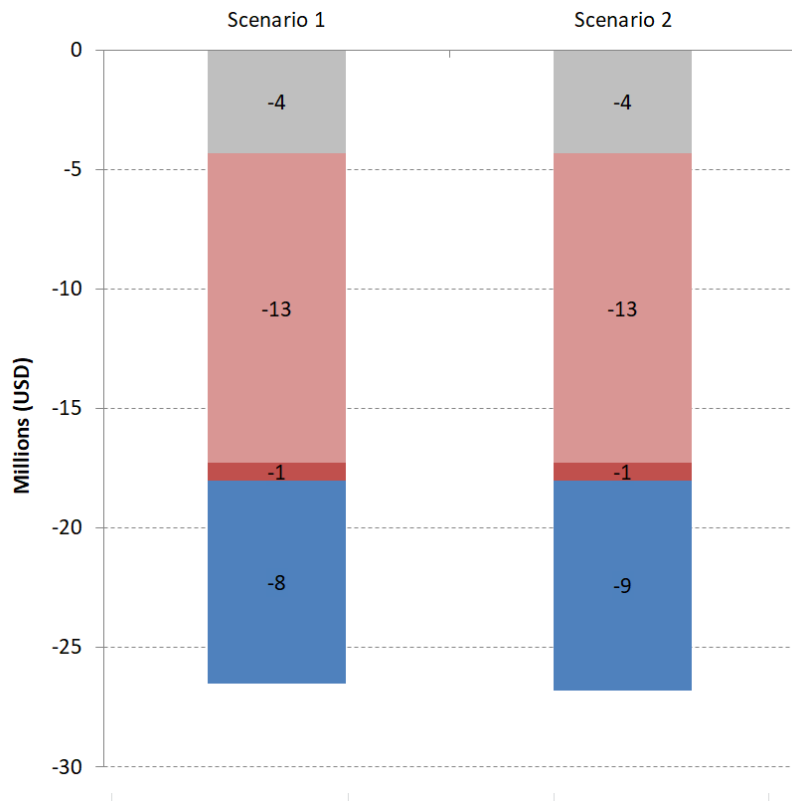
0.11 million passenger reduction in February 2020 compared to originally-planned due to COVID-19

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

- From/to mainland China
- Other international destinations (Iranian carriers)
- Other international destinations (Foreign carriers)
- Other international destinations (Foreign carriers*)

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

International passenger services from/to Iran (Islamic Republic of) in Feb 2020



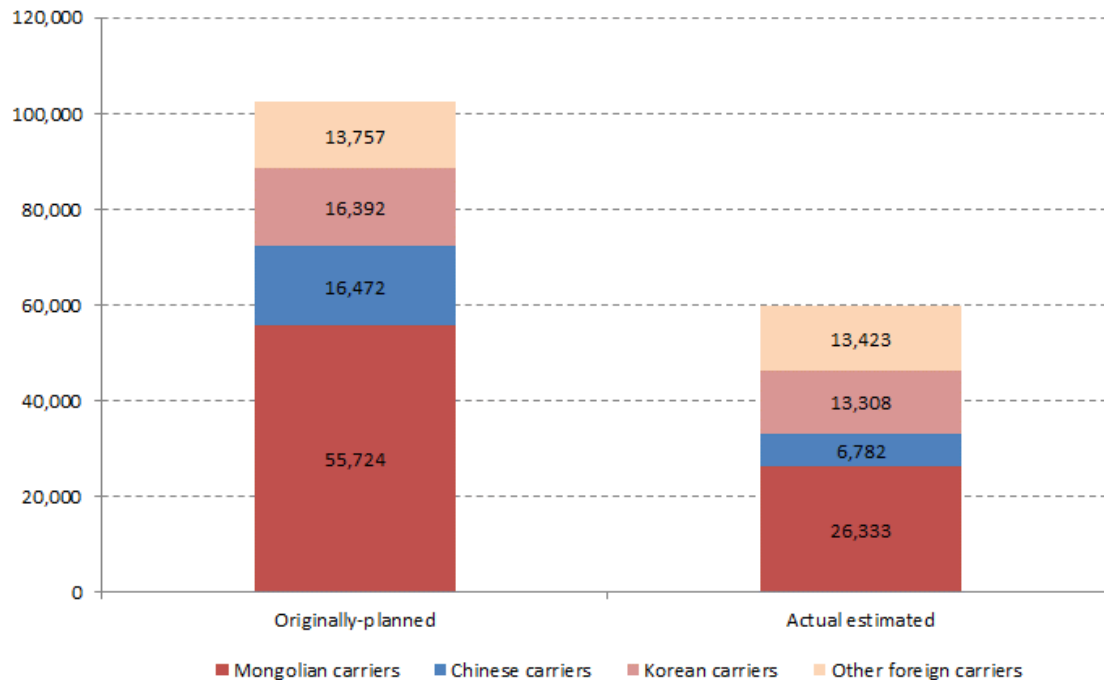
USD 22 million potential loss of airline revenues in February 2020 compared to originally-planned due to COVID-19

- 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

- From/to mainland China
- Other international destinations (Iranian carriers)
- Other international destinations (Foreign carriers)
- Other international destinations (Foreign carriers*)

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

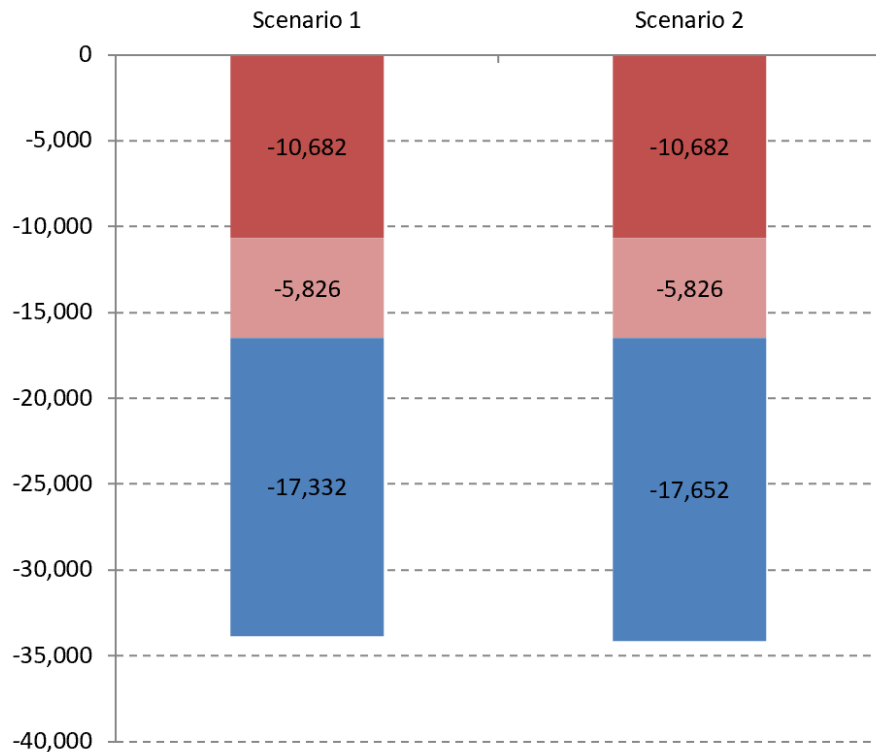
International passenger services from/to Mongolia in Feb 2020



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

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

International passenger services from/to Mongolia in Feb 2020

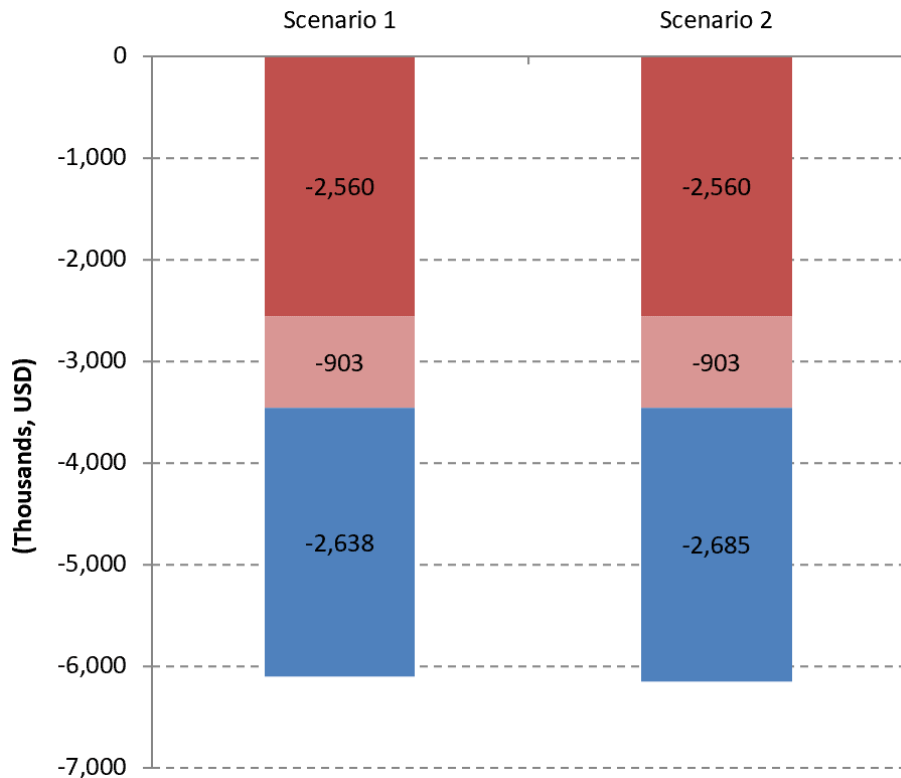


34,000 passenger reduction in February 2020 compared to originally-planned

- 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

- From/to mainland China and Hong Kong SAR
- From/to Republic of Korea
- Other international destinations

International passenger services from/to Mongolia in Feb 2020



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

- From/to mainland China and Hong Kong SAR
- From/to Republic of Korea
- Other international destinations



- Arrangement for the prevention and Management of Public Health Events in Civil Aviation (CAPSCA)
 - <https://www.capsca.org/CoronaVirusRefs.html>

- Aviation and COVID-19
 - <https://www.icao.int/Security/COVID-19/Pages/default.aspx>

- Updated analysis of the effects of the Novel Coronavirus (COVID-19) on air transport
 - [https://www.icao.int/sustainability/Documents/COVID-19/ICAO Coronavirus Econ Impact.pdf](https://www.icao.int/sustainability/Documents/COVID-19/ICAO_Coronavirus_Econ_Impact.pdf)



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<https://www.icao.int/Newsroom/Pages/Economic-impact-estimates-due-to-COVID-19-travel-bans.aspx>

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