

## THE AVIATION INDUSTRY: A GUIDE TO ITS ECONOMICS AND OPERATIONS

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### Abstract

*Exploring the intricate relationship between law, economics, and global politics, this book examines the regulatory environment of the aviation industry. Tracing the historical development of aviation law, the book has a particular focus on how economic polycentrism and the liberal international economic order have influenced the sector's regulatory framework. It discusses the aviation industry's responses to unforeseen global events, such as the COVID-19 pandemic and geopolitical conflicts, providing a detailed analysis of the legal mechanisms that ensure industry stability and resilience. Key topics include the role of arbitration in resolving disputes, the impact of international regulations, and the critical contributions of both public and private actors in shaping aviation law. Additionally, the book explores the challenges posed by new and emerging technologies, such as the increasing automation in aviation systems and the legal considerations surrounding cybersecurity in aviation operations.*

### Introduction

The term 'aviation' is most commonly used to describe mechanical air transportation, which is carried out using an aircraft. The two main aircraft types are airplanes and helicopters, but most modern definitions of the word 'aviation' extend beyond this to include unmanned aircraft, such as drones. The importance of the modern aviation industry is difficult to overstate. Still, one of the main reasons for this importance is the globalized nature of the industry, helping to connect different continents, countries, and cultures. As a result, global aviation has been key in facilitating efficient travel to distant places, enriching many lives in the process.

The aviation industry has also been a key contributor to global economic prosperity, not only because the tourism industry boosts local economies but also because it has allowed for improvements to global trade.

Meanwhile, the aviation industry also directly provides millions of jobs for people around the world, with examples including everything from pilots and cabin crew to air traffic controllers and aerospace engineers. On top of this, the aviation industry has helped to create many jobs in the wider travel and tourism industry too.

### 3 Large Aircraft Manufacturing Companies Within the Aviation Industry

Aircraft manufacturing is crucial to the aviation industry, and the following three companies are among the largest:

## AIRBUS

Within the Aviation industry, Airbus is a large European aircraft manufacturing company that produces aircraft for both the civilian and military aviation markets. Most of its production facilities are in France, Germany, and Spain, while its headquarters is in the Netherlands. It is currently the world's largest airline manufacturer, while the Airbus A380, used by airlines like Emirates and Lufthansa, is recognized as the world's largest passenger airliner.



Another large manufacturing company within the aviation sector is Boeing. Based in the United States, Boeing is generally classed as the second-largest airline manufacturer, as well as one of the largest defense contractors in the world. The company headquarters is situated in Chicago, Illinois. In addition to producing commercial and military jets, Boeing is also heavily involved in manufacturing spacecraft. Some of its best-known commercial airplane models include the Boeing 737, the Boeing 747, and the Boeing 777.



Lockheed Martin has its headquarters in Maryland, in the United States. Within the aviation industry, Lockheed Martin is recognized as the world's largest defense contractor, specializing in military aviation and producing fighter and reconnaissance aircraft for air forces worldwide. The company was formed through a merger between Lockheed Corporation with Martin Marietta, and some of its best-known airplanes have included the F-16 Fighting Falcon and the F-35 Lightning II.

Commercial aviation faces its most uncertain future in decades. COVID-depressed demand is now resurging, but there are many uncertainties and challenges for operators and manufacturers to manage.

The commercial aviation industry is facing a tidal wave of demand—passenger air travel has largely rebounded from COVID-

19 lows, aircraft orders are being placed at an aggressive rate, and suppliers, operators, and OEMs are feeling pressure to deliver at a level that is straining production capacity and workforces.

We hear a similar story from OEMs and operators. Major manufacturers have plans to ramp up production and are facing challenges in scaling capacity and supply chains. Operators want to capture surging demand but face shortfalls in pilots and ground personnel and are eager for new-generation, more fuel-efficient aircraft.

However, there are reasons to question the duration and magnitude of this increased demand. Inflation is at a level not seen in developed economies in decades, different economies are on divergent trajectories, and experts disagree on the effect of central bank measures to control inflation and their potential to overcorrect and cause a recession. Consumer confidence is taking a hit as economic pressures increase. Adding to the burden, high fuel and oil prices have increased costs for airline operators, which translates to higher ticket prices.

Beyond economic concerns, operators and manufacturers are grappling with other major disruptions: the effects of travel restrictions and the sudden reopening of borders in China, the war in Ukraine, and the resulting restricted airspace, labor shortages, and supply chain complications. Sustainability issues, for many years a secondary concern, are becoming more urgent, prompting and perhaps forcing operators and manufacturers to revise long-established practices.

The commercial aviation industry is facing an uncertain future with arguably more

unknowns ahead than at any point in its history. In this environment, airline operators may find it more difficult than ever to forecast the demand for air travel. That, in turn, makes it challenging for manufacturers to confidently predict the long-term market for new aircraft and fleet upgrades and to ensure they will have the capacity, material, and labor to meet it.

### **Navigating Turbulence: The Impact of Global Economics on the Aviation Industry**

The global economy profoundly influences the aviation industry, an intricate and expansive sector pivotal to international commerce and communication. Economic fluctuations, from shifts in exchange rates to variations in commodity prices, directly affect airline operations, fleet expansions, and passenger demand. Additionally, geopolitical developments and international trade policies significantly impact the industry's financial health and strategic planning.

This analysis aims to explore both the positive and negative impacts of these economic forces on the aviation industry. Understanding this complex interplay necessitates a deep knowledge of both economic principles and aviation dynamics. We delve into the multifaceted ways global economics shapes the aviation sector, providing insights into its dualistic influence.

#### **Negative Impacts**

#### **Navigating Challenges: Economic Downturns and Their Impact on Aviation**

Economic downturns trigger a decline in the aviation industry, marked by reduced

demand for both corporate travel services and tourism travel. Consequently, airlines may face difficult decisions, including route reduction, fleet downsizing, and even staff layoffs.

This downturn not only affects airlines but also extends to the entire aviation ecosystem, encompassing airport operators, ground handling companies, and ancillary service providers. The ripple effect can be significant, as reduced airport traffic leads to decreased revenue for these interconnected businesses.

Furthermore, economic downturns often result in reduced capital investment in the sector, slowing down the pace of technological advancements and infrastructure development. The aviation industry's resilience, however, is notable, often bouncing back with innovative strategies and operational efficiencies. Yet, the path to recovery can be arduous, requiring strategic planning and often governmental support to navigate these challenging economic waters.

#### **Fuel Price Volatility: Its Profound Effect on Airline Economics**

Fuel costs are a critical component of airline economics, subject to global market volatility. Fluctuating oil prices directly impact airlines' operational costs, with rising fuel prices often necessitating fare increases or operational adjustments like route rationalisation. Airlines employ various strategies to mitigate these effects, including fuel hedging and investing in more fuel-efficient aircraft.

However, sudden spikes in fuel costs can severely strain airlines' profitability, sometimes leading to bankruptcies, especially among smaller carriers.

Conversely, periods of low fuel prices can boost airline profits and stimulate industry growth.

### **Exchange Rate Fluctuations: Consequences for the International Aviation Sector**

Exchange rate fluctuations play a crucial role in the international aviation industry, influencing a wide range of aspects from ticket pricing to the procurement of aircraft. Airlines operating across different currency regions are particularly vulnerable to these changes. When the value of an airline's home currency diminishes, the cost of expenses incurred in foreign currencies, like aircraft purchases and fuel, escalates, adversely affecting their profitability.

On the other hand, a stronger home currency can reduce these costs and potentially facilitate easier international expansion for the airline. This dynamic underscores the complex interplay between currency markets and the global aviation industry.

### **Government Policies and Their Influence on the Aviation Industry**

The landscape of the aviation industry is significantly influenced by a myriad of government policies. These policies encompass a broad spectrum of regulations, taxes, airport fees, and airspace management, each playing a critical role in determining the operational efficiency and competitiveness of airlines. Regulations, for instance, can range from safety and environmental standards to consumer protection laws, each adding layers of complexity to airline operations. Taxes and fees, including those levied on fuel, tickets, and airport usage, directly impact cost structures and, ultimately, fare prices.

Moreover, the management and allocation of airspace are crucial in ensuring efficient flight operations, with direct implications for flight times, fuel consumption, and delays. Government policies in this area can either enhance or impede operational efficiency, depending on how effectively airspace is managed.

### **Positive Impacts**

#### **Economic Growth and Aviation: Exploring the Surge in Demand and Profitability**

Economic growth catalyses a significant increase in the demand for aviation services. In periods of robust economic activity, both business travel and consumer spending power are enhanced, leading to a spike in air travel. Airlines experience heightened profitability, which in turn drives investments in fleet expansion, technological advancements, and infrastructure development.

Moreover, economic growth can stimulate competition and innovation within the industry, leading to improved services and new market opportunities. This growth phase is crucial for the aviation industry as it often dictates strategic long-term planning and operational scaling.

#### **The Role of Aviation in Trade Facilitation and Global Supply Chains**

The aviation sector plays a pivotal role in global trade, acting as the backbone for rapid and efficient movement of goods worldwide. In times of economic growth, the demand for air cargo services sees a marked increase, which is critical for industries relying on the swift transport of high-value and perishable goods. This heightened demand not only benefits airlines through increased cargo revenues

but also supports the broader global supply chain ecosystem, enhancing trade connectivity.

Furthermore, the efficiency of air freight is instrumental in facilitating just-in-time supply chain strategies, thereby reducing inventory costs and enhancing business efficiency. The aviation industry's contribution to trade is thus multifaceted, impacting global economic dynamics significantly.

### **Tourism and Aviation: How Economic Expansion Bolsters Travel**

The symbiotic relationship between tourism and the aviation industry is particularly evident during economic expansion. With the rise in disposable income and the burgeoning middle class, especially in emerging markets, there's an observable increase in outbound tourism. This trend not only benefits airlines but also extends to travel agencies, hospitality services, and destination economies.

The growth in tourism driven by aviation accessibility opens up new routes and destinations, fostering cultural exchange and global connectivity. Additionally, the aviation industry's role in promoting sustainable tourism practices becomes increasingly significant, balancing economic benefits with environmental and social responsibilities.

### **Job Creation in Aviation: Correlations with Global Economic Health**

The aviation industry is a significant contributor to global employment, offering a wide array of job opportunities across various sectors including airline operations, airport management, maintenance, and air traffic control. Economic health plays a vital role in shaping these employment

opportunities. As the demand for aviation services increases with economic growth, so does the need for a skilled workforce. Moreover, the development of the aviation sector can have a broader economic impact, contributing to skills development, technology transfer, and regional development, thereby playing a key role in overall economic progress.

### **Robust near-term demand and production challenges**

Manufacturers currently have a firm order backlog for 9,400 passenger aircraft through 2027, of which the vast majority are narrow-body jets.

To fulfill this demand, OEMs have announced that they will scale up production capacity to historically high rates of 55 to 100 aircraft a month for the next five years. <sup>2</sup> This ramp-up will require managing risks in the supply chain, such as raw materials availability, inventory health, and workforce reliability.

Current uncertainty in the supply chain and labor markets could portend a continued, longer-term production challenge. If demand remains at levels similar to today, OEMs will need to find ways to become more productive or risk missing out on potential growth.

Historically, not all orders in the backlog come to fruition, but predicting when a softening might impact deliveries is difficult. OEMs need to balance near-term needs with some caution about overinvesting in capacity. Similarly, operators must guard against overinvesting in fleets and overhiring now while still seizing current opportunities.

To help visualize the uncertainty, we developed three scenarios for travel demand through 2027 and then projected the number of aircraft that would be needed in each case. In two of our scenarios, despite the current situation, the underlying demand for aircraft could be lower than the current backlog, which may have repercussions for the bottom lines of operators and manufacturers. However, several strategies can help both groups protect their markets and profitability.

### **Three scenarios for future air-travel demand**

Many uncertainties within the airline industry are reflected in or are driven by global and regional GDP growth. For instance, high GDP growth tends to drive air travel, and high travel rates may benefit GDP. Factors that depress global GDP, such as high fuel prices, also hurt airline travel. We are also in a period of high macroeconomic uncertainty—will economies tip into a recession or manage to avoid it? Our three scenarios are primarily driven by GDP, with some associated factors.

Scenario A depicts resurgent growth as governments and businesses exercise robust monetary and fiscal responses to the current economic situation. It assumes that global energy markets and supply chains will become less volatile, travel demand in China will quickly resurge, and the consequences of the conflict in Ukraine will be contained.

In scenario B, the economy shows resilience, even as fiscal stimuli wind down and central banks raise interest rates. Consumers remain cautious but continue to spend moderately. Travel increases, partly

because governments reduce remaining travel restrictions, including a gradual rollback to precrisis conditions in China. On the downside, some economic disruptions continue because of elevated and volatile energy prices and limited supply chain disruptions in certain regions.

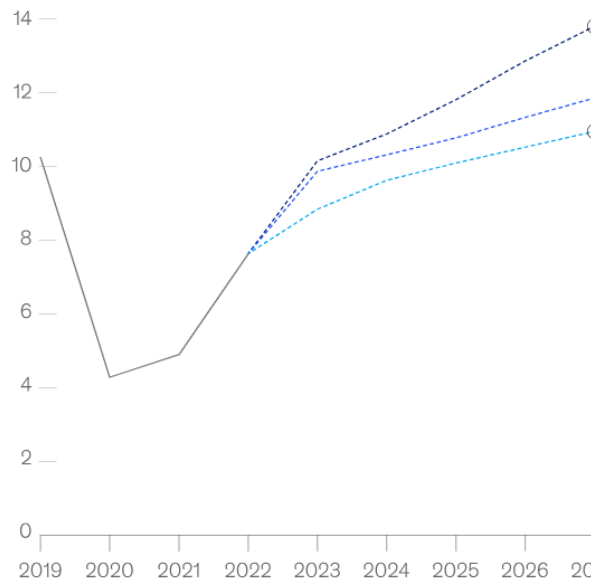
Scenario C, the most negative, depicts a recession-driven slowdown in which global supply chain disruptions, slower reopening recovery in China, and higher interest rates to contain inflation combine to depress air-travel demand.

These scenarios imply a range of CAGRs through 2027 for global air travel, from 0.8 percent under scenario C, which anticipates a prolonged slowdown, to 3.8 percent for scenario A's resurgent growth. Similarly, demand for available seat kilometers will vary. By 2027, it ranges from about 10.9 trillion in scenario C to 13.8 trillion in scenario A, a difference of 21 percent (Exhibit 1).

#### **Exhibit 1**

Air-travel demand is projected to grow, but the increase will depend on economic developments.

**Global air-travel-demand scenarios,<sup>1</sup> available seat kil**



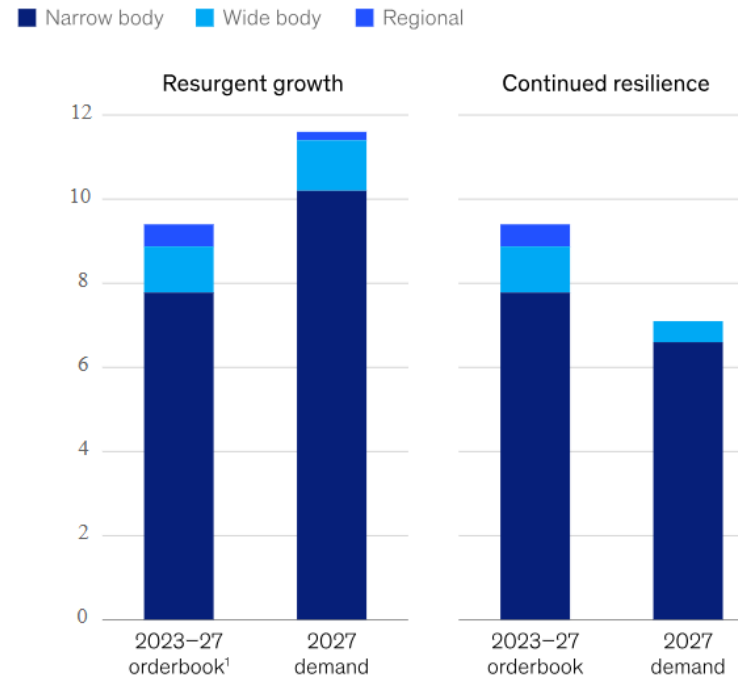
<sup>1</sup>The scenarios made different assumptions about the following factors: macroeconomic utilization (eg, load factor recovery), industry incentives, and structural changes (eg,

Increased passenger air-travel demand and the replacement of older aircraft will translate into demand for new passenger aircraft. Based on the numbers from our three scenarios, future demand for new aircraft would total between 5,200 and 11,600 through 2027 (Exhibit 2).

**Exhibit 2**  
**Demand for aircraft would exceed the order backlog in the resurgent-growth scenario**

**Demand for aircraft would exceed the order backlog in the resurgent-growth scenario.**

**Global commercial aircraft demand scenarios, number of passenger aircraft**



<sup>1</sup>Firm passenger aircraft orders. Source: Cirium order backlog; McKinsey analysis

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These scenarios show the significant impact of uncertainty on the balance of supply and demand in the industry. Scenario A represents a supply-constrained situation, likely resulting in extended retirement ages and continued ramp-up in production capacity, especially for narrow-body aircraft. Scenarios B and C indicate fewer aircraft deliveries to match demand than are currently in the order backlog. Unless airlines shift to historically high retirement rates to transition to new-generation fleets, in these scenarios, manufacturers might

face long-term excess capacity despite the near-term production challenges.

### **Managing uncertainty**

For airlines, balancing available aircraft and crews with demand is a continuing challenge, and with greater uncertainties than before, they will need to prepare for agility in the coming years. A few distinctive ways to build an infrastructure for success, given the continued uncertainty of the air-travel environment, include taking appropriate measures in right-sizing fleet composition, preparing to meet travel demand by customer segment and route, and moving toward a vision for aviation of the future.

Advanced network-planning capabilities to reflect ever-changing customer demand scenarios will be a critical component in managing uncertainty for operators.

Passenger travel demand in all scenarios is developing more significantly within regions. Airlines can benefit from fleet composition strategies that accommodate this trend while optimizing operating-cost efficiencies.

While developing fleet composition strategies, airlines can invest in and maintain a unique solution for customer experience, sustainability initiatives, and next-generation technology. To develop and deploy these strategic decisions, airlines can prioritize a cohesive vision that reflects the mission and values offered to the customer.

For manufacturers, uncertain travel demand translates to demand for aircraft, which has a ripple-down effect on the overall supply chain. All three demand scenarios require building production capacity in the short term, but the scale and continuity of additional capacity are uncertain.

Aerospace manufacturers can prepare for an uncertain future by ensuring the health and resiliency of their supply chain, prioritizing strategies for flexibility in their workforce, and taking calculated steps toward modernizing manufacturing capabilities.

To ensure supply chain health and resiliency, manufacturers can evaluate risk and the financial health of suppliers and consider redundancies and vertical integration for flexibility in scaling and descaling production.

Efficient and flexible scaling or descaling of production relies not only on the supply chain but also on the availability and flexibility of the workforce. Manufacturers may be able to attract new talent by devising a hiring strategy that incorporates flexible and appealing working conditions. Manufacturers will want to balance strategies for managing uncertainty in the short term against their long-term capabilities. Integrating the best of digital innovation and investing in cutting-edge capabilities can build resiliency in the short term while enabling a unique product offering for years to come.

### **Creating a plan**

The only certainty in commercial aerospace today is that no one can confidently predict anything. There is no set of actions that will help a company contain all its risks. But any company can examine its exposures, determine where they are greatest, and devise a plan to insulate them from the most damaging consequences.

For operators and manufacturers—and for the companies that supply them with materials and services—the situation will require a well-considered capital



expenditure plan, a finger on the pulse of demand and the order backlog, and a strong operational strategy to increase resiliency and flexibility. As the tides rise in commercial aviation, players in the industry should prepare to grow together with transparent communication, data sharing, and a cohesive vision. Now is the time to set an agile strategy for success in the uncertain future of the commercial aviation environment.

### Conclusion

The aviation industry's relationship with the global economy is both intricate and undeniable. Economic downturns, fuel price volatility, exchange rate fluctuations, and varying government policies present significant challenges, affecting operational efficiency and financial stability. Despite these obstacles, the industry's innovative and adaptive strategies highlight its resilience.

Economic upswings, on the other hand, fuel growth in air travel demand, trade facilitation, and tourism, which in turn boost airline profitability and job creation.

Serving as a barometer of global economic health and a catalyst for economic growth, the aviation sector is an essential component of the world's economic fabric, adeptly evolving with the ever-changing economic landscape.

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