

# Impacts of COVID-19 on the Dutch aviation industry





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## Executive summary

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## Executive summary

*The coronacrisis has an immense impact on the global aviation industry. As the novel coronavirus (SARS-CoV-2) spread across the world, more and more countries implemented travel restrictions. As a consequence, passenger transport largely came to a halt: in April, the Dutch airports processed 98 percent fewer passengers than in April 2019.*

*The Ministry of Infrastructure and Water Management commissioned SEO Amsterdam Economics and To70 to estimate the impacts of the crisis on the aviation industry in four possible future scenarios. In the most optimistic scenario, the virus is under control quickly and the aviation industry recovers in the first half of 2021 to 2019 levels. In the most pessimistic scenario, the virus will not get under control and restrictions will be in effect for a long time. Confidence among travellers decreases and businesses increasingly switch to digital forms of communication. In this scenario, social distancing becomes the norm in airplanes, which translates into lower occupancy rates and higher ticket prices. Combined with a worldwide recession, this leads to a significant reduction in the demand for air travel. Many airlines will go bankrupt and Schiphol will lose its function as a hub.*

*In the most optimistic recovery scenario, the Dutch aviation industry will recover in 2021; in the most pessimistic scenario, passenger levels will stay 70 to 80 percent below pre-crisis levels. In 2020, the welfare loss ranges between €0.9 to 1.3 billion, depending on the scenario. Gross employment and value added decrease by 40,000 to 60,000 FTE and €4 to 6 billion, respectively. In the most optimistic scenario, the impacts are largely limited to 2020; in the most pessimistic scenario, the impacts are more structural.<sup>1</sup>*

## Introduction

The coronavirus first appeared in China at the end of 2019. In February the virus started spreading to the rest of the world. First to other Asian countries, Europe and the Middle East and subsequently to North and South America and Africa. In response to this, an increasing number of countries implemented travel restrictions, forcing airlines to cancel many of their passenger flights. In April, passenger travel largely came to a halt: global passenger traffic decreased by more than 94 percent. Europe and the Netherlands experienced even larger declines of 98 percent. May saw the start of a slight recovery, despite the fact that the spreading of the virus outside of Europa was still rampant.

The strong reduction in the number of passenger flights also resulted in a reduction of cargo capacity, which led to higher freight tariffs and an increase in demand for *full freighter* capacity. Many airlines decided to transport cargo with (converted) passenger aircraft.

We estimated the impacts of COVID-19 on: the Dutch aviation network, passenger and cargo demand, national welfare and the economy. The study was conducted from May - July 2020. This executive summary describes the main findings. The full report (in Dutch) is available on [our website](#).

The scale of the impacts depends on multiple factors that are currently shrouded in uncertainty, such as: the speed at which the virus is controlled, travel restrictions are lifted and confidence among travellers returns, as well as structural impacts on travel behaviour, the degree of consolidation within the industry and long-term impacts on the economy. Due to these uncertainties, the impacts are estimated for four possible future scenarios.

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<sup>1</sup> In the short-term, the employment impacts may be overestimated as government support measures to keep workers employed were not taken into account. In addition, companies may not lay off personnel immediately. Over the longer term, the estimates might be underestimated, because companies might reorganise and become more efficient and therefore require less personnel per unit of production.



Source: SEO Amsterdam Economics  
 Note: The scenarios were defined in June 2020

## Literature and interviews

The scenarios were defined based on: existing scenario studies of (aviation) organisations such as IATA, ACI, ICAO and Eurocontrol, surveys among travellers and insights from experts from the European and Dutch aviation and travel industries.

The general expectation is that the aviation industry will recover in 2 to 4 years to 2019 levels. This wide estimate indicates that there are many uncertainties. Domestic and intra-European markets will recover more quickly than intercontinental markets. Large OD markets are expected to recover ahead of thinner OD markets and transfer markets. This means that demand will first return to the larger (hub) airports. However, the complete recovery of these airports will also take the longest due to their dependence on intercontinental (transfer) traffic. Demand can structurally decrease when confidence among travellers reduces and companies more critically assess the necessity and costs of business trips in a time when digital forms of communication have become more common.

Ticket prices will initially be lower due to overcapacity but will increase over time due to an increase in costs, less competition and the fact that loans will have to be repaid and airlines will have to rebuild their financial reserves. The upside of this will be that airlines will emerge from the crisis with increased efficiency. Regional carriers, small network carriers and holiday charters that do not receive state support will face difficult times. Low-cost airlines are in less need for additional financing and will therefore emerge from the crisis with a lower debt burden than their competitors.

It is expected that the crisis will have no impact on climate goals. In the short term, fuel efficiency will increase due to the accelerated phase-out of older aircraft. In the long term, the increase in fuel efficiency could stagnate because airlines have less financial resources to invest in new technology, new aircraft and sustainable fuels. This makes it more challenging for airlines to reach the climate goals.

## Scenarios

Based on this information, four possible future scenarios were defined. The scenarios indicate what *could* happen and should not be interpreted as predictions. As the scenarios have a broad scope, they indicate the bandwidth within which the impacts are likely to be:

- **Scenario 1: Quick return to the ‘old normal’ (V-shape):** In the most optimistic<sup>2</sup> scenario, the virus is quickly under control due to the implementation of effective global measures. Travel restrictions are gradually lifted from the second half of 2020. Passengers will quickly return to their old patterns of behaviour. This means that there is no structural impact on travel behaviour. European air passenger and cargo demand will be back at 2019 levels in Q1 2021. Intercontinental demand will be back at those levels in Q2. Due to the limited duration of the crisis and state support, there will be no large-scale bankruptcies, mergers and acquisitions.
- **Scenario 2: Gradual transition to the new normal (U-shape):** In the second scenario, it will take longer to control the virus. Travel restrictions are gradually lifted as in Scenario 1 but at a slower pace. By the end of 2021, a vaccine/medicine becomes available which results in the restoration of passenger confidence. However, demand for business travel decreases because companies more critically assess the necessity and costs of business trips and because they have grown more accustomed to digital forms of communication. Due to autonomous market growth, European passenger demand will be back at 2019 levels in Q1 2023.

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<sup>2</sup> ‘Optimistic’ and ‘pessimistic’ relate to the speed at which the virus is controlled and the aviation industry recovers. In an ‘optimistic’ scenario in which the industry recovers quickly, the negative impacts (such as those on the climate and living environment) increase more rapidly. Therefore, the scenarios cannot be considered ‘optimistic’ or ‘pessimistic’ from all perspectives.

Intercontinental demand will return to those levels in Q2. Until the availability of a vaccine/medicine, operational and health measures will remain in effect. Combined with quick tests before departure, this will be sufficient to limit the spreading of the virus. *Social distancing* in the terminal and on board aircraft will therefore not be necessary. Overcapacity and an increase in costs will lead to bankruptcies of several regional carriers, weaker network carriers and holiday charters. A large part of their slots is taken over by competitors.

- **Scenario 3: New outbreak and hub rationalisation (W-shape):** Initially Scenario 3 is identical to Scenario 2. However, a vaccine will not be available in the short-term. New outbreaks of the virus regularly occur due to a reduced attention for *social distancing* measures. As a result travel restrictions are reimplemented and lifted on a regular basis. Due to the lessons learnt from the first outbreak, new outbreaks will have smaller impacts. Nevertheless, the new outbreaks reduce passenger confidence. Companies will increase the use of digital forms of communication (video conferencing), causing a decrease in business demand. European passenger demand will be back at 2019 levels in Q1 2024. Intercontinental demand returns to 2019 levels later. As there is no vaccine/medicine available, operational and health measures will remain in effect for a longer period of time. *Social distancing* in the terminal and on board the aircraft are required. This will lead to higher ticket prices and a drop in demand. Overcapacity and an increase in costs will lead to bankruptcies of several regional carriers, weaker network carriers and holiday charters. Several countries are no longer able to support their flag carrier. Due to the strong decrease in intercontinental demand, KLM will be forced to rationalise its network by 50 percent. This means that Schiphol will become a less important hub in the dual-hub system of Air France-KLM, with only a limited number of intercontinental destinations remaining.
- **Scenario 4: Long-term impact with loss of hub function (L-shape)** In the most pessimistic scenario, it will take a long time to control the virus. Measures are less effective because the virus keeps re-emerging in mutated forms. Travel restrictions are only lifted between countries in which the virus is under control (safe corridors), but will be reimplemented as soon as (a new form of) the virus re-emerges. This will affect passenger confidence. Companies will only allow business travel when this is absolutely necessary. Combined with a long-term economic recession, this will lead to a decrease in local (OD) passenger demand (especially to intercontinental destinations). Operational and health measures remain in effect for longer. Just like with Scenario 3, *social distancing* will be required on board aircraft. As a result, ticket prices increase and demand declines, resulting in significant overcapacity. This results in a global consolidation wave. Many airlines will go bankrupt, including KLM. Schiphol will lose its hub function and the Netherlands will become dependent on foreign airlines.

The scenarios are defined in a policy-neutral manner. This means that state support has not been taken into account. At the time of writing, several governments have announced or provided support to their (national) aviation industry. Such support may limit the negative impacts on the aviation industry, welfare and the economy. The estimated impacts may therefore be interpreted as lower bound. Although we do not make any statements about the probability of the different scenarios a bankruptcy of KLM (as assumed in Scenario 4) has become less likely due the support provided by the Dutch government to KLM.

## Impacts

For each of the four scenarios, the impacts have been estimated on air passenger and cargo demand, the aviation network, national welfare and the economy (employment and value added). The impacts are quantified for the period 2020-2022 by contrasting the scenarios against a reference scenario without COVID-19. The effects on demand, the network and the economy are contrasted against the reference situation of 2019. The effects on national welfare are contrasted against a reference scenario in the current year, taking into account autonomous market growth. The medium-term impacts (up to 2030) are addressed qualitatively.

**Demand and network**

In the most optimistic first scenario, demand for air transport recovers strongly in the second half of 2020. Passenger and cargo demand are back at pre-crisis levels in the first half of 2021. Schiphol and Eindhoven Airport will again face capacity restrictions. In the second scenario, passenger markets take two more years to recover, until the first half of 2023. Cargo traffic will recover more quickly (see Table S.1).

In the third and fourth scenarios, recovery will take longer. This is because the virus will re-emerge regularly and travel restrictions will have to be reimplemented. *Social distancing* on aircraft is necessary in these scenarios, leading to higher ticket prices and a drop in demand. In Scenario 3, KLM will have to rationalise its network and in Scenario 4 KLM goes bankrupt. This will respectively lead to a decrease and the total loss of Schiphol’s hub function and with that the loss of transfer passengers and intercontinental connections. The supply effects lead to a structural decline in passenger demand. In the most pessimistic fourth scenario, passenger demand at the Dutch airports declines by 80 percent in 2022 compared to 2019. In both scenarios, cargo traffic will recover more quickly but will not return to pre-crisis levels by the end of 2022.

In all scenarios, regional airports recover more quickly than Schiphol because they focus on European OD traffic, which is expected to recover ahead of intercontinental OD traffic and transfer traffic.

**Table S.1 Quick recovery in Scenario 1, structural lower demand in Scenario 4**

	2019	Scenario 1			Scenario 2			Scenario 3			Scenario 4		
		2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
<b>Passengers (mln)</b>													
Schiphol	71.7	-53%	-2%	1%	-72%	-62%	-26%	-72%	-75%	-52%	-73%	-82%	-84%
Regional airports	9.5	-49%	0%	1%	-72%	-52%	-17%	-72%	-69%	-40%	-75%	-75%	-75%
<b>Cargo (x 1,000 tonnes)</b>													
Schiphol	1,570	-9%	-1%	1%	-20%	-14%	-1%	-20%	-22%	-15%	-23%	-25%	-25%
Regional airports*	109	-9%	-2%	1%	-16%	-12%	-2%	-16%	-18%	-14%	-18%	-23%	-25%
<b>Flights (x 1,000)</b>													
Schiphol	497	-43%	-1%	1%	-64%	-55%	-21%	-62%	-64%	-33%	-65%	-73%	-75%
Regional airports	70	-40%	0%	1%	-64%	-46%	-14%	-63%	-57%	-20%	-66%	-65%	-65%

Source: SEO Amsterdam Economics

\* Maastricht Aachen Airport is the only regional airport with a significant cargo operation

Note: Relative changes compared to 2019

**Welfare**

A decrease in flight supply impacts national welfare in several ways. Dutch passengers will be confronted with longer travel times and/or higher travel costs. Dutch companies in the aviation industry generate less revenue, which leads to smaller profits or higher losses. Over the longer term, a decrease in flight supply can also affect the business climate, resulting in a drop in productivity. However, this will only occur when flight supply from the Dutch airports is reduced more strongly than at foreign airports. A decrease in the number of flights has a positive impact on the climate and local surroundings.

The study quantifies the most important impacts on national welfare: the impacts on passengers, the climate and productivity. The remaining impacts were addressed qualitatively and included as positive or negative *pro-memory* (+/-PM) items.

In the first scenario, national welfare reduces by more than €900 million (+/-PM) in 2020. In the other scenarios, demand recovers less quickly resulting in a larger welfare reduction: over €1.3 billion (+/-PM) in 2020. In scenarios one, two and three, the welfare loss decreases in the subsequent years as demand returns to the market. In the fourth scenario, the welfare loss increases to €1.4 billion (+/-PM) in 2021 due to the presumed bankruptcy of KLM (see Table S.2).

**Table S.2 Negative Impacts for consumers and companies, positive impacts on the climate and local surroundings**

Reference  (x mln €, price level 2019)	Scenario 1			Scenario 2			Scenario 3			Scenario 4		
	2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
Direct impact (Dutch passengers)	-1,004	-75	-65	-1,411	-1,160	-498	-1,411	-1,454	-970	-1,453	-1,539	-1,536
Direct effects (Dutch producers)	-PM	-PM	-PM	-PM	-PM	-PM	-PM	-PM	-PM	-PM	-PM	-PM
External effects (Climate)	146	11	6	203	189	87	198	212	128	203	238	247
External effects (Local surroundings)	+PM	+PM	+PM	+PM	+PM	+PM	+PM	+PM	+PM	+PM	+PM	+PM
Indirect effects (Productivity)	-85	-6	-6	-124	-98	-40	-124	-126	-80	-129	-135	-136
<b>Total</b>	<b>-942</b>	<b>-69</b>	<b>-65</b>	<b>-1,333</b>	<b>-1,069</b>	<b>-450</b>	<b>-1,338</b>	<b>-1,367</b>	<b>-922</b>	<b>-1,378</b>	<b>-1,436</b>	<b>-1,424</b>
	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>	<b>+/-PM</b>

Source: SEO Amsterdam Economics

Note: Absolute changes compared to the same year in the reference scenario

The welfare losses mainly consist of higher travel costs for Dutch passengers. Due to a reduced flight supply, passengers more often are dependent on indirect flight alternatives. This increases in average travel times, which translates into a welfare loss. Ticket prices could also increase due to less competition and measures that increase costs. Those who refrain from using air transport incur half of the cost increase as a welfare loss.

The impacts on Dutch companies in the aviation industry will most likely be negative due to lower revenues and higher costs. On the other hand, the reduction in flight supply has positive impacts on the climate and local surroundings, especially in scenarios three and four. In addition, airlines are more likely to use their most efficient airplanes during the recovery phase. Older, less fuel-efficient and noisier aircraft types shall only return to active service in the final stages of recovery.

### Economy and employment

Lower demand for air transport (temporarily) translates into less economic activity within the aviation industry and within supplying industries. This translates into less employment and added value. In the most optimistic scenario, gross employment declines by almost 40,000 FTE<sup>3</sup> in 2020. At the same time almost €4 billion in added value is lost (see Table S.3). In the more pessimistic second and third scenario, the losses in 2020 are even larger. When demand returns, companies can recruit new staff and productivity will increase. In the most pessimistic fourth scenario, gross employment will drop by 67,000 FTE in 2022 compared to 2019. Added value – estimated only for Schiphol – will drop by €6.6 billion. These are conservative estimates.

<sup>3</sup> In the short-term, the employment impacts may be overestimated as government support measures to keep workers employed were not taken into account. In addition, companies may not lay off personnel immediately. Over the longer term, the estimates might be underestimated, because companies might reorganise and become more efficient and therefore require less personnel per unit of production.

**Table S.3 Gross employment could decrease by 67,000 FTE**

	2019*	Scenario 1			Scenario 2			Scenario 3			Scenario 4		
		2020	2021	2022	2020	2021	2022	2020	2021	2022	2020	2021	2022
<b>Employment</b> (x 1,000 FTE)													
- Direct	60	-26	-1	1	-36	-30	-12	-36	-38	-26	-37	-41	-42
- Indirect (backwards)	37	-15	-1	0	-21	-18	-7	-21	-22	-15	-22	-25	-25
Schiphol													
- Direct	56	-24	-1	1	-34	-29	-12	-34	-36	-25	-35	-39	-40
- Indirect (backwards)	36	-14	-1	0	-20	-17	-7	-20	-21	-15	-21	-23	-24
Regional airports													
- Direct	4	-2	0	0	-2	-2	-1	-2	-2	-1	-2	-3	-3
- Indirect (backwards)	2	-1	0	0	-1	-1	0	-1	-1	-1	-1	-1	-1
<b>Added value</b> (x bln €, price level 2019)													
Schiphol													
- Direct	7.3	-3.1	-0.1	0.1	-4.3	-3.7	-1.5	-4.3	-4.6	-3.2	-4.5	-5.0	-5.1
- Indirect (backwards)	3.0	-0.8	0.0	0.0	-1.2	-1.0	-0.3	-1.2	-1.3	-0.9	-1.3	-1.4	-1.5

Source: SEO Amsterdam Economics based on Decisio

\* The numbers for 2018 have been updated based on the transport development between 2018 and 2019. That period saw a shift from cargo to passenger flights. This most likely leads to somewhat less employment and added value compared to 2018

Note: Absolute changes compared to 2019

**Medium-term impacts**

In the first and second scenario demand growth is delayed by 2 and 4 years respectively. This means that Schiphol and Eindhoven Airport will again reach their capacity limits within a few years’ time.

In the third scenario, European passenger demand will recover in 2024. Intercontinental demand will remain at a structurally lower level due to the rationalisation of the KLM network. To reach intercontinental destinations, passengers remain dependent on flights from foreign airlines. These will often be indirect flights via the hubs of the respective airlines. This will lead to extra travel time and costs for consumers and businesses. More indirect flights via foreign hubs could also lead to an increase in net emissions. When flight supply from Dutch airports is affected more than from foreign competitors, this could have an adverse impact on the business climate around the Dutch airports. These developments lead to a structural welfare loss. When *social distancing* measures remain in effect, this could lead to capacity problems within airport terminals from 2023 onwards, which could further delay the recovery process. Furthermore, the structural loss of intercontinental passenger flights significantly reduces *belly*capacity for air cargo. The cargo market will therefore become more dependent on cargo aircraft. There is a risk that Schiphol eventually loses its marketplace for cargo. A structural decline in aviation activities at the Dutch airports goes hand in hand with a decline in employment and added value.

In the fourth scenario, all these developments may occur to a larger degree, because the entire hub function of Schiphol is lost and with it a large portion of the intercontinental network. Due to the strong and structural decrease in passenger demand, the Dutch airports will not face capacity restrictions anytime soon – not even when *social distancing* measures will remain in effect within the airports.

In all scenarios, airlines have to tap into their financial reserves and/or take out extra loans. Therefore, they have less financial resources to invest in new aircraft in the short term. Because of this, manufacturers of airplanes and airplane engines can invest less in R&D, which means that new technologies will enter the market at a later

moment in time, especially in the more pessimistic scenarios. During the recovery period, airlines shall use their most fuel-efficient aircraft. This will lead to relatively fuel-efficient operations. In the long term, delayed fleet replacements and reduced R&D investments could lead to a stagnation of fuel-efficiency improvements.





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