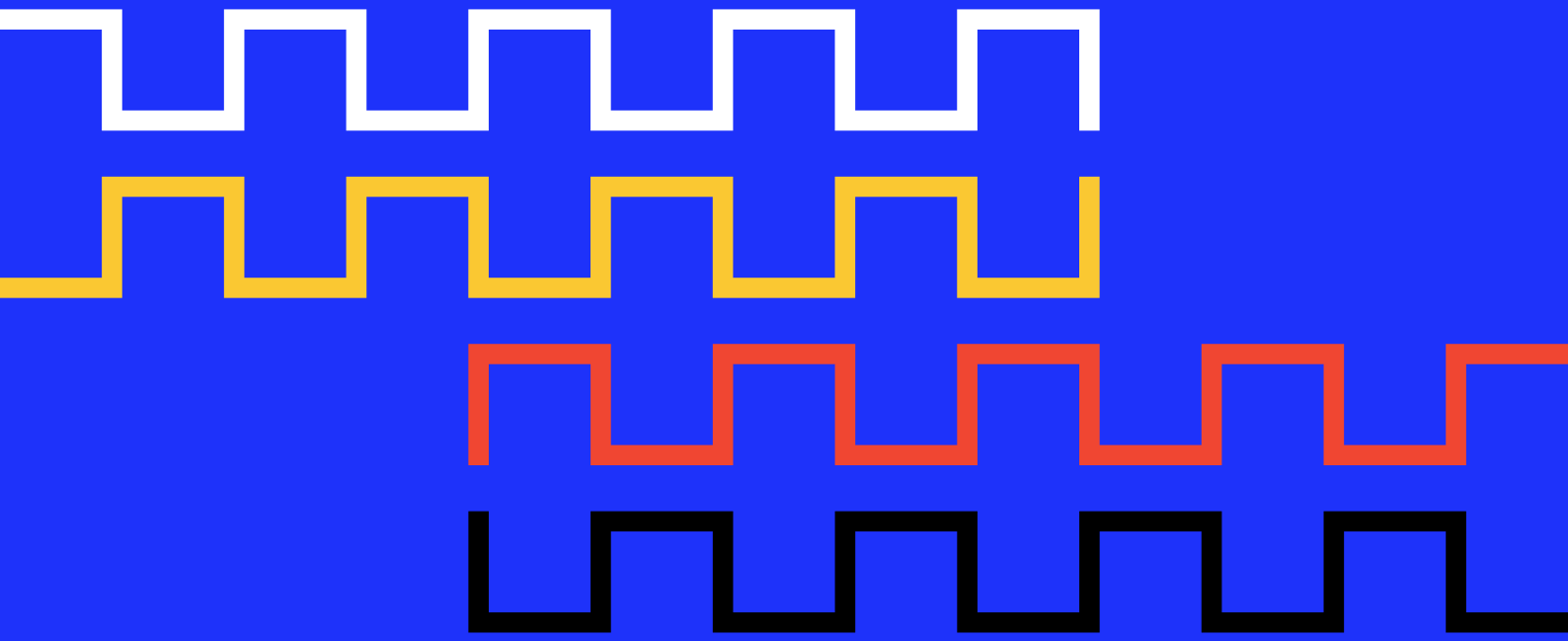
December 2022

Understanding the pandemic's impact on the aviation value chain



McKinsey & Company

IATA

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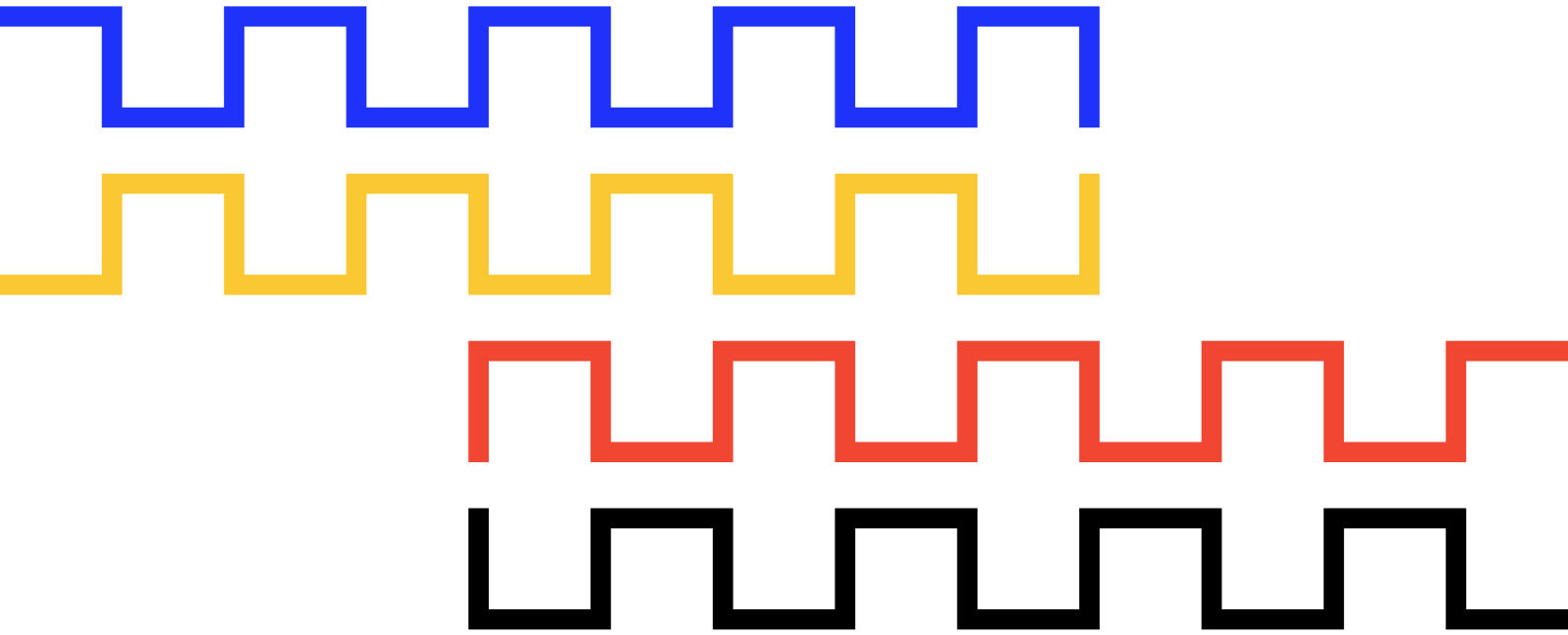
Introduction

Since 2005, IATA and McKinsey & Company have jointly looked at value creation across the aviation value chain. This analysis examines the entire value chain, covering aircraft and engine original equipment manufacturers (OEMs); lessors; airports; air navigation service providers (ANSPs); ground handlers; maintenance, repair, and overhaul (MRO) providers; catering companies; airlines; global distribution systems (GDSs); and freight forwarders. The value chain analysis presented here excludes upstream value creation by oil companies. Given the differentiated nature of oil companies, profits attributed to jet fuel production alone are not transparent. Hence, this has been excluded.

While acknowledging the human toll the COVID-19 pandemic has exacted, the focus here is on economic value creation, defined as the difference between the return on invested capital (ROIC) and the weighted average cost of capital (WACC) — thereby taking the lens of an investor. ROIC measures the earnings available to pay debt and equity investors in relation to the capital invested. The WACC can be seen as the opportunity cost for the investor, as it is a measure of the alternative return the investor could have had if the capital were invested in an asset with a similar risk profile. The difference between the two indicates economic profitability. If the ROIC is greater than the WACC, then value is being created. Conversely, if the ROIC is lower than the WACC, then economic value is being lost.

This report covers 2020 and 2021 and deepens the assessment of value creation by including a larger sample of companies in each sector. COVID-19 led, and still leads, to significant loss of lives, and daily life has been upended in countless ways. Businesses are affected in various ways too. This report provides a starting point for understanding performance pre-pandemic and during COVID-19, and aims to inform the debate about how to enhance value creation and efficiency across the whole value chain. (For an analysis of the aviation value chain in 2020, please see McKinsey's article Taking stock of the pandemic's impact on global aviation).

First, the report investigates the longer-term performance of the value chain. It then dives deeper by sector to understand what drives that performance. Next, it assesses the value chain dynamics and forces acting upon the airline sector which help explain performance. It concludes by looking at what could be done to enhance value creation in the value chain going forward.



Executive summary

The aviation value chain consists of a diverse set of sectors in terms of size, structure and performance. Pre-pandemic, the value chain as a whole generated an economic loss of approximately USD 5 billion per year. Airlines consistently were the weakest link across the value chain, generating an economic loss of approximately USD 18 billion per year.

Amid lockdowns and travel restrictions, all sectors making up the aviation value chain suffered significant losses in 2020 and 2021 - except for air cargo carriers and freight forwarders who experienced yield increases given undersupply and sustained demand. With economic losses of USD 175 billion in 2020 and USD 104 billion in 2021, airlines showed the largest economic losses during the pandemic. Of the other sectors, those with greater shares of fixed costs, such as airports, suffered more and saw less ROIC recovery in 2021 versus 2020 than those with a more variable cost base, such as ground handlers.

The great disparity of returns across the value chain — where some sectors match the most profitable sectors globally, and others are near the bottom of cross-sector performance — existed long before the pandemic. Airlines' under-performance has its roots in factors such as low entry and high exit barriers, high sensitivity to external shocks, the fragmented nature of the industry, and a more concentrated supplier landscape, to name a few.

As the value chain is only as strong as its weakest link, all sectors that make up the chain have an interest in one another's ability to perform. To expand the value created for all participants, value chain partners can consider various mutually reinforcing steps. These include improving service and reliability by working together across the value chain, pursuing opportunities for greater data and insights sharing, removing inefficiencies in the value chain, working together on decarbonization, collaborating to meet ever-changing demand in customer segments, and enhancing resilience and robustness.

Aviation makes a significant economic contribution to societies globally. By jointly working to enhance performance across the value chain, all sectors should be able to generate a a return to its investors beyond the minimum based on its risk profile.

Taking a step back: Pre-pandemic value chain performance

The aviation sector is impacted by all forms of macro-economic, natural, and other shocks, rendering the sector highly cyclical. Over time, the sector, and airlines in particular, have accumulated considerable expertise in crisis management. Those skills were in full display during the pandemic, as airlines took full advantage of the new opportunities in air cargo in innovative ways. Prior to the pandemic, the Global Financial Crisis too brought greater resilience to the industry, led by North America. In its wake, airlines posted uninterrupted operating profits from 2010 to 2019 — a period that attracted considerable investor interest to the airline industry. Profitability was not uniform across the airline industry, however, and was the highest in markets with fewer infrastructure constraints, favorable regulatory environments, and a greater openness to consolidation.

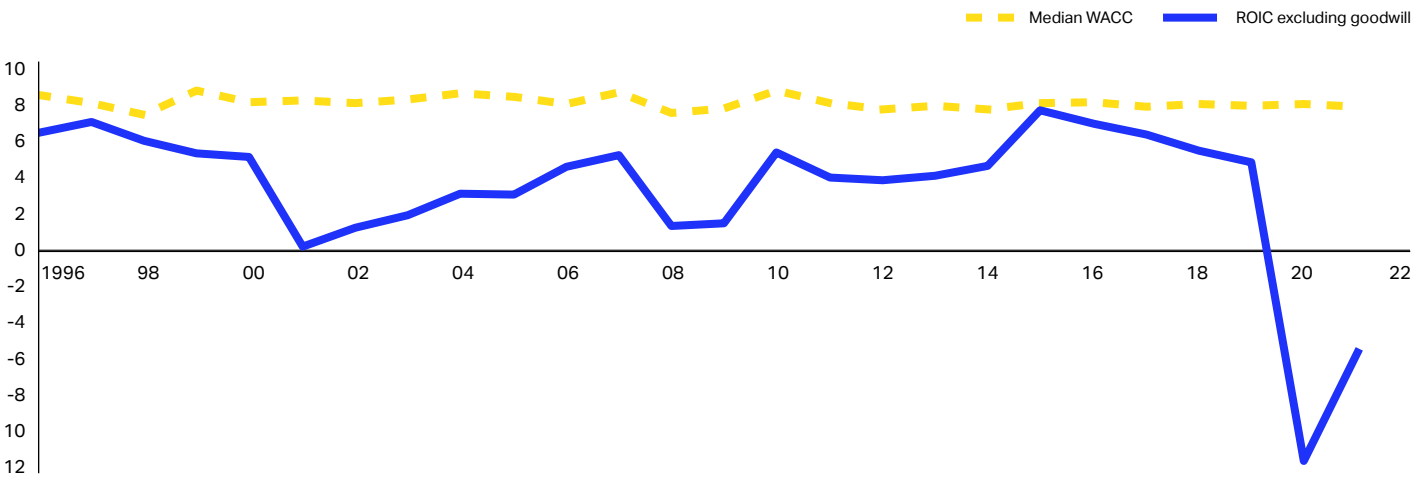
In spite of this period of consistent operating profits, the airline sector did not produce economic returns defined as the difference between the return on invested capital (ROIC) and the weighted average cost of capital (WACC) (Exhibit 1). In fact, on this basis, airlines were consistently the weakest link across the aviation value chain over the 2012-19 period (Exhibit 2).

Jet fuel prices fluctuated significantly between 2012 and 2019, with a low point of approximately USD 52 per barrel in 2016 to a high point of USD 130 per barrel in 2012. As a result, the fuel share of airline operating expenses fluctuated between 22% and 33% in this period. Airline sector ROIC averaged approximately 6% during this period, versus 8% for the oil & gas sector.

Exhibit 1

ROIC for the airline industry remained below WACC in pre-COVID-19 years; worst ever result in 2020 with improvement in 2021

Airline industry ROIC excluding goodwill vs. median WACC, 1996-2021, %

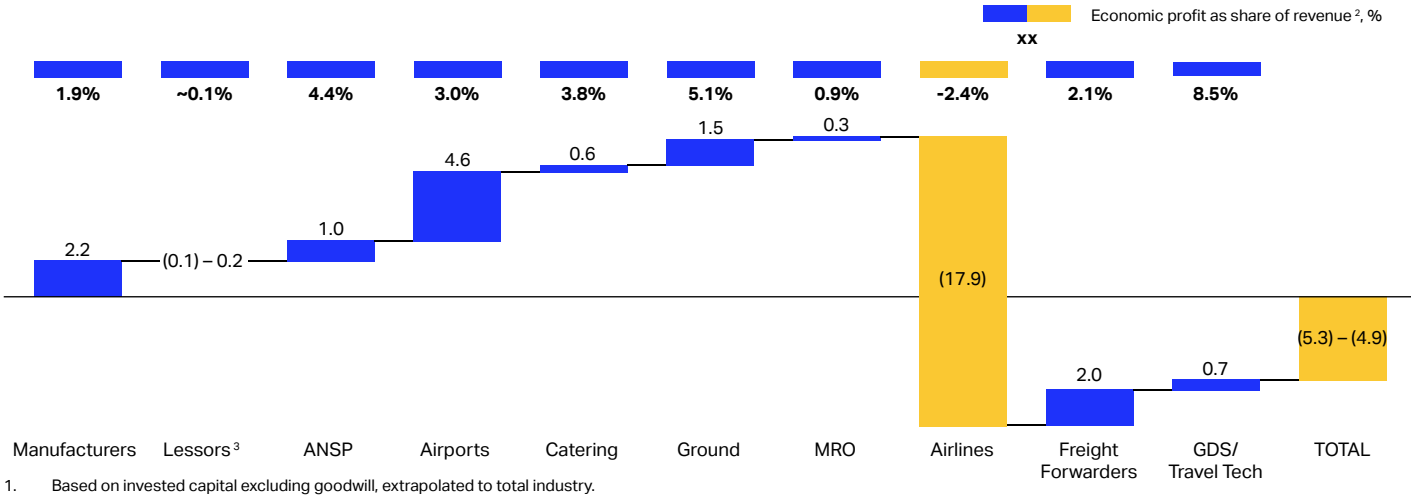


Source: McKinsey value chain modelling for IATA

Exhibit 2

Pre-COVID-19, the air transport value chain generated an economic loss of USD ~5 billion p.a. driven by large airlines losses

Average annual economic profit/loss by subsector, 2012-2019, USD Billion [1]



1. Based on invested capital excluding goodwill, extrapolated to total industry.
2. Computed as cumulative economic profit divided by cumulative sector revenue over the period.
3. Sector economic profit for lessors estimated based on sample economic profit as share of revenue and as share of fleet value, the combination of which is expressed as a range.

Source: McKinsey value chain modelling for IATA

Changes during the pandemic

Global airline traffic (measured by revenue passenger kilometers) declined by 66% in 2020, and by 58% in 2021, compared to 2019, producing an economic loss of USD 244 billion in 2020 and USD 146 billion in 2021 across the value chain (Exhibit 3). These are hyperbolic losses, considering that in the best year for the value chain, 2015, economic profit was limited to USD 12 billion for all sectors combined.

Amid lockdowns and travel restrictions, all aviation sectors suffered significant losses in 2020 and 2021 — except for air cargo carriers and freight forwarders where supply-demand imbalances led to increases in yields, and value creation. Sectors with greater shares of fixed costs, such as airports, suffered more than those with a more variable cost base, e.g., ground handlers, while airlines lost the most.

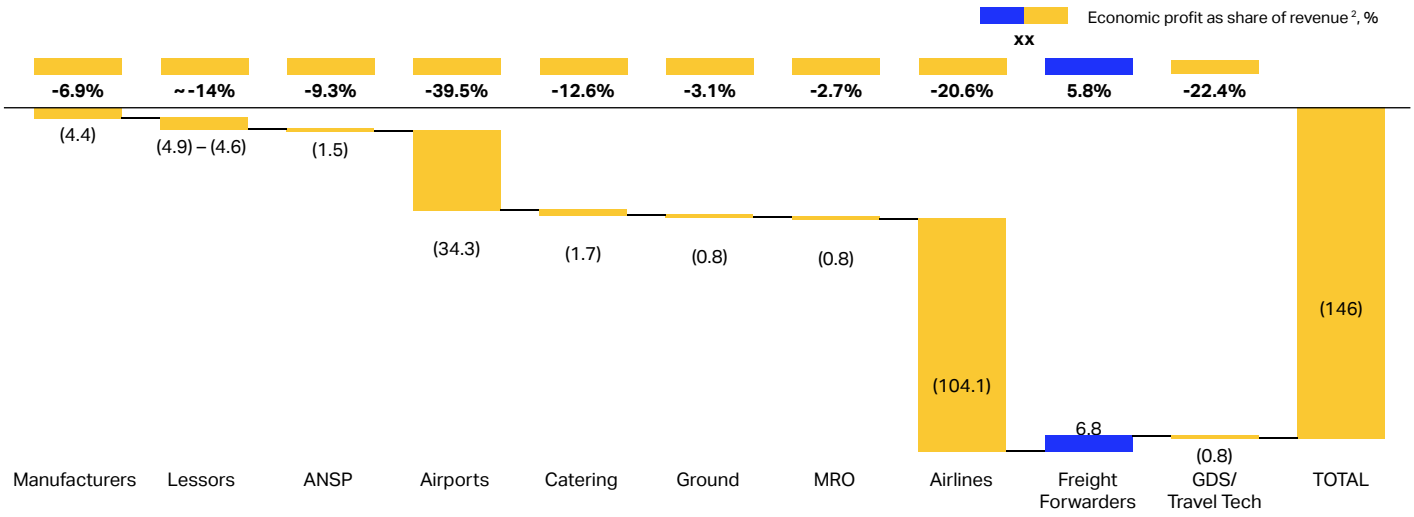
ROIC improved across the value chain in 2021 compared to 2020, and the rebound in terms of the degree of change in ROIC differed materially by sector (Exhibit 4). Airports rebounded the least compared to other aviation sectors in 2021, with ROIC improving by 0.9 percentage points. At the other end of the spectrum, the manufacturers showed a 24.5 percentage point increase in ROIC. The other sectors in the value chain saw their ROIC rise by between 5 and 10 percentage points, generally speaking. Nevertheless, all sectors, except the freight forwarders, stayed in the red in 2021.

Jet fuel prices initially came down in 2020, from approximately USD 80 per barrel in 2019 to USD 47 in 2020. But in 2021, prices rebounded to USD 78, and the forecast average for 2022 is USD 126. Where airline sector ROIC came to -5.9% in 2021 as a result of the pandemic, the oil & gas sector reached 11.4%.

Exhibit 3

In 2021, all subsectors noted sizable economic losses – air cargo was the only bright spot

Economic profit/loss by subsector, 2021, USD Billion[1]

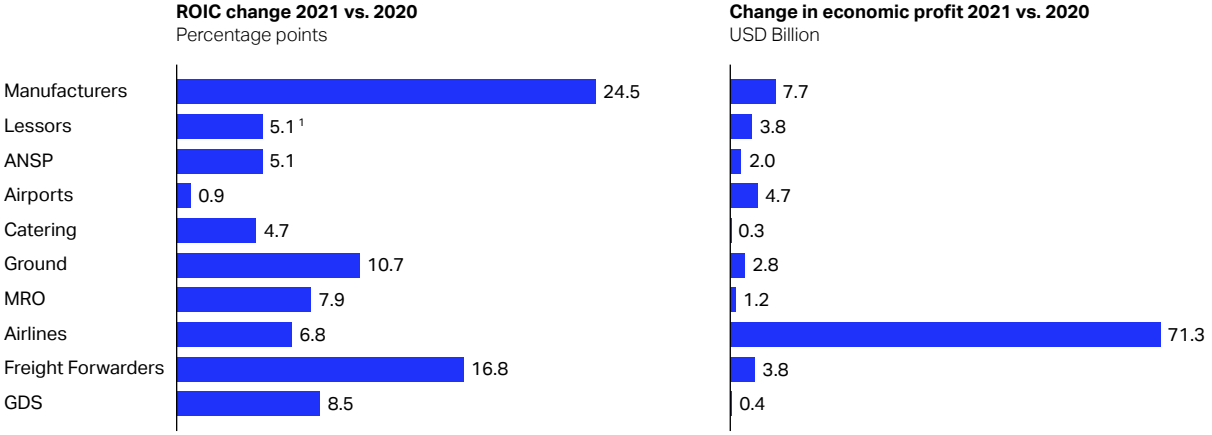


1. Based on invested capital excluding goodwill, extrapolated to total industry.
2. Computed as cumulative economic profit divided by cumulative sector revenue over the period.

Source: McKinsey value chain modelling for IATA

Exhibit 4

ROIC change 2021 vs. 2020: OEMs and freight forwarders in the lead



1. Change in ROE.

Source: McKinsey value chain modelling for IATA

Performance and recovery by sector

Airlines

The airline sector produced an economic loss of USD 175 billion in 2020 (10 times larger than the average annual value destruction pre-pandemic) and USD 104 billion in 2021, resulting in economic profit margins of -46% and -21% respectively.

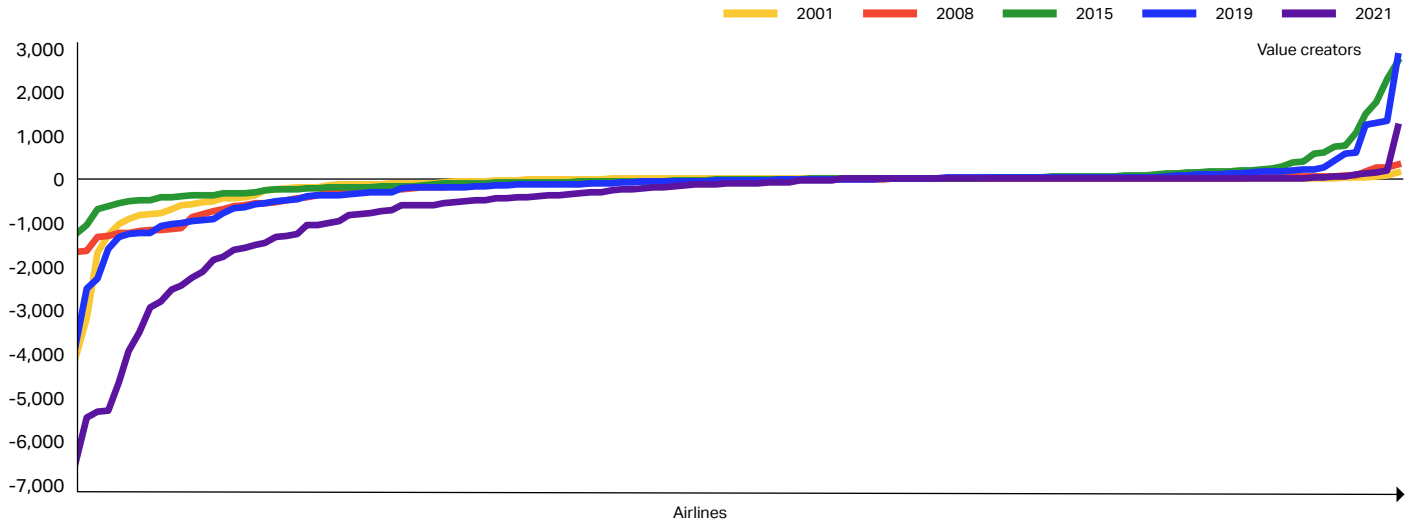
Plotting the economic profit of companies, ordered from low performers to best performers, reveals a "power curve" [1]; Power curves have tails that rise and fall at exponential rates, with long flatlands of middle-performing companies. Airlines' power curves are, unsurprisingly, skewed to the negative. The vast majority of airlines, 104 out of a sample of 111 in 2019, find themselves in the middle flatland or at the left tail-end, again illustrating the general characterization of the industry as one that is highly competitive and for the most part producing slim margins. However, the power curve shows that despite overall economic losses, there are always a small number of airlines that do achieve a return above the cost of capital (Exhibit 5). These airlines differ in composition, are from different regions, and have different business models — some are low cost and some follow a network business model , and many have borrowed from each other and become hybrid business models. The outperformance of these airlines can be explained by the market context and carrier-specific factors. For instance, some airlines may be active in more mature markets where capacity growth is in line with underlying demand growth. Others may exhibit excellence in factors important for attracting customers or maximizing asset productivity, such as ancillary sales, a unique network portfolio, and operational excellence [2].

Frequent flyer programmes, too, can be a source of significant value for airlines. To illustrate, it is not uncommon for large North American network carriers to generate annual revenue of USD 3-5 billion through mileage sales to financial institution partners. This revenue stream has also proven to be less volatile during the pandemic compared to passenger revenues.

Exhibit 5

The airline industry power curve shows the large variation in performance by year

Airline industry economic profit power curve [1], USD Million



1. Number of carriers by year differs, power curve lines stretched to make equal, i.e., lines show more the distribution than the actual number of airlines.

Source: McKinsey value chain modelling for IATA

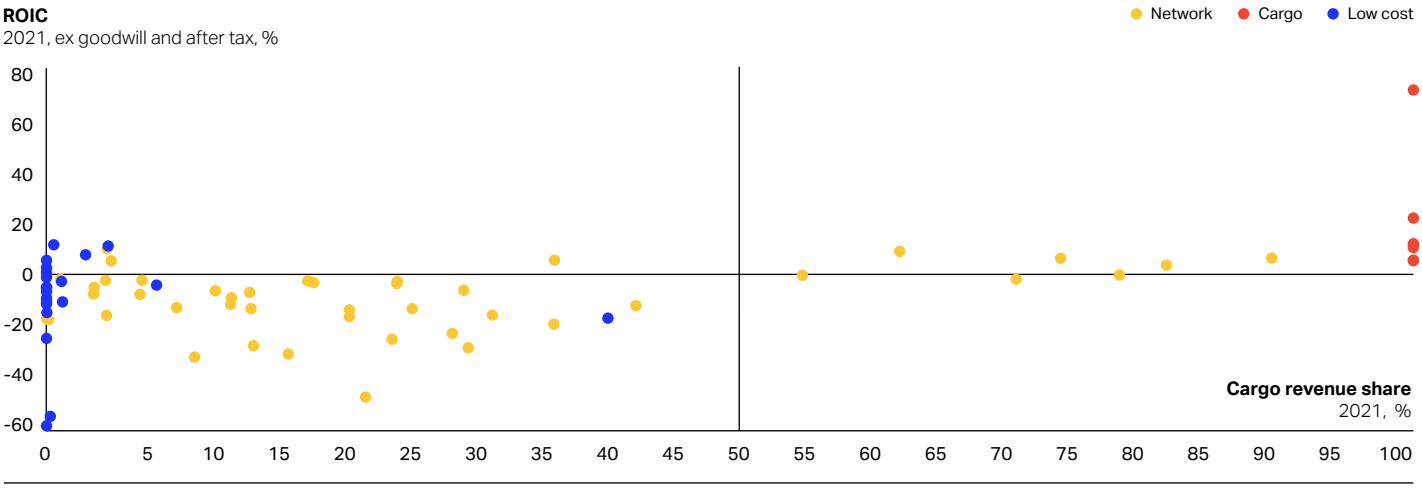
[1] Martin Hirt, "Is your strategy good enough to move you up on the power curve?", McKinsey, January 30, 2018.
[2] Jaap Bouwer, Alex Dichter, Vik Krishnan, and Steve Saxon, "The six secrets of profitable airlines", McKinsey, June 28, 2022.

Air cargo was a clear, and much-needed, area of relief during the pandemic. In 2021, of the nine value-creating airlines in the sample, seven had significant or pure cargo operations. Global air cargo tonnage was roughly 7% higher in 2021 than in 2019. Airlines idled widebodies as long-haul passenger demand evaporated given travel restrictions. Bellies of passenger aircraft used on long-haul flights contribute around half of global cargo capacity normally. Strong demand, coupled with a sharp reduction in supply, led to cargo yields spiking. Consequently, carriers more exposed to air cargo saw less of a decline in ROIC, and several pure-play air cargo carriers began to create value. Airlines with limited cargo activity saw the greatest drop in ROIC in 2021 (Exhibit 6).

Low cost carriers (LCCs) outperformed network carriers in terms of ROIC pre-pandemic (Exhibit 7). The traditional LCC model focuses on shorter haul point-to-point travel, which can reduce costs through higher aircraft utilization and a more simplified aircraft fleet. It also reduces cost through flying to secondary airports, increased seat density, and greater online distribution share, to name a few. During the pandemic, LCCs performed worse however. An absence of air cargo may help to explain this.

Exhibit 6

More cargo led to higher returns during the pandemic

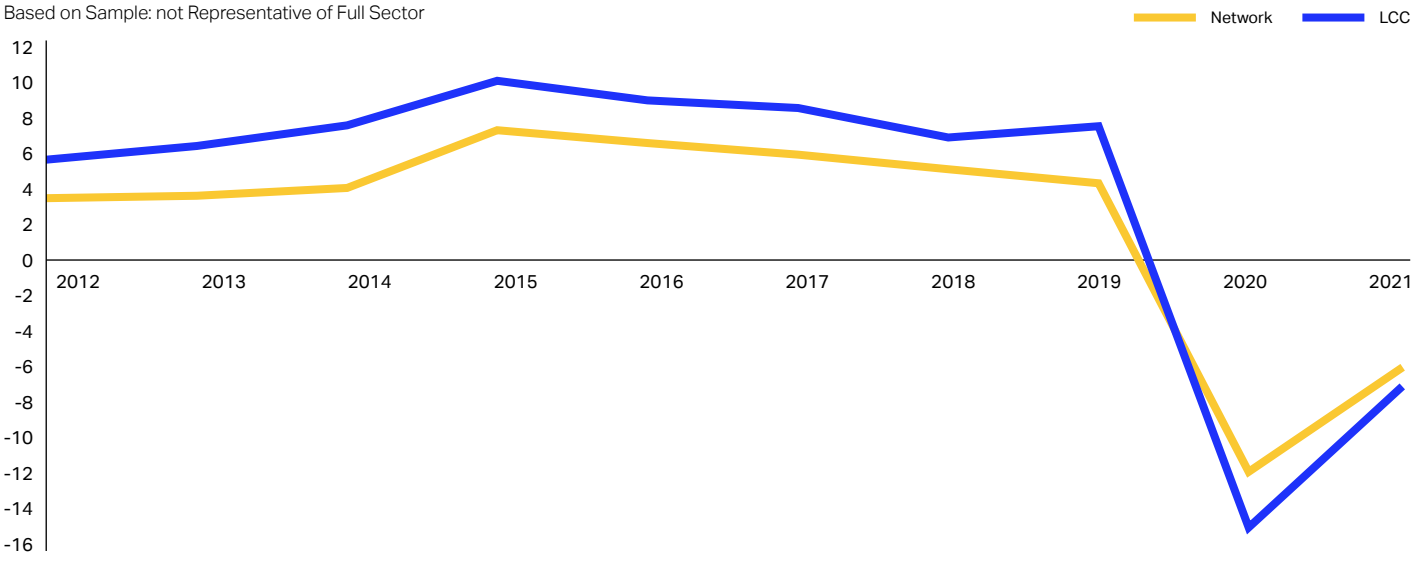


Source: McKinsey value chain modelling for IATA

Exhibit 7

LCCs in sample performed better than network carriers pre-COVID-19, but worse during the pandemic

Network versus low cost carrier ROIC ex goodwill, weighted average, 2012-2021, %



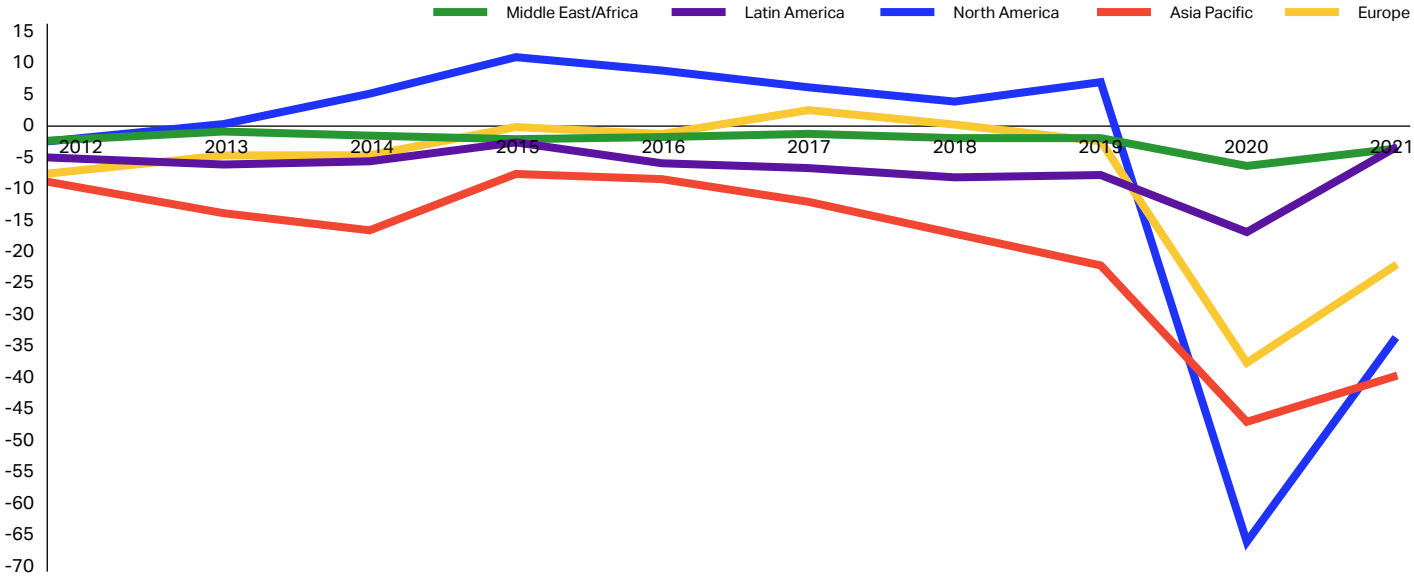
Source: McKinsey value chain modelling for IATA

Airline performance differs significantly by region (Exhibit 8). Pre-pandemic, North America was the only value-creating region. This may have been due, in part, to a more consolidated and mature market, with only moderate capacity additions (Exhibit 9). The top-5 carriers' share of scheduled seat capacity reached approximately 80% in North America and ROIC performance was significantly higher versus other regions. Latin America, too, showed a higher degree of consolidation, albeit not as high as North America. ROIC performance in Latin America lagged North America driven, in part, by greater capacity additions.

Exhibit 8

Pre-COVID-19, North America was the only region where airlines created value

Annual airline sector economic profit by region, 2012-2021, USD Billion

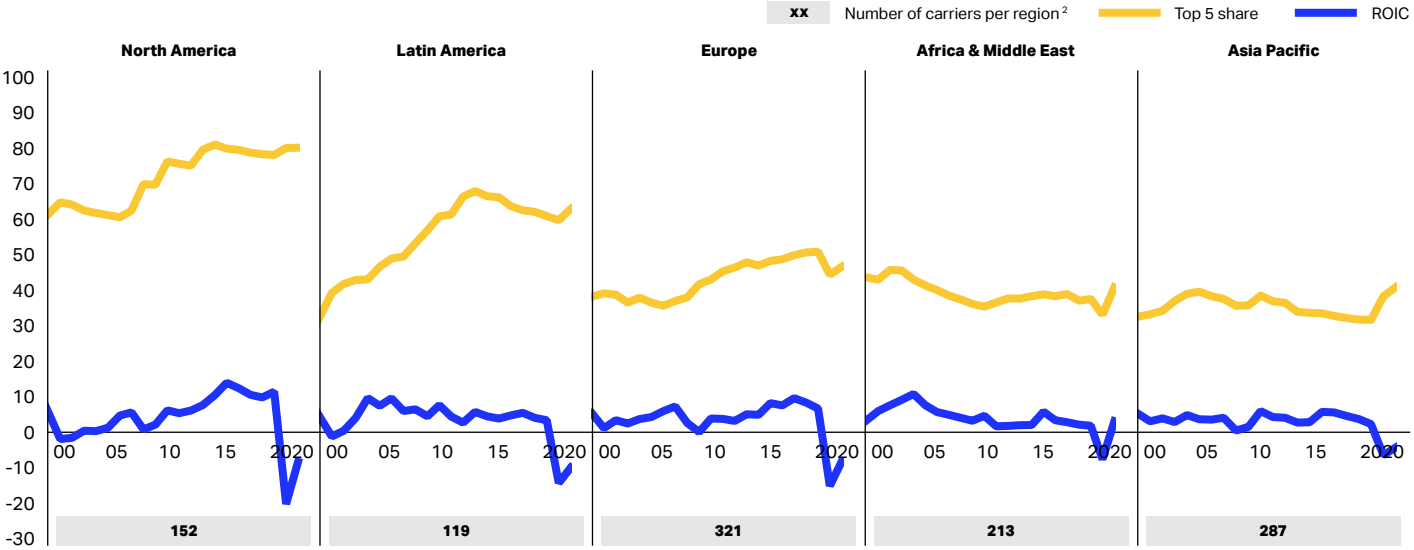


Source: McKinsey value chain modelling for IATA

Exhibit 9

North America showed most consolidation and best ROIC performance pre-pandemic

Top 5 airline group share of scheduled seats within region [1] versus airline ROIC ex goodwill by region, 2000-2021, %



1. North America seen as United States and Canada. Europe includes Turkey, Russia. Latin America includes Mexico.
2. Per August 2022. Individual active carriers.

Source: McKinsey value chain modeling for IATA; Diio mi

Airlines' largest operating cost component, jet fuel, showed considerable volatility during the pandemic. After initially dropping by approximately 40% year-on-year in 2020, prices increased by around 70% in 2021 and by another 43% in 2022, adding to cost pressure.

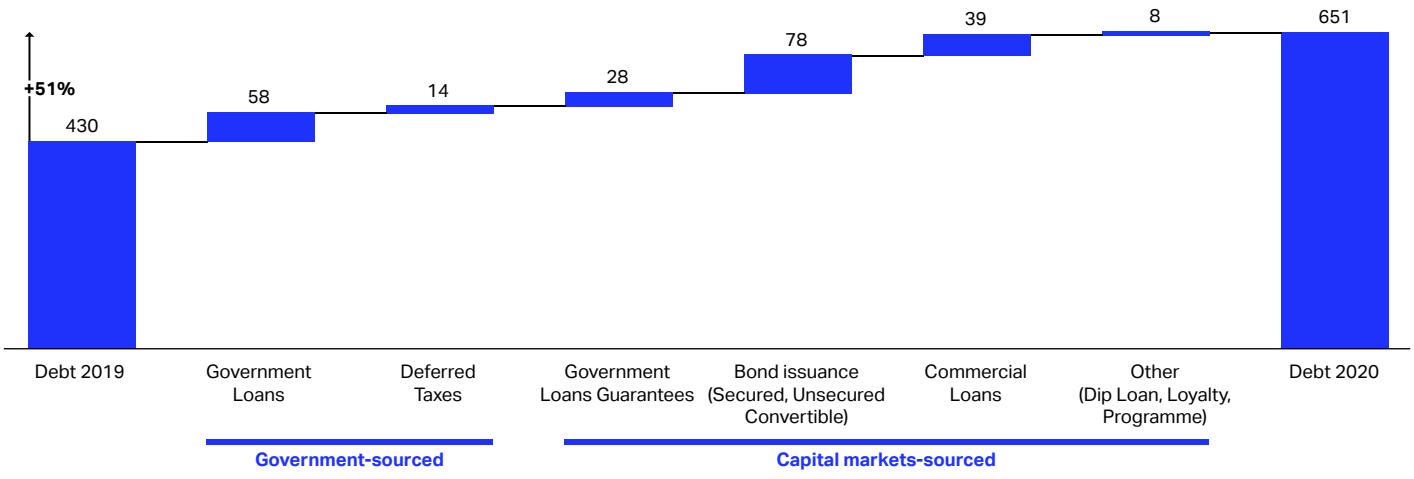
Given the historic impact of the pandemic on performance, the airline sector took on significant amounts of debt during COVID-19 (Exhibit 10). Only one third of the debt taken on in 2020 was supported by governments, showing remarkable access to credit markets in this time of crisis. Innovatively, multiple airlines used their frequent flyer programmes as collateral to secure new loans.

Nonetheless, the additional debt burden has seen credit scores move down several notches. The share of tracked airlines with a C or D rating increased from 5% to 29% between 2019 and 2021. The reduction in credit ratings could on average lift the cost of funds by 1 percentage point and add to the financial challenges ahead (Exhibit 11).

Exhibit 10

The airline industry became significantly more indebted during COVID-19

Estimated change in global airline sector debt, USD Billion

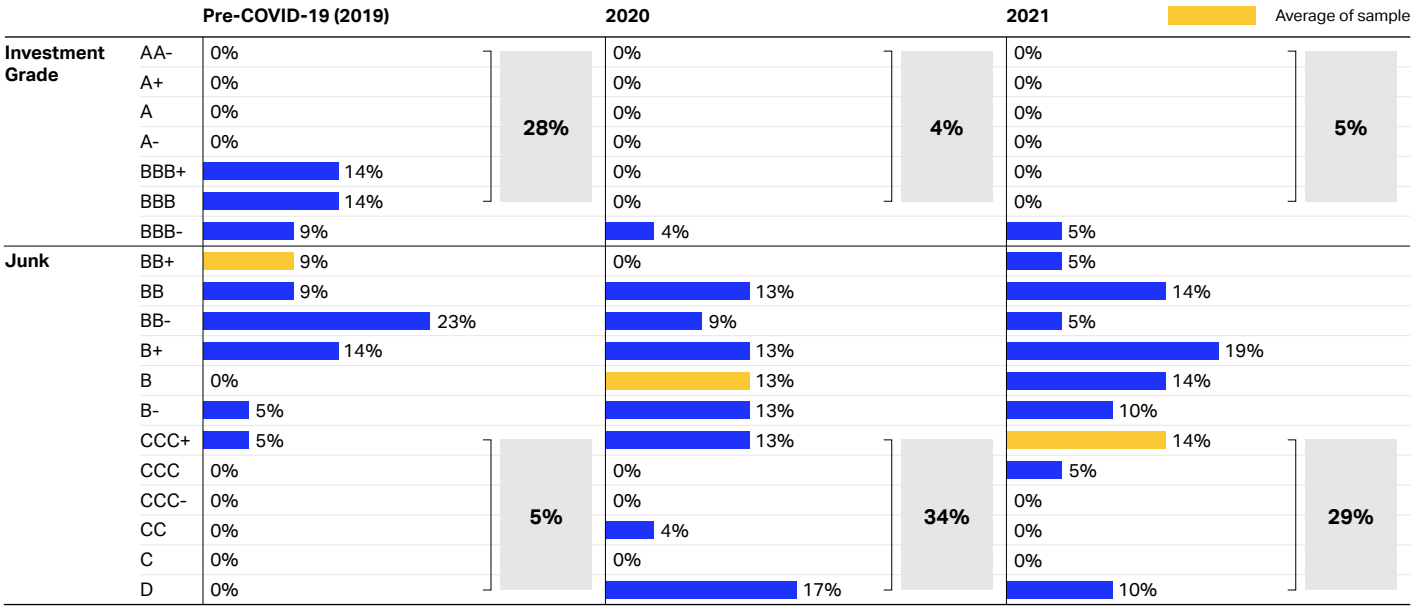


Source: IATA

Exhibit 11

Credit ratings worsened significantly during the pandemic

Airline industry distribution of credit ratings, share of S&P tracked airlines [1], %



1. Sample size — 2019: 22, 2020: 23, 2021: 21.

Source: S&P

Airports and air navigation service providers

Airports generated around USD 4 to 5 billion in annual economic profit between 2012-2019. Both airports' and airlines' ROIC fluctuated between 4% and 8%, but as airlines bear more risk and have a higher WACC, they generated economic losses over the same period [3]. If we were to exclude North American airports which operate on a utility-like not-for-profit basis, the airport ROIC globally is higher, varying as a function of regulatory regimes and till structures as well as revenues from non-aeronautical sources.

The pandemic drove airports' pre-COVID-19 positive ROIC of around 6% into negative territory in 2020 and 2021. Airports have broadly been more resilient than airlines in this respect (Exhibit 12). Airports faced drops in aeronautical revenues and passenger-related retail and services. Unsurprisingly, given the depth of the crisis, many airports both needed and received government support through COVID-19, which combined with continued inflows from real estate and other sources, lessened the impact of the crisis.

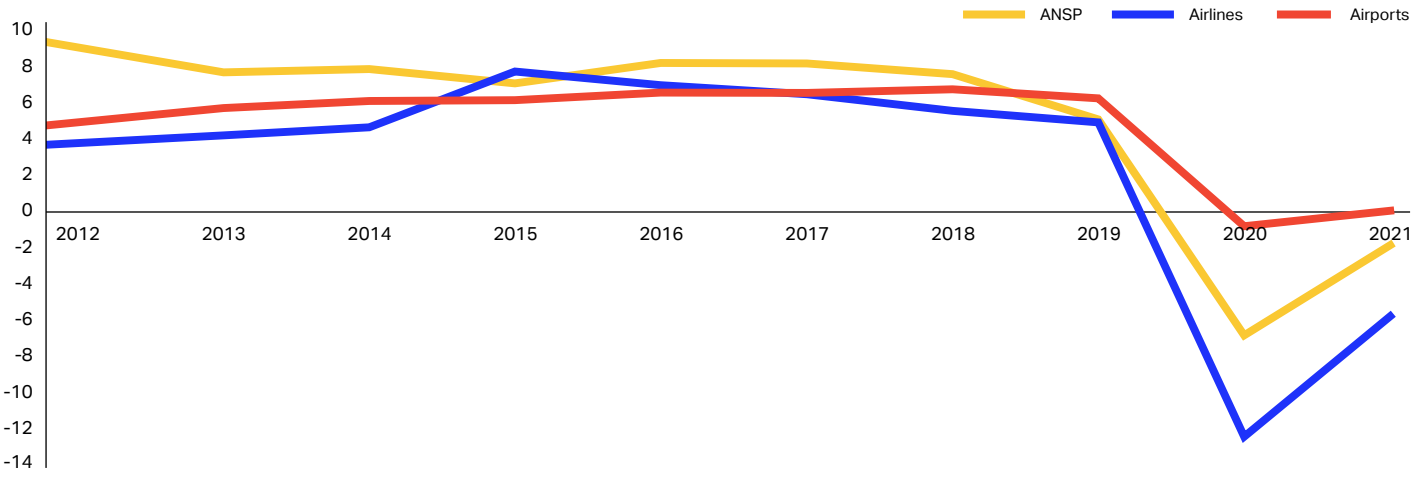
ANSPs are mostly government-run, though private in countries such as Canada and the United Kingdom. The sector is highly fragmented at the macro level, with many individual ANSPs, but highly concentrated at the local level, with typically one ANSP covering one country.

The ANSP sector reported profits above WACC levels pre-pandemic. ROIC for the sector was about 8% between 2012 and 2019 versus about 6% for airlines (Exhibit 12). ANSPs' ROIC in 2020 and 2021 dropped to about -7% and -2% respectively, given high fixed costs and overheads, and the reduced level of flight activity. In 2021, global scheduled flights were down approximately 36% compared to 2019.

Exhibit 12

ANSP and airport returns compared to airlines

ROIC, excluding goodwill, 2012-2021, %



Source: McKinsey value chain modelling for IATA

[3] McKinsey value chain modeling for IATA.

Original equipment manufacturers and lessors

The aircraft and engine OEM sector generated returns that outperformed airlines pre-pandemic, earning a ROIC of about 16% between 2012 and 2019 (Exhibit 13). As the pandemic hit, OEMs' ROIC fell to -26% in 2020 and -2% in 2021.

In 2020, global commercial aircraft orders were down 54% in 2019 but rebounded strongly by 154% year-on-year in 2021. This led to a relatively strong improvement in performance — albeit with negative economic profit — in 2021. Aircraft manufacturing is a consolidated, global market where companies also earn a return through after-market services. Entry barriers are high given the capital needs for aircraft programs and the considerable know-how and expertise involved. Aircraft programs are complex and lengthy, and some manufacturers have experienced production challenges in recent years, which dented profitability. There are some relatively new entrants in the market, particularly those that produce aircraft with fewer than 120 seats.

Lessors earned a return on equity of about 9% pre-pandemic. In 2020, returns fell to approximately 0% as lease rates plummeted and demand decreased. The leasing market has high barriers to entry but is fairly fragmented. Some consolidation has occurred, but new companies are entering the market as well. It is a sector where there is value in diversifying portfolios, to spread risk and tap into different growth rates. There have been some defaults, and some lessors underwent restructurings in recent years.

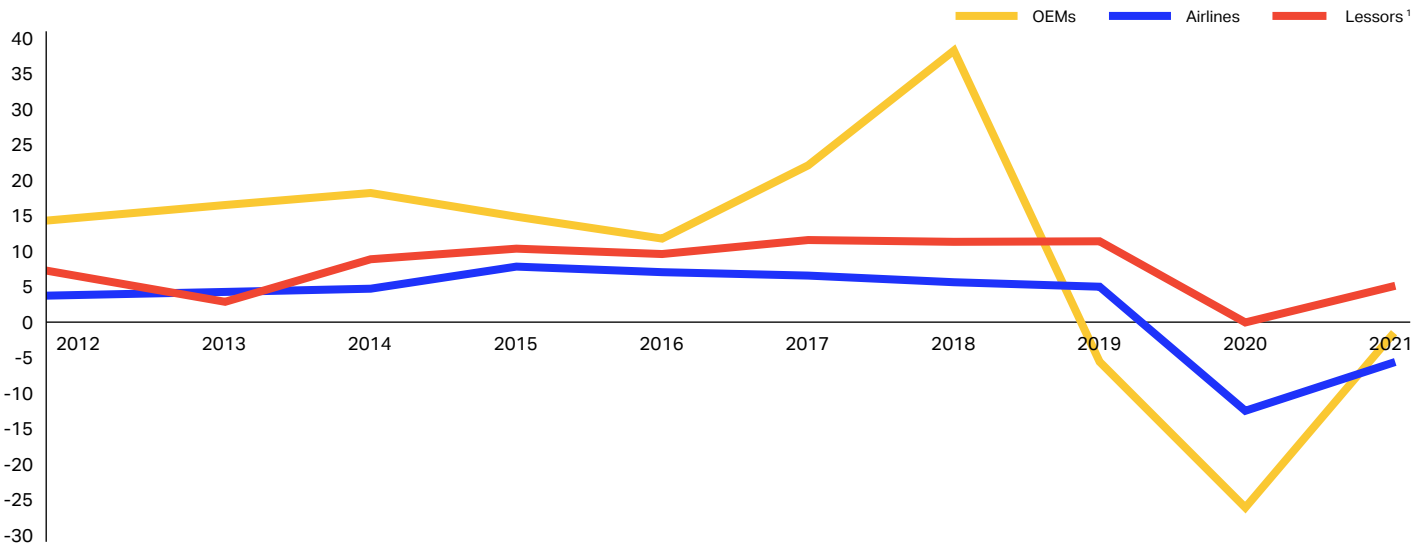
Lessors have seen their share of the commercial aircraft fleet grow over time. For narrowbody aircraft, the share of leased aircraft globally increased from 42% in 2010 to 51% in 2022, where for widebodies, the share grew from 27% to 35%. Over that period, airlines turned increasingly to leasing and to sale-and-leaseback solutions in order to limit equity requirements and gain some flexibility.

Overall, lessors bounced back strongly in 2021. The sector roughly halved its economic loss in 2021 though performance varies widely. Some airlines have renegotiated and restructured leases, for example adopting power-by-the-hour arrangements, especially those which went through a bankruptcy or court-led restructuring. Still, the majority of airlines have continued to pay leases, in some cases with a restructuring or deferral of payments.

Exhibit 13

OEM and lessor returns compared to airlines

ROIC, excluding goodwill, 2012-2021, %



1. ROE.

Source: McKinsey value chain modelling for IATA

Catering, ground handling and maintenance, repair and overhaul

Pre-pandemic, the catering, ground handling, and MRO sectors outperformed the airline sector consistently in terms of ROIC (Exhibit 14). Ground handlers' ROIC was approximately 16% between 2012 and 2019. When traffic dropped in 2020, ROIC fell to -7%. The sector recovered well compared to others in terms of ROIC improvement in 2021. Ground handlers' revenues are driven by passenger and freight volumes and the sector has lower fixed costs compared to other aviation sectors.

The catering sector's ROIC was approximately 20% between 2012 and 2019. Catering faces similar passenger-variable revenue streams and relatively low fixed costs as the ground handler sector, with labor representing a significant share of operating expenses. For both segments, the market at a global level appears fragmented, but is more concentrated at a local airport-specific level. There is ongoing consolidation activity.

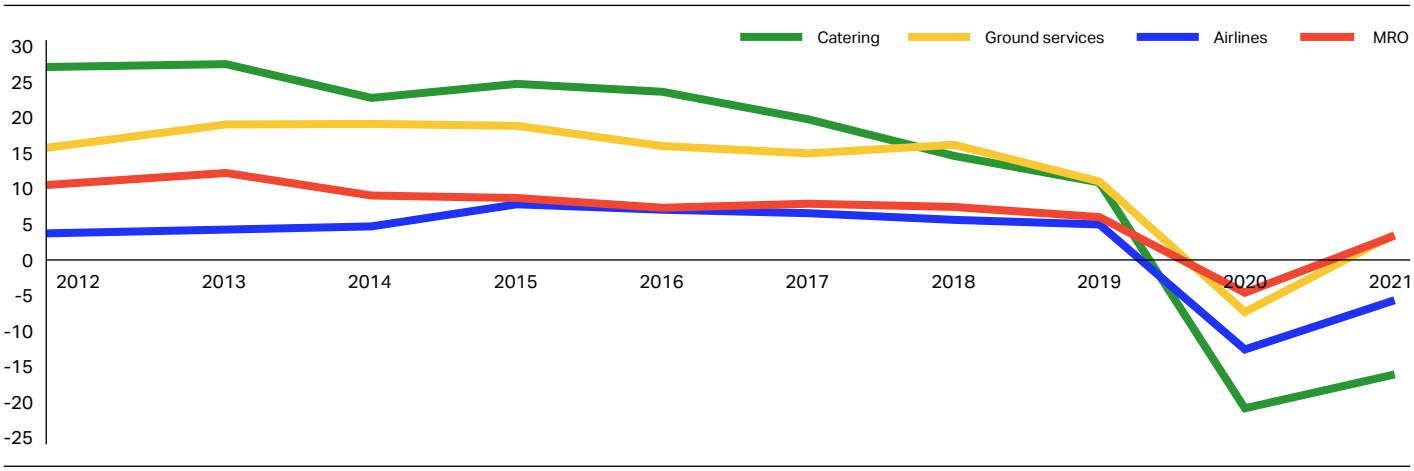
The global passenger volume, as core driver of caterers' revenue, fell by approximately 59% in 2020 and by 52% in 2021, versus 2019. Furthermore, long-haul passengers, who generate more catering revenue, showed a greater reduction. As a result, caterers' ROIC dropped to -21% in 2020 and -16% in 2021.

MROs fared better in 2021 compared to 2020, with a ROIC of 3% in 2021, up from -5% in 2020. At a global level, the market is fairly fragmented, but there are geographical and component-related niches where the landscape is more concentrated. MROs exhibit large structural differences by type of maintenance. Base maintenance on the air frames is mostly labor driven, with less differentiation across firms, where engine MRO is more concentrated and has significant OEM involvement. Line maintenance is highly fragmented with little opportunity for differentiation, but there can be local market concentration. Barriers to entry overall are relatively high given the technological know-how and certification required.

Exhibit 14

Catering, ground handling and MRO returns compared to airlines

ROIC, excluding goodwill, 2012-2021, %



Source: McKinsey value chain modelling for IATA

[4] https://www.iata.org/en/iata-repository/publications/economic-reports/airline-industry-economic-performance---june-2022---data-tables.

Global distribution systems – Travel tech

Pre-pandemic, GDSs were the best performing sector in the value chain on an economic margin basis, with ROIC significantly above the airline sector (Exhibit 15). There are high entry barriers on the distribution side, given the need to build out a global network of travel agencies and airlines. On the IT side, the core system is the passenger service system (PSS) which is mostly supplied by two organizations. This leads to a highly concentrated industry. Many airlines continue to depend on GDSs for broad reach in their distribution, particularly for high-value corporate traffic.

In 2020 and 2021 ROIC for the sector dropped significantly, to -16% and -8% respectively. The GDS sector's prime revenue source lies in segment-linked booking fees, but most companies have evolved into travel software ecosystem businesses that offer a broader array of services.

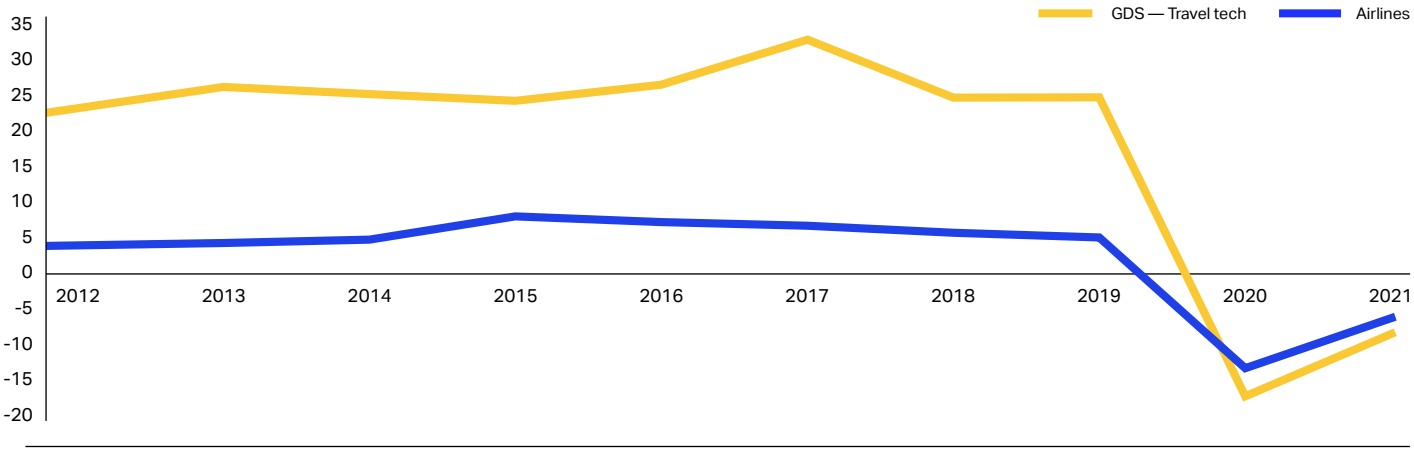
Through the pandemic, sales shifted towards online bookings through the airline.com and mobile channels, particularly as business-travel volumes were harder hit than leisure travel. To illustrate, the share of airline direct supplier online bookings in the United States increased from 50% in 2019 to 64% in 2021 [5], and globally from 39% to 48% (Exhibit 16).

Distribution will likely continue to be a dynamic sector as travel recovers post-COVID-19. Airlines may retain some of the direct distribution share even as international travel returns. IATA's New Distribution Capability (NDC) is transforming the way airlines distribute their products through GDS and beyond, and could also potentially lead to new commercial relationships.

Exhibit 15

GDS – Travel tech returns compared to airlines

ROIC, excluding goodwill, 2012-2021, %

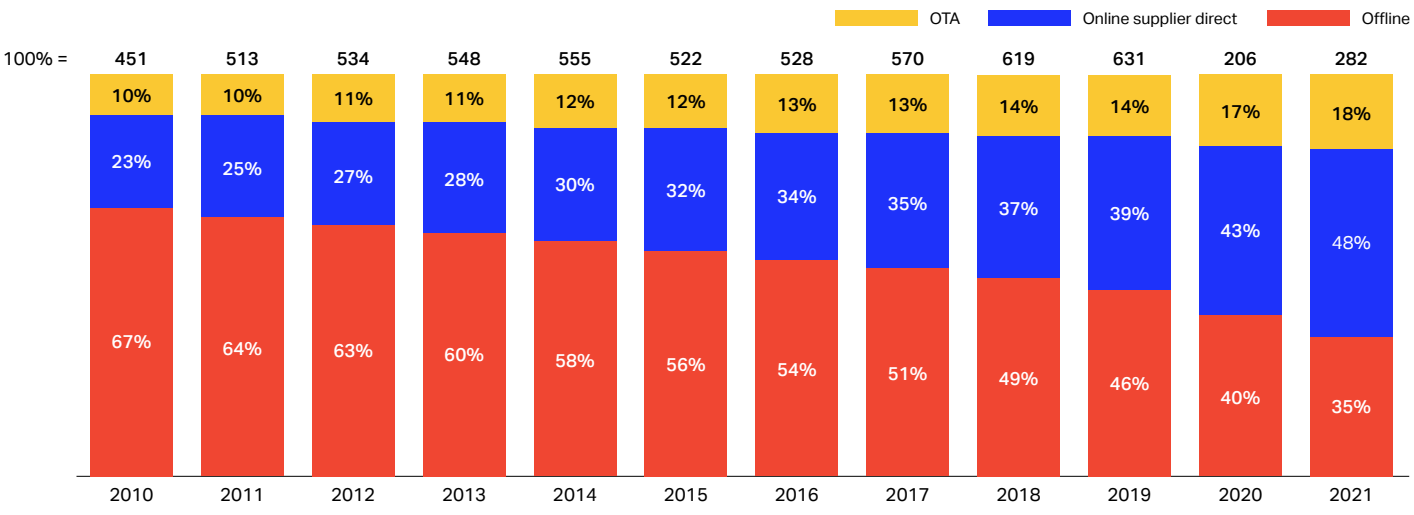


Source: McKinsey value chain modelling for IATA

Exhibit 16

During COVID-19 a larger share of bookings went through direct/online channels

Breakdown of airline gross bookings by channel, global, share of bookings, % and USD Billion



Source: PhocusWright

[5] PhocusWright US Airline Market Report 2021-25.

Cargo airlines and freight forwarders

Cargo was the only bright spot for the value chain in 2020 and 2021 (Exhibit 17). Of the nine airlines that were value creating in 2021, seven had significant or fully cargo-driven operations. Going forward, cargo yields are expected to remain elevated, and come down gradually as more belly capacity is reinstated.

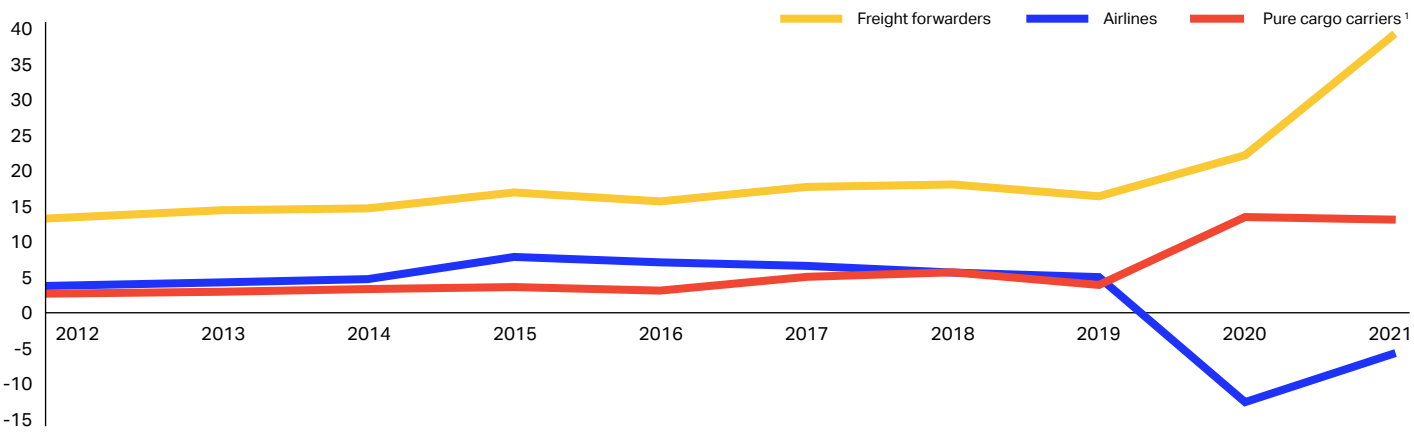
Freight forwarders play an important role in air freight, with approximately 80% of air cargo volumes being handled by this sector. It is a fragmented sector, with the top companies accounting for around 35% of sector revenue, but there is consolidation activity. Freight forwarding has a highly variable cost base and started out as an asset-light business. As the industry developed, the need increased to develop more sophisticated IT and offer, amongst others, tracking systems. Most forwarders now offer certain logistics services as well – warehousing and consolidation, for instance. Larger players differentiate themselves through sales and support infrastructure globally to service larger shippers, and can secure access to airline capacity at preferential terms. Thus, over time, the sector has become harder to enter.

That said, forwarders are still flexible businesses, with high capital turnover. The average revenue per invested dollar of capital was approximately USD 4.1, versus USD 0.9 for the airline sector in 2019. During 2012 to 2019, freight forwarder ROIC averaged approximately 16%. As profitability is linked with air cargo volumes and freight rates, performance improved significantly during the pandemic, with ROIC moving to 22% in 2020 and 39% in 2021.

Exhibit 17

Freight forwarder and cargo carrier returns compared to airlines

ROIC, excluding goodwill, 2012-2021, %



1. Full freighter pure play carriers only.

Source: McKinsey value chain modelling for IATA

Value chain dynamics

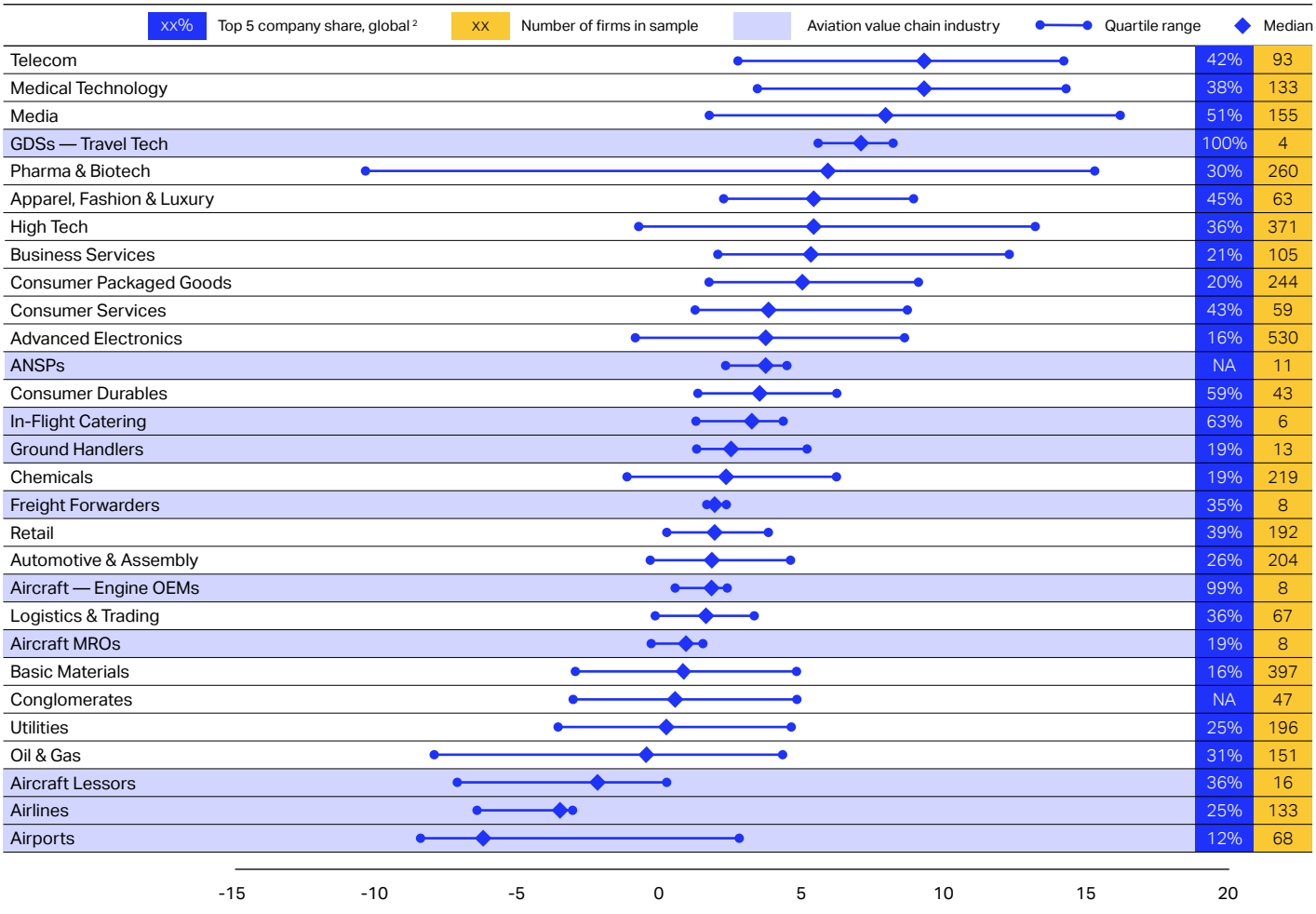
There is a great disparity of returns across the air transport value chain, where some links in the chain can be compared to the most profitable industries in other sectors, and other links struggle to keep up with the utilities sector (Exhibit 18). Airlines in particular have underperformed, and this has its roots in several factors: low entry and high exit barriers, a high share of fixed costs, high sensitivity to external demand shocks, a fragmented industry, and a more concentrated supplier landscape, to name a few. This creates a highly challenging environment and has to led to uneven distribution of profits across the value chain.

The degree of global fragmentation, measured here through the share of sector revenue accounted for by the top 5 companies, differs significantly between sectors, as does the degree to which sectors compete globally. With some sectors, such as airports, ground handlers and caterers, the global degree of fragmentation can differ from the local picture at a particular city.

Exhibit 18

Performance across the aviation value chain compared to other sectors over the past 20 years

Economic profit margin quartile range by industry [1], ex goodwill, 2002-2021, select industries, %



1. Data set includes global top 5000 companies by market cap in 2021, excluding insurance and banks.
2. Indicative and for entire industry. Top 5 share will differ based on segments within industries (e.g., Chemicals consists of many different sub-industries, not all chemicals players are active in all). OEMs: top 5 OEM share of 2019 value of produced aircraft. Lessors: top 5 lessor share of leased fleet value Q4 2021. Airports: top 5 airport group revenue share out of total 2019 market size. Catering: top 5 caterer share of 2019 total market revenue. Ground: top 5 share of 2019 market revenue. Airlines: top 5 airline group revenue share out of total 2019 industry revenue. Freight Forwarders: top 5 air forwarder revenue share. All other sectors: share of top 5 2021 as share of total revenue in sector based on global top 5000 companies by market cap.

Source: McKinsey Corporate Performance Analytics; Cirium; Value Chain Model; Company reports; Airports Council International; Teal

In 2011, IATA worked with Harvard Business School's Professor Michael Porter to examine the forces acting upon the airline sector and their influence on the sector's profitability. Exhibit 19 illustrates Porter's framework with updated content.

More than a decade since this research, and after the largest crisis the sector has ever seen, the question arises whether these forces have truly changed. The answer is likely no. Bargaining power of suppliers continues to be high. The threat of substitutes remains, and in fact increased during the pandemic given the surge in availability, acceptance, and use of online meeting tools.

Barriers to entry remain relatively low and barriers to exit high. COVID-19 saw an uptick in airline start-ups. In 2019, 42 airlines began service, followed by 57 in 2021. New entrants were attracted into a sector by the availability of cheaper second-hand aircraft and leases, and availability of skilled pilots. There were also few bankruptcies through COVID-19. Barriers to exit remained high with various carriers receiving life support from their stakeholders. COVID-19 did not result in as large a reduction in carriers as may have been expected. In 2019, 59 airlines ceased operations, and this number decreased to 53 in 2020, and 33 in 2021.

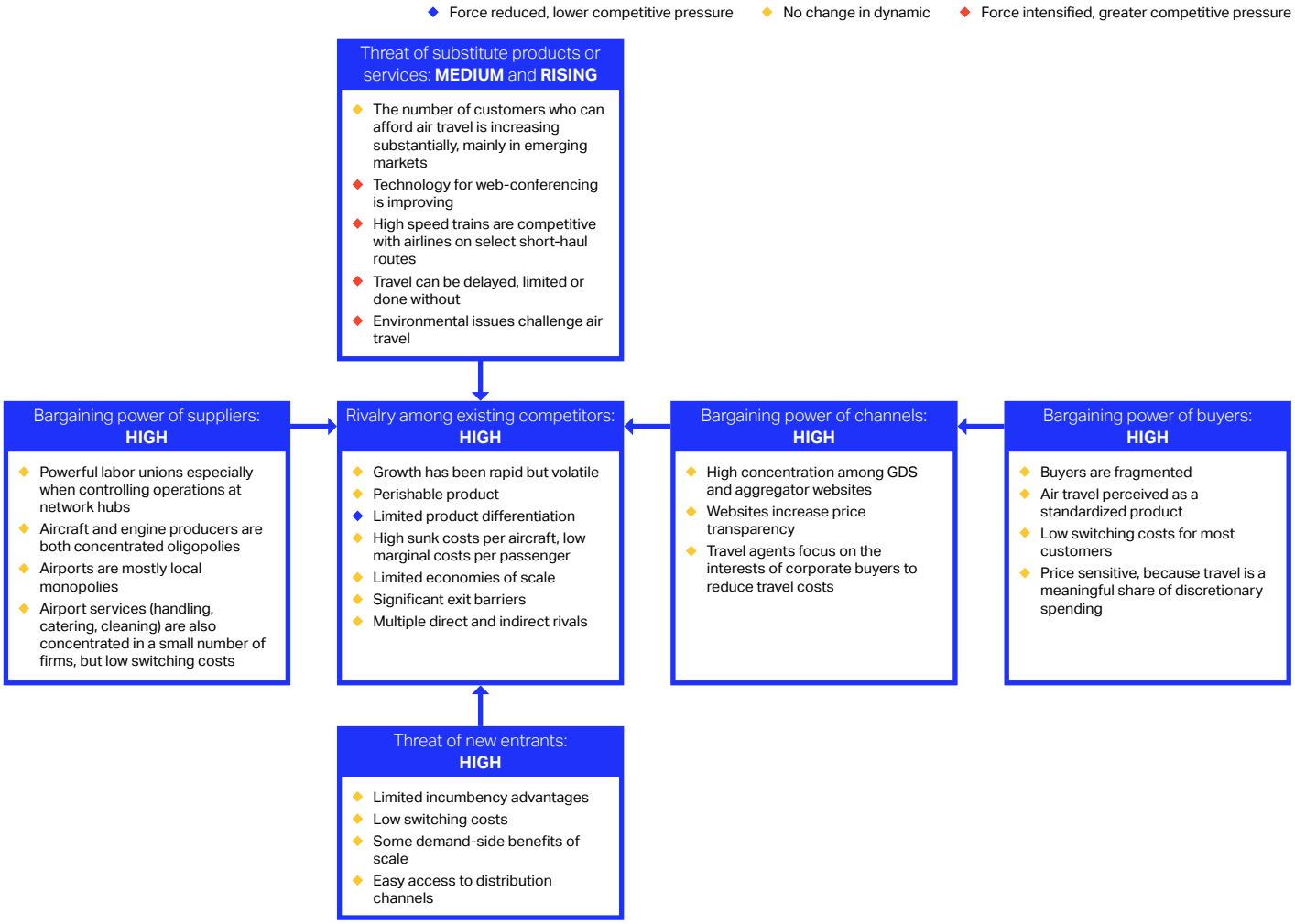
Price transparency has increased further with the rise of online travel agents and metasearch comparison websites. On the supplier side, the strength of labor remains — with significant unionization. Airport privatization has continued.

Additionally, all aviation sectors operate in a highly regulated environment. This not only relates to safety, but also to economic performance. Most countries have ownership limits in place for airlines, capping foreign ownership of local airlines, for instance to 25% in the US and 49% in Europe. This has the effect of limiting the free flow of capital and adding a barrier to cross-border consolidation. As such, airlines do not operate in a policy vacuum.

Exhibit 19

Competitive forces shaping the airline sector have arguably not changed or have intensified

Degree of change observed in competitive forces for the airline sector since 2011 [1]



1. In 2011 this five forces analysis was originally done by Michael Porter for IATA.

Source: McKinsey and IATA update based on original from Professor Michael Porter, 2011

Expanding the value created by all value chain participants

While we focus on economic value in this report, aviation provides significant value in other forms. Worldwide, pre-COVID-19, aviation enabled 4.5 billion passengers to take to the air, creating new connections and reuniting families. Aviation supported around 88 million jobs directly, and accounted for just over 4% of global economic activity. Aviation generates positive externalities, especially for countries and cities which are home to major aviation hubs, while providing an essential service in locations with poor connectivity to the global economy, and often life-saving services during the pandemic.

The sectors making up the aviation value chain each contribute to the total economic value added. The airline sector is at the center of the value chain and its revenue flows (Exhibit 20).

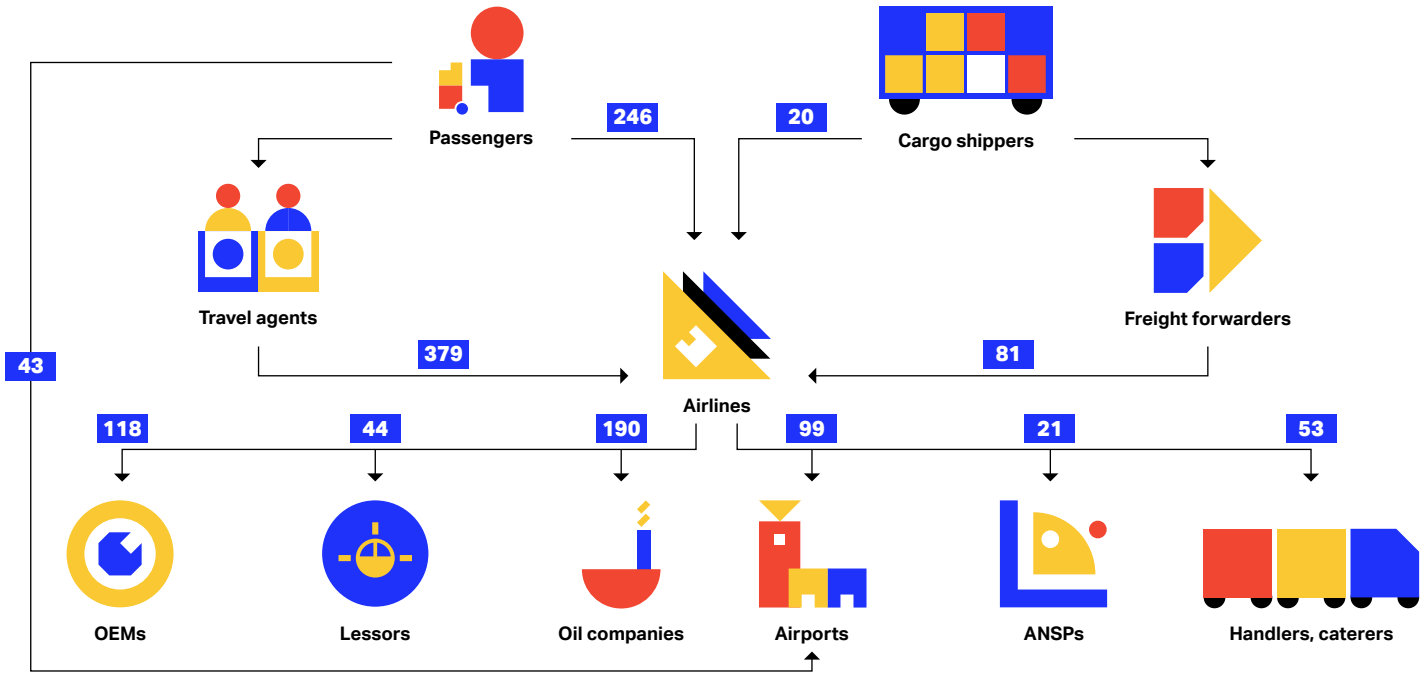
The airline sector remains a highly challenging industry where shareholders are not rewarded with the minimum return they should expect based on the risk profile of their investment. The aviation value chain was negatively impacted by the pandemic — and airlines fared the worst. However, even before the pandemic, airlines were the only value chain sector where investors did not get a return above the cost of capital over a prolonged period.

What could be done to strengthen the value chain for everyone? Companies across the value chain could consider various actions to enhance the performance of the value chain as a whole, and ensure financial sustainability for all. To the extent that the chain is only as strong as its weakest link, all actors have an interest in one another's ability to perform.

Exhibit 20

Illustrative flow of revenues within the aviation value chain

Indicative revenue flows within the aviation sector, 2019, USD Billions



Source: McKinsey

Improving service and reliability by working together across the value chain, thus attracting more customers

Individual companies across the value chain are customers and suppliers to companies in other aviation sectors, and together they are partners in the fulfilment of the customer journey. There is an opportunity for greater value chain collaboration to enhance the experience for customers, thereby improving the results for all involved. Examples could include joint mapping of full customer journeys, including current challenges and where these occur, involving all sectors that influence the customer journey so it can be improved holistically, rather than by one party at a time. If the value chain can work together to improve reliability and comfort throughout the journey, demand could rise.

As the value chain participant who contracts directly with the passenger, airlines are at the center of the customer relationship. However, airlines rely on airports, handlers, caterers and others to bring the journey to completion (Exhibit 21). Delays are a significant source of frustration for customers, and the responsibility for them is shared across the value chain. Airlines are responsible for, amongst others, aircraft turnarounds between flights, technical and crew performance. However, delays are often under the purview of air traffic control, security, and airport conditions, in addition to the weather, the effects of which could sometimes be reduced with corrective action by the airports or the national aviation administration. Ensuring that security checks are smooth, frees up time for passengers to spend in the airports, boosting retail. Swift baggage reclaim helps make a passenger's onward journey hassle-free. Enhanced collaboration can only bring benefits to all parts of the value chain who depend upon the passengers airlines fly.

Exhibit 21

Airlines do not own the full end-to-end customer journey — cooperation required to optimize customer experience

✓ Airline owned ✓ Airline partially owned ✗ Not airline owned

Journey	Travel Inspiration	Shop & Purchase	Prepare to travel	To Airport	Airport Experience	In-flight	Arrival and On-trip	Post-trip	Lifestyle Engagement
Sub-journey	Desire/Need ✗	Research flight ✓	Research destination ✗	Transport ✗	Check bags ✗	Entertainment ✓	Deplaning ✓	Customer follow-ups ✓	Loyalty programs ✓
	Research destination ✓	Purchase flight ✓	Book other (car, hotel…) ✗	Parking ✗	Security ✗	Seating and aircraft configuration ✓	Immigration ✗	IROPS [1] recovery ✓	Partnerships ✓
	Promotions ✓		Arrange travel documents ✗	IROPS [1] early communication ✓	Airport navigation ✗	Refreshments and meals ✓	Connections ✗		Credit cards ✗
			Pack ✗		Shop and dine ✗	IROPS [1] mitigation ✓	Baggage claim ✗		
			Make departure arrangements ✗		Wait at gate ✓		Customs ✗		
			Check-in for flight ✓		IROPS [1] recovery ✓		Transport ✗		

1. IROPs are Irregular Operations, i.e. extraordinary situations in which a flight does not operate as scheduled.

Source: McKinsey

Pursuing opportunities for greater data and insights sharing across the value chain

Companies within the value chain are starting to put the data-rich environment in which they operate to greater use by, for instance, using advanced data techniques to provide more tailored offers to customers, or to engage in predictive maintenance. Beyond this, there is an opportunity for greater sharing of data and insights across the value chain. This could include enhanced data sharing between airlines, airports, and handlers about expected volumes — leading to better short-term projections and enhanced operational planning at airports. Initiatives such as airport collaborative decision-making (A-CDM) could be further rolled out to enhance joint performance of the value chain and the passenger experience. A-CDM's focus lies on improving the efficiency and resilience of airport operations by encouraging airlines, airports, handlers and ANSPs to collaborate more and to exchange accurate and timely data and insights.

Removing inefficiencies in the value chain

Tackling inefficiencies could enhance performance for the whole chain. For example, longer than necessary flight paths within regions lead to air traffic control (ATC) inefficiencies, additional fuel burn, and associated climate impact. The European ATC body Eurocontrol indicates that flights in Europe use, on average, between 9% and 11% more fuel than the most efficient flight routes. Improvement initiatives, such as Europe's Single European Sky, can help address these inefficiencies, boost profitability, and reduce CO_2 emissions for all participants in the value chain.

Working together on decarbonization

Decarbonization is the prime challenge at this time. Moving the airline industry to net zero by 2050 requires significant innovation and value chain cooperation, potentially through novel forms of collaboration. Sustainable aviation fuel (SAF) will play a major role in airlines' path to net-zero operations but announced supply does not equal expected demand. Decarbonization is a challenge that will require the value chain working together to solve. The industry needs fuel suppliers to invest in capacity — likely backed with commitments from airlines and with support and incentives from governments.

Airports need to develop a new fueling infrastructure, must decarbonize their own operations, and give passengers low-carbon onward ground transport choices. Handlers and caterers need to work with their host airports, to electrify and improve energy efficiency. Airframe and engine OEMs need to develop ever-cleaner technologies such as hydrogen-powered flight. ANSPs must innovate to reduce emissions on conventional flights, while adapting regulations to permit new forms of transport, such as eVTOL services.

The investment needed is significant, and it will take everyone working together to get aviation to net zero.

Collaborating to meet ever-changing demand in customer segments

Airlines and their value chain partners face ever-changing patterns of customer demand and do adapt their business models to such evolutions. The more a market matures, the more differentiated demand tends to become. Certain trends might have been accelerated because of the pandemic. To be sure, working from home has impacted the entire transportation sector in multiple ways. For airlines, this has spread out demand for flights over the week in many cases. Much speculation abounds regarding business travel in the post-COVID-19 world, but the jury is still out on whether lowered demand will be anything but transitory.

On the other hand, business travelers might opt more often for economy-class travel, certainly on shorter flights. Leisure travelers have been seen to chose business class for their holiday trips. Hence, there is a fluidity among market segments and demand morphs constantly along the spectrum from the ultra-low-cost option to first-class travel and private jets.

In response to changing customer demand, airline business models have become much more hybrid. Today, few airlines are "pure" in the original sense of the terms "low-cost" or "network" carriers, as both have borrowed from each other and adapted their offering. It is vital for customer-welfare maximization that the regulatory environment fosters competition, innovation, and sustainability, not only in aviation but across all modes of transportation. Consumers will then optimize their choices and the transportation sector will be more efficient [6].

Enhancing resilience and robustness

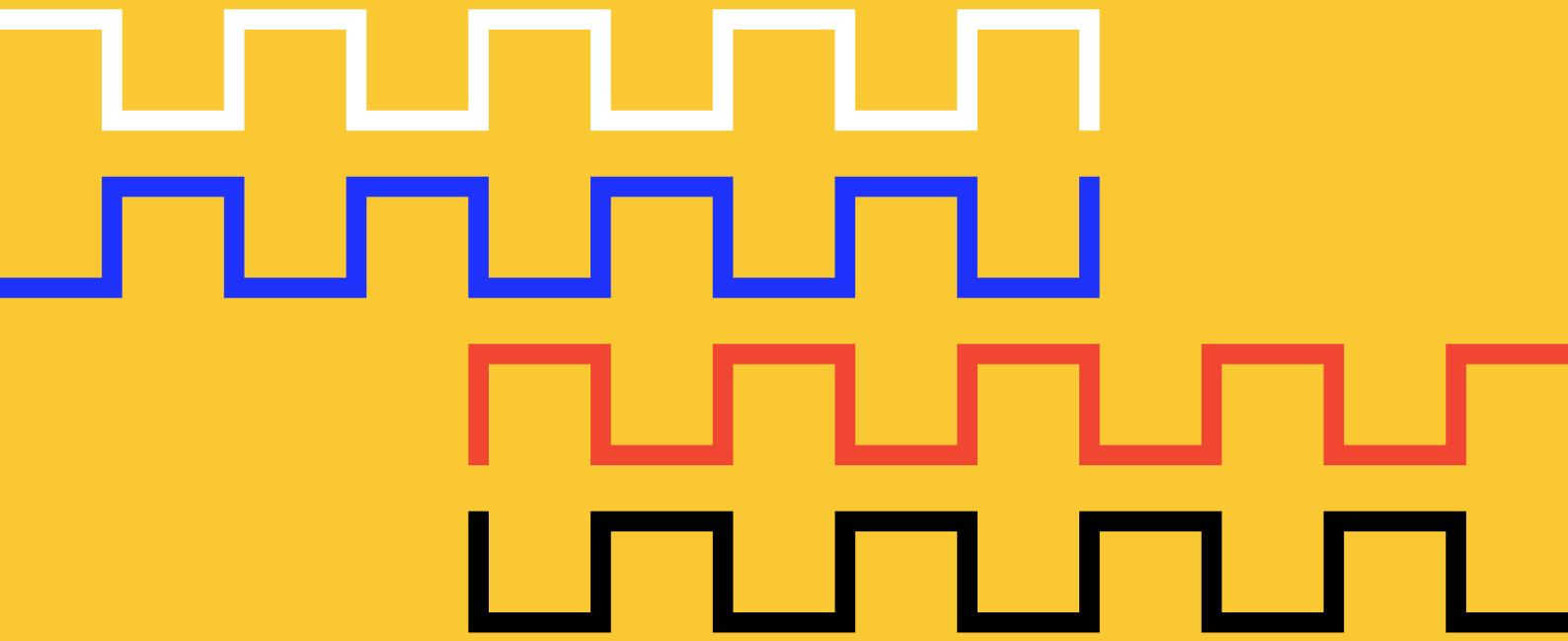
Airlines have proved to be resilient, having bounced back, for the most part, from the multiple crises the world has seen since the inception of the industry. What arguably is less of a feature among airlines is robustness, i.e. the ability to avoid falling over in the first place. Robustness can be enhanced through creating more diverse revenue streams, in addition to the habitual attention to costs. This might involve vertical and horizontal integration when that is possible, maybe even beyond the aviation value chain. Achieving robustness likely necessitates discipline in terms of capacity expansion, and a strengthening of alliances and collaboration among the airlines. In essence, the goal must be not only to grow, but to grow profitably and sustainably, in order to limit the impacts of various crises on the airline industry and the aviation value chain.

[6] "One Size does not Fit All: A Study of how Airline Business Models have evolved to meet Demand in Europe", IATA, November 2022.

Conclusion

Aviation provides significant benefits to the broader economy. Pre-pandemic, the aviation value chain overall did not generate the economic returns its investors expect. This was led primarily by the large economic losses of the core sector, airlines, which remain in a challenging market structure and context. COVID-19 led to significant value loss for all sectors, apart from cargo-focused ones.

As aviation emerges from the pandemic, there is an opportunity to expand the value created for all participants in the value chain. This requires performance improvement within each sector and also requires greater collaboration and fresh ways of working across partners in the value chain.



Annex A: Definitions

Definitions

	Definitions	Calculation methodology
ROIC	• 'Return on invested capital' (ROIC) measures the operating performance of the company • Calculation excludes goodwill (= amount paid over book value in an acquisition)	• ROIC = NOPLAT/end of year operating invested capital • Used end of year values to avoid discrepancies due to M&A, perimeter or accounting changes
Invested capital	• Invested capital (IC) represents the amount invested in the operations of the business • Adjusted for operating leases (if applicable)	• IC = Operating working capital + net PP&E [1] + net other operating assets • Before lease accounting change (IFRS16/ASC842): Operating leases capitalized using 7.3x factor, in line with industry practices (typically 7-8x); post accounting change RoU asset included in PP&E
NOPLAT	• After tax operating profit, adjusted for operating leases	• NOPLAT = Adjusted EBITA [2] – Taxes • Taxes based on marginal tax rate, differentiated per country • Before IFRS16/ASC842: profit is adjusted for leases (interest component of lease expense added back to EBITA; assuming 7% interest rate)
Economic profit	• "Excess profit" earned above the cost of capital, expressed in USD million p.a. • Economic profit **spread** • Economic profit **margin**	• = (ROIC-WACC) * Invested Capital • = ROIC-WACC • = Economic Profit/Revenues
WACC	• Opportunity cost of funds invested	• WACC = Cost of equity * equity weight + (after tax) Cost of Debt * debt weight

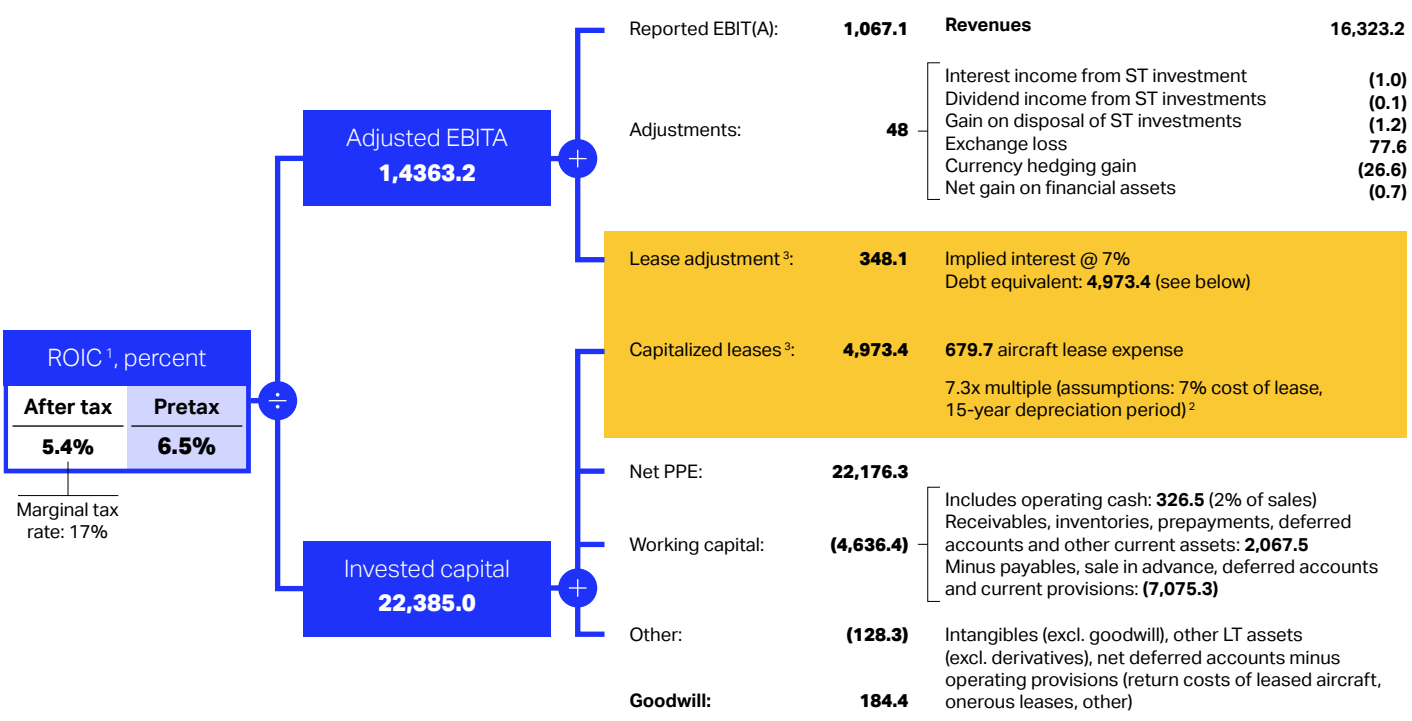
1. PP&E =Property, Plant & Equipment; includes Right of use asset post IFRS16/ASC842 implementation.
2. EBITA = Earning before Interest, Taxes and goodwill Amortization.

Source: McKinsey value chain modelling for IATA

Annex B: Example ROIC calculation

Example ROIC calculation — illustrative carrier

Local currency millions



1. Adjusted for operating leases, including goodwill.
2. Capitalization multiple: 1/(1/Depreciation period + Cost of lease).
3. For companies reporting under IFRS16 or ASC842, no adjustment made to operating profit and capitalized leases replaced with published Right of Use Asset.

Source: McKinsey value chain modelling for IATA

Annex C: WACC estimates

It is important to note that the weighted average cost of capital (WACC) used in this analysis is the opportunity cost for investors. It does not measure the actual cost of capital for the individual companies, but rather what 'financially minded' investors would expect to earn on an asset with similar risk characteristics.

To estimate WACC, the following formula is applied:

Nominal post-tax WACC = cost of equity × (1 − gearing) + cost of debt × gearing

where gearing = **debt / (debt + equity)**.

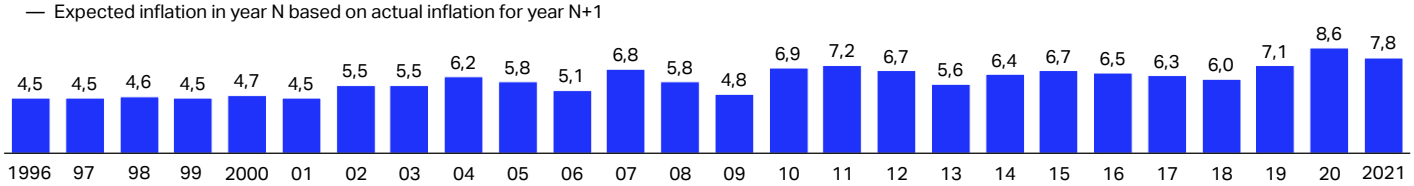
The cost of equity is estimated using the standard Capital Asset Pricing Model (CAPM) and is equal to the risk free rate plus a risk premium:

Cost of equity = risk free rate + re-leveraged equity beta × equity market risk premium

with re-leveraged equity beta = **(asset beta − debt beta × gearing) / (1 − gearing)**.

WACC methodology: Cost of equity

- **Market Risk Premium (MRP):**
  - MRP estimated each year to maintain (real) cost of equity around estimated long term average of 7%
  - MRP = (7% + Expected inflation) - Risk Free Rate
  - Expected inflation in year N based on actual inflation for year N+1



- **Risk Free Rates (RF):** Nominal year-end 10-year US rates for all airlines
  - US government rate is the only 'risk free' rate; all calculations made in USD; consistent with MRP
  - Value observed as of 31/12/xx
- **Asset Betas:** Airline (0.80); Airport (0.55); ANSP (0.40); Catering (0.70); CRS (1.30); Freight Forwarders (0.80); Ground services (0.70); Leasing (1.10); Maintenance (0.70); Manufacturers (1.10)
- **Debt Betas:** Based on rating: AAA/BBB- (0.15); BB+/B+ (0.20); B/B- (0.25); CCC and below (0.30)
- **Target Debt/Equity (D/E), Airlines:** Based on ratings; AAA/A- (60/40); BBB+/BBB- (67/33); BB+/BB- (71/29); B+/B- (75/25); CCC (80/20), CC/-D (82/18). Estimate based on S&P credit ratios and observed values
- **Target Debt/Equity for other sectors:** Airport (200%); ANSP (80%); Catering (50%); GDS (20%); Freight Forwarders (80); Ground services (50%); Maintenance (20%); Manufacturers (15%)

The cost of debt is the post-tax return on investing in the debt. The following formula is applied:

Cost of debt = (risk free rate + debt premium) × (1 − corporate tax rate).

It varies by company specific debt premiums (based on estimated credit risk) and by country specific marginal tax rates. As noted above, this does not represent the actual cost of debt for individual companies, but rather the return an investor would earn by investing in debt with that company/sector's credit risk characteristics.

WACC methodology: Cost of debt

Risk Free Rate: 10-year **US government** rate

Tax Rates: Marginal tax rates from the country of origin

Debt Premium based on estimated credit rating:

Credit spread: Last 5-year rolling average; estimated by multiplying observed credit spreads by adjustment factor (to take into account implied probability of default for lower credits):

- Observed spreads: Difference between yield to maturity for a basket of similarly rated 10-year company bonds (e.g., AAA, AA, A, BBB, etc.) and yield to maturity of comparable 10-year government bond
- Adjustment factor applied to BBB and below ratings, based on implied probability of default and expected loss rate
- Capped for lower credit: highest possible spread is equal to MRP

Credit rating: Actual rating else, estimated based on financial ratios:

- Airlines: EBITDAR margin, Net Debt/EBITDAR, EBITDAR/Fixed charges, EBIT/Interest, Age of fleet
- Airports: EBITDA/Gross interest
- Others: EBITDA/Gross interest or typical industry rating for all non rated companies

Annex D: Companies included in the analysis

Airlines

The airlines studied in the analysis represent approximately 85% of the global airline sector revenue pool. To compute sector aggregates for ROIC and economic profit, the sample of airlines studied is scaled up using its proportion of regional sector revenues, and this is subsequently summed up to a global estimate.

Companies included:

Europe	North America	Asia Pacific	Rest of World
Aegean Airlines	ABX Air, Inc.	Air Astana	Aerolineas Argentinas
Aer Lingus	Air Canada	Air China	Aeromexico
Aeroflot	Air Transport Services Group (ATSG)	Air India	Air Arabia
Air Berlin (up to 2016)	Alaska Air	Air New Zealand	Air Mauritius (up to 2018)
Air Europa	Allegiant Travel	AirAsia	Avianca Holdings
Air France	American Airlines	AirAsia India	Azul
Air Italy (up to 2018)	Atlas Air Worldwide	AirAsia X	Comair Limited
AirBridgeCargo	Cargojet Airways	All Nippon Airlines	COPA Holdings
Alitalia (up to 2015)	Delta Airlines	Asiana	Egyptair
Austrian Airlines	Evergreen International Airlines	Bangkok airways	El Al Israel Airlines
Blue Panorama	Frontier	Cathay Pacific	Emirates
British Airways	Hawaiian	Cebu Pacific	Ethiopian Airlines
Brussels Airlines	Jetblue	China Airlines	Etihad (up to 2014)
Cargolux	Kalitta Air	China Eastern	FlyDubai
Czech Airlines	Mesa Airlines	China Southern Airlines	GOL Linhas Aereas Inteligent
Easyjet	Polar Air Cargo	EVA Airways	Interjet
Finnair	Republic Airways	Garuda Indonesia	Jazeera Airways
Flybe (up to 2017)	Skywest	Go First	Kenya Airways
Iberia	Southwest Airlines	Hainan airlines	Kuwait Airways
Icelandair	Spirit Airlines	Hong Kong Airlines	LATAM
KLM	United Airlines	Indigo (Interglobe aviation)	MiddleEast Airlines
LOT Polish Airlines	US Airways	Japan Airlines	Oman Air (up to 2017)
Lufthansa	Virgin America (up to 2015)	Jet Airways (up to 2017)	Qatar Airways
Norwegian Air Shuttle	Westjet	Juneyao	Royal Air Maroc (up to 2018)
Pegasus Airlines		Korean Airlines	Royal Jordanian
Primera Air Scandinavia (up to 2017)		Malaysian Airlines	South African Airways (up to 2018)
Ryanair		Nok Air	Tunisair (up to 2017)
S7 airlines		Pakistan International Airlines	VivaAerobus
Scandinavian Airlines (SAS)		Philippine Airlines	Volaris
Swiss International		Qantas	
TAP Air Portugal		Shandong Airlines	
Turk Hava Yollari		Shenzhen Airlines	
Virgin Atlantic Airways		SIA Group	
Volotea		Sichuan Airlines	
Vueling		Skymark	
Wizz Air		Spicejet	
WOW Air (up to 2017)		Spring Airlines	
		Sri Lankan airlines	
		Thai Airways	
		Vietjet Air	
		Vietnam Airlines	
		Virgin Blue/Virgin Australia	
		Vistara	

Airports

The airports studied in the analysis represent between 30% and 40% of the global airport sector revenue pool. To compute sector aggregates for ROIC and economic profit, the sample of airports studied is scaled up using its proportion of regional sector revenues, and this is subsequently summed up to a global estimate.

Companies included:

Europe	North America	Asia Pacific	Rest of World
Aena	Atlanta	Airports Corporation of Vietnam	ACSA
Aéroport de Beauvais-Tillé	Chicago Midway	Airports of Thailand	Aeropuerto de Tocumen
Aéroport de Bordeaux - Mérignac	Chicago O'Hare	Angkasa Pura I	Aeropuertos Argentina 2000 (up to 2014)
Aéroport de Lyon-Saint-Exupéry	Dallas Fort Worth	Angkasa Pura II	Corporacion America Airports
Aéroport de Nice-Côte d'Azur	Denver	Auckland International Airport	Grupo Aeroportuario del Centro Norte (OMA)
Aéroport de Toulouse-Blagnac	Las Vegas Airport	Beijing Capital International Airport	Grupo Aeroportuario del Pacífico (GAP)
Aeroport Marseille Provence	Los Angeles World Airports	Changi	Grupo Aeroportuario del Sureste (ASUR)
Aeroporti di Roma	San Francisco Airport	Chongqing Airport Group	Guayaquil Airport (up to 2014)
Aeroports de Paris	Tampa	Delhi	Kenya Airports Authority
BAA/Heathrow Airport Holdings	Toronto	Guangzhou Baiyun International Airport	ONDA
Flughafen Wien		Hainan Meilan International Airport (Regal)	Santiago de Chile (up to 2014)
Flughafen Zürich (Unique)		Hangzhou International Airport	
Fraport		Hong Kong Airport	
Kobenhavns Lufthavne		Incheon	
London Gatwick		JATC	
Malta International Airport		Malaysia Airports Holdings	
Munich airport		Melbourne (APAC)	
SAVE (Venezia) (up to 2016)		Mumbai (up to 2014)	
Schiphol Amsterdam Airport		NanJing Lukou International Airport	
Sheremetyevo		Narita	
TAV Havalimanlari Holding		Shanghai International Airport (Hongqiao)	
Toscana Aeroporti		Shenzhen Airport Co.	
		Sichuan Province Airport Group	
		Sydney Airport	
		Xiamen International Airport Co.	

ANSPs

The ANSPs studied in the analysis represent approximately USD 7 to 9 billion in revenue. To compute sector aggregates for ROIC and economic profit, the sample analyzed is scaled up using its proportion of estimated total sector revenue.

Companies included:

Aerothai
Air Services
Airways Corporation of New Zealand
ATNS
CAAS
DFS Deutsche Flugsicherung
ENAIRE
ENAV
GKOVD - State Federal Unitary Enterprise ATM corp.
NATS
NavCanada

Lessors

The lessors studied in the analysis represent approximately 40% of estimated global lessor revenue. To compute sector aggregates for ROE and economic profit (based on the difference between ROE and Cost of Equity), the sample analyzed is scaled up using (a) its proportion of estimated total sector revenue and (b) its proportion of estimated total sector fleet value.

Companies included:

AerCap Holdings
Air Lease Corporation
Aircastle
Alafco
Aviation Capital Group
Avolon (to 2014)
AWAS (to 2016)
BOC Aviation
Boeing Capital (up to 2012)
China Aircraft Leasing Company
Dubai Aerospace Enterprise
FlyLeasing
ILFC (up to 2013)
Intrepid Aviation (up to 2014)
Nordic Aviation Capital
Willis Lease

OEMs

The aircraft and engine OEMs studied in the analysis represent more than 90% of estimated global OEM revenue. To compute sector aggregates for ROIC and economic profit, the sample is scaled up using its proportion of estimated total sector revenue.

Companies included:

Airbus Commercial
Boeing Commercial
COMAC
Embraer
Pratt & Whitney
Safran

MROs

The MROs studied in the analysis represent between 30% and 40% of estimated global MRO revenue. To compute sector aggregates for ROIC and economic profit, the sample is scaled up using its proportion of estimated total sector revenue.

Companies included:

AAR Corp
AirAsia Taiwan
AMECO
BBA Aviation
GAMECO
HAECO
Lufthansa Technik
SIAEC

Ground handlers

The ground handlers studied in the analysis represent approximately 25% of estimated global handling revenue. To compute sector aggregates for ROIC and economic profit, the sample is scaled up using its proportion of estimated total sector revenue.

Companies included:

Bangkok Aviation Fuel Services
BBA Aviation
Celebi Hava Servisi
Derichebourg/Penauille (up to 2012)
DNATA
GlobeGround Berlin (up to 2012)
Heathrow Airport Fuel Company
John Menzies
Korea Airport Service Co
Saigon Ground Services
SATS (ground handling)
Saudi Ground Services Company
World Fuel Services – Aviation

Caterers

The caterers studied in the analysis represent between 30% and 40% of estimated global caterer revenue. To compute sector aggregates for ROIC and economic profit, the sample is scaled up using its proportion of estimated total sector revenue.

Companies included:

Do & Co
Gate Group
Journey Group (up to 2015)
SATS (Catering)
Saudi Airlines Catering Company
Servair

GDSs – Travel tech

The GDSs/travel tech players studied in the analysis represent more than 90% of estimated global GDS revenue. To compute sector aggregates for ROIC and economic profit, the sample is scaled up using its proportion of estimated total sector revenue.

Companies included:

Amadeus IT Group
Sabre Corporation
Travelport
Travelsky

Freight forwarders

The freight forwarders used in the analysis report a mixture of contract logistics and freight forwarding revenues, which in some cases has not been possible to split. Similar to other sectors, ROIC and economic profit for the sector has been estimated by scaling up estimates based on the sample, using the share of global sector revenue.

Companies included:

Agility Public Warehousing Company
DSV Panalpina
Expeditors
Hellman Worldwide Logistics
Kintetsu World Express
Kuehne & Nagel International
Panalpina (up to 2018)
Uti Worldwide (up to 2014)