

Advances in Airline Economics  
**Volume 12**

# Airports and Regional Development



**Edited by**  
Chunyan Yu and James Peoples

# AIRPORTS AND REGIONAL DEVELOPMENT

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ADVANCES IN AIRLINE ECONOMICS VOLUME 12

# AIRPORTS AND REGIONAL DEVELOPMENT

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INVESTOR IN PEOPLE

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# INTRODUCTION: AIRPORTS AND REGIONAL DEVELOPMENT

Chunyan Yu<sup>a</sup> and James Peoples<sup>b</sup>

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## ABSTRACT

*Airports serve as vital catalysts for regional development, shaping economic landscapes and transforming urban–rural dynamics. They reduce costs for regional businesses to engage with the global economy while enhancing access for tourists and businesses to regional markets. This volume explores the multifaceted relationship between airports and regional development across Asia, Europe, and North America, highlighting their roles as drivers of economic growth, social welfare, and connectivity. The collection of the chapters employ contemporary empirical techniques as well as presents case studies on diverse geographic contexts, thereby providing a nuanced examination on airports’ impacts on regional growth. The findings present new insights into the benefits and costs associated with airports being an instrument for economic development, offering policymakers, researchers, and industry stakeholders a deeper understanding of the critical role of airports in fostering regional development.*

**Keywords:** Airports; connectivity; regional development; aerropolis; general aviation airport; airline hub; global warming

## 1. INTRODUCTION

Transportation services have been a vital source of economic growth worldwide for centuries. Throughout much of modern history, surface transportation – via land and sea – served as the primary means for moving passenger and cargo. Iconic trade routes, like the Silk Road, facilitated international commerce by connecting Asia and Europe through extensive networks of waterways and roadways. Similarly, sea routes like the Northwest Passage significantly boosted

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trade among Europe and North America. On land, routes such as the ancient Incense Route linked the Persian Gulf to the Mediterranean Sea, playing a critical role in regional economies.

By the mid-19th century, technological advancements revolutionized transportation services. Railroads and ocean liners offer faster, more reliable methods of moving large groups of people and goods over vast distances, far surpassing the capabilities of sailing ships and animal drawn carriages. These innovations dominated long-distance passenger transport throughout the 19th century. However, at the turn of the 20th century a transformative form of transport service evolved: the development of aviation. Airplanes, unrestricted by the limitation of land or sea, introduced a new era of long-haul transport. By the mid-20th century, aviation enabled faster transport and at increasingly lower fares for the masses, making air transport more accessible and more competitive ([Sentinel Aviation, n.d.](#)).<sup>1</sup> It was the proliferation of airports, however that was critical to the competitive success of the airline industry. These facilities provided passengers and shippers access to the air transport network.

The history of the airport began in 1909 with the establishment of the first facility of its kind at College Park, Maryland, USA. Since then, the number of airports worldwide with codes given by the International Civil Aviation Organization (ICAO) has grown to over 40,000 ([Sentinel Aviation, n.d.](#)). These facilities served over 6.6 billion passengers collectively in 2023 ([Josephs, 2024](#)), and transported over 65.6 million metric tons of cargo in 2021 ([Lee, 2024](#)). Airports have a profound impact on local economies, creating jobs and enhancing businesses' ability to move goods efficiently across the globe. As such, functioning airports are essential components of regional development.

While traditional growth models consider transportation services as key drivers of economic development, there is a growing need to better understand airports' roles in regional development. This is particularly important as governments continue to make significant capital investments in these facilities.

This volume contributes to the literature by providing comprehensive analysis of the economic impacts of airports on regional development. The chapters feature international perspectives, examining cases in Asia, Central and Eastern Europe (CEE), Western Europe, North America, and rural areas. The volume also recognizes the external costs associated with the growth in airport operations. Analysis on external costs provide an international appraisal of the need for carbon-neutrality and sustainability. Hence, this volume provides a holistic approach toward the analysis of airports and regional development.

## **2. ASIA/EURO ASIA**

The initial set of chapters in this volume examine airports and regional development in Asia and Eurasia. The first chapter co-authored by Wei Zou, Pinghan Liang, and Xinhan Jiao highlights the importance of airport facilities as a key factor of connectivity between high-speed rail (HSR) and airline transport service, focusing on intermodal connectivity in China. The impressive development of HSR

in China and the acceleration of intermodal airport facilities beginning at the turn of this century provides the perfect case study examining the impacts of airports and their potential complementarity with HSR contribute to regional economic growth. The authors estimate a gross domestic product (GDP) equation using a difference-in-difference specification to compare per capita GDP for cities with a functioning rail station in conjunction with an operating airport facility to per capita GDP for cities that don't have access to both airports and HSR stations. Using panel data at the city level during the 2000–2020 period, the authors observe the following three key findings. Connecting HSR and airports promote regional growth in part by enhancing the efficiency of freight transport and reducing logistics costs. Findings also reveal that this connectivity additionally promotes regional growth by enhancing the scale and diversity of urban consumption. Regional growth is shown to additionally benefit from this type of intermodal connectivity accelerating rural to urban migration. In sum, this chapter shows aviation services do not provide transportation in isolation as surface and air transport can work in tandem to provide efficient and expansive services. And the airport is key to allowing for seamless connectivity among these two transportation modes.

In the succeeding chapter, Ferhan Sengur explains that Türkiye is a key hub linking Asia and Europe. The chapter extends the analysis of airports' impact on regional economic growth by identifying additional social welfare benefits associated with airport operations. For instance, Sengur explains that airports promote local labor market growth, create enhanced educational opportunities, and improve residents' quality of life. The latter benefit arises in part because airports provide air transport access for the delivery of critical pharmaceutical and electronic products. The chapter uses a case study approach to examine the economic and social impacts of airport operations for the cities of Istanbul, Antalya, and Eskisehir. The choice of these three airports depicts vastly different cities with each airport uniquely affecting their local economies. For instance, Istanbul airport, which is the country's largest airport, serves as a major global hub generating over \$24 billion to the country's GDP in 2022 ([Bazaar Times, 2022](#)). While some of the revenue generation is derived from tourism, it is an important driver of international business. Antalya is also located in a large metropolitan area but not nearly the size of Istanbul. Antalya's major airport is also vital to the area's tourist sector, as the city served as the host of over 15 million tourists from 180 countries in 2023, with most of them arriving by air transport ([Travel and Tour World, 2024](#)). The smaller city, Eskisehir's airport provides a much different service to local businesses and residents as it is the focal point of aviation education for the country. Sengur's findings show that on average, the city's aviation university graduate over 200 aviation students annually and the airport's facilities are critical for hands-on training of future aviation workforce.

### 3. EUROPE

The second set of chapters in this volume examines the contribution of airport operations to regional economic growth in Europe. The initial chapter in this set focuses on the group of countries located in Central and Eastern European

countries (CEE). Sonia Huderek-Glaszka and Peter Forsyth examine how constitutional and regulatory frameworks and differences in regional economies influence the effectiveness of airport operations as an engine for regional growth. Their analysis of the influence of differing constitutional frameworks across CEE countries reviews the transition from communism to a more democratic governance model in this region. The authors observe that this shift in constitutional framework ushered in a new era of market-driven incentives among regional and local airports. These airports also benefitted from an infusion of funding from the financial backing of the European Union. That funding was part of a wider investment strategy focused on modernizing infrastructure in the Eurozone. The authors reveal that the liberalization of markets and European Union integration during the turn of the 21st century is associated with a near doubling of air transport passengers transported to and from CEE countries, as the number of passengers served by CEE airports increased from 34 to 99 million from 2003 to 2023. The authors show this annual growth rate of 9.1% substantially outperformed the 5.2% annual passenger growth rate for Western European countries during the same time period. While these findings on passenger demand for the entire CEE region support the notion that a more open and better financed airport system has contributed to greater economic growth, in part by promoting tourism and international business activity in the CEE region, the authors reveal such economic growth varies considerably when examining the correlation of air transport services and economic development at country level. They report countries with a strong airport-economic growth correlation are likely to rely more heavily on air connectivity for transport services compared to countries that invest more heavily in road and rail transport services and engage in less international trade.

The examination of regional development and growth associated with the operations of these airports is framed by the concept of the aerotropolis city in Chapter 5, as Iva Bultaovic and Andrea Papatheodorou examine regional and urban economic development associated with operations at London Heathrow (LHR) and Dubai International (DXB) airports. These airports, respectively, served the second and fourth largest number of passengers in the world in 2023 (OAG, n.d.). Both are located in their country's most populated cities, which is a key reason for the authors choosing these localities for their case study analysis. The authors define an aerotropolis as a city with an airport that serves as the core source of urban development. The aerotropolis uses local government policies on zoning regulation, tax abatement, and other economic incentives to assist businesses and service clusters, taking advantage of the connectivity the airport can provide. Connectivity is enhanced by placing the airport as a central physical structure from which surrounding concentric zones offering services, including logistics companies, freight and cargos services, hospitality services for tourists, retail services, and conference rooms for business meetings. Case study analysis of Dubai International Airport shows that this aerotropolis consists of multiple tax free business zones covering 2.1 million square feet and serving over 2,800 companies. The authors report that the economic activity generated by these businesses uses environmentally friendly infrastructures to meet local regulations

setting a net zero carbon emissions goal by 2050. Case study analysis of economic activity associated with the operations of London Heathrow Airport reveals the expansive area used by this airport as it covers over 132 million square feet and transported over 79 million passengers and 1.4 million metric tons of freight in 2023 and 2022, respectively. Consistent with the business and tourist service focus for economic activity derived from taking advantage of the connectivity of Dubai International airport, London Heathrow Airport also provides more than simply transport services. For instance, the authors report that terminals at LHR house over 30 restaurants and 60 retail stores. Also consistent with the operations at Dubai International, LHR contributes to generating significant regional growth while addressing a sustainability goal of net zero carbon emissions by 2050. The authors' case study analysis, however, does identify notable differences in these airports' alignment with the aerotropolis framework. Their analysis shows that unlike Dubai International, businesses in the area surrounding LHR are not strictly tied to airport operations. Nonetheless, both airports contribute significantly to regional economic growth.

While Chapter 5 focuses on regional development in densely populated localities, many airports are located in sparsely populated regions, and those airports play an important role in business development as well as enhancing social welfare in more remote regions. In Chapter 6, Christine Große and Pär Olausson expand this volume's analysis of airports and regional development in Europe to include an examination of airports serving populations located in the geographic periphery and in low residential density areas in Sweden. The land size to population ratio for this country underscores the importance of examining the potential welfare gains associated with providing easily accessible airport service in this its more rural locations. At the national level, Sweden has the second lowest population density in the European Union. This low density is even more pronounced for areas located in the northern part of the country far away from the country's population centers located in the Stockholm, Västra Götaland, and Skåne counties. Residents in sparsely populated areas face unique societal challenges associated with receiving vital supplies such as food, energy, and pharmaceuticals. The authors explain the significance of air transport service as an efficient mode to provide a reliable and sustainable flow of goods and services to residents in the rural north. Using cost–benefit analysis they show that while infrastructure investment in rural airports can be relatively costly, locating and maintaining airport facilities in these areas is critical in sustaining societal resilience in these areas. Given their observation on the social welfare enhancement associated with infrastructure investment in airports serving rural areas, the authors offer policy prescriptions that prioritize effective crisis management, regional development and the maintenance of essential societal function through strategic infrastructure investment.

Analysis of the contribution of small rural airports in Europe continues in Chapter 7 as Felix Pot and Sierdjan Koster present a nuanced empirical examination of the causal relationship between air transport connectivity and regional economic development. Their examination considers the possibility of causality differing by airport type. These authors categorize airport by three size categories:

large, medium, and small. The latter category is characterized by airports that have a catchment area serving primarily rural locations. Identifying these airport differences is important partly because the type of airport service provided varies with size. As the authors report, large airports typically provide international connectivity that generates high traffic volume. Such traffic flow contributes to regional growth and development by promoting business transactions, tourist visitations, and local employment opportunities. In contrast, small airports generally serve as hubs that connect rural areas to the broader air transport network. Maintaining these rural connects to regional services supports economic activity in localities with low population suggesting growth influenced by access to external goods and services drives the need for airport infrastructure investment in small airports. Pot and Koster also consider the possibility of causality differing due to spatial heterogeneity. They identify locality characteristics such as population density, educational levels of local residents, share of jobs with requiring high technology skills and GDP growth as well as other factors influencing the need for transport connectivity as key sources of spatial heterogeneity. The inclusion of GDP as a connectivity determinant in this study's model reveals the challenge determining the causal direction of airport operations and regional growth. Based on data for airports in European Union member countries and data on regional characteristics at the regional level-2 EU nomenclature of territorial units statistics (NUTS-2), the authors test the causal direction between growth and airport size as well as between growth and spatial heterogeneity. Their findings suggest that causality is bidirectional for large airports whereas the connectivity is largely derived from existing economic growth for smaller airports. The authors' policy prescription derived from interpreting these findings call for the need to tailor airport investment growth strategies that take into account airport size and the unique economic and social characteristics of the airport's catchment area.

#### **4. NORTH AMERICA**

The third set of chapters in this volume examines airport operations' influence on regional economic growth in North America. This region accounted for 24% of passenger traffic in 2023 (IATA, 2024) even though it is home to only 7.66% of the world's population (World Population Review, n.d.). Furthermore, despite its relatively small continental population, the North American economy contributes to 30% of the world GDP, a majority of which is generated by the United States (The GlobalEconomy.com, n.d.). Given this region's disproportionate contribution to global economic growth, understanding the extent to which airport operations in this region serve as drivers of growth has far reaching societal welfare implications beyond North America. Chapter 8 examines the impacts of US airline hub airports on a city's local economy during the 1978–2022 period. Marquise McGraw and Natasha Kallish observe that hub airports are an integral part of the regional growth story in part because these airports present airlines with a central connection

facility that stimulates economic activity in the surrounding area by attracting businesses and tourists. In their analysis, McGraw and Kallish take a holistic approach toward examining airport hubs and economic growth. Rather than limiting their analysis to the economic impact of established hubs, the authors also include the regional growth and development effects of establishment of hubs and closing of hubs. The significance of this analytical approach is highlighted by noting that while opening a hub directly enhances local demand travel related sectors, hub closings remove a key source of connectivity not only for that sector but also for other sectors such as wholesale trade and businesses in the service sector. Considering the potential for bidirectional causality mentioned in the preceding chapter, McGraw and Kallish use a synthetic control event study design which allows for the estimation of causal outcomes when examining the economic impact of hub airports. Their findings suggest hub airports increase personal income by 1.7–2.2% and per-capita personal income by 1.2–1.5%. Evidence on hub openings suggests that air travel related employment and, to a lesser extent, hotels, benefit from the increased air traffic. Evidence on hub closings suggests these airports help support sectors such as wholesale trade and finance/insurance/real estate. These findings support their hypothesis that airline hubs function as a productive source of regional growth and development by providing high-quality infrastructure that supports business activity.

Chapter 9 continues the analysis of US airports by examining general aviation (GA) airports. GA airports are public use facilities that do not typically engage in commercial airline services, and if they do, they provide such services with less than 2,500 commercial passenger boardings each year (FAA, 2012). The authors report that many of these airports serve as infrastructure hubs for their regions. Chunyan Yu and Sohee Yoo explain that activities supported by GA hubs include air ambulance services, flight training as well as private corporate flights to name a few of the services provided by GA airports. Chapter 9 explores economic contributions of GA airports and highlights the significant roles these airports play in business aviation, tourism, agriculture, emergency services, and pilot training, using a case study approach for their analysis. The choice of airports for the case studies cover the four types of GA as classified by the Federal Aviation Administration (FAA): national, regional, local and basic GA airport. The latter category is a GA airport that provides facilities to offer emergency service, charter or critical passenger service, cargo operations, flight training, and personal flying. These airports typically accommodate mostly single-engine propeller aircraft. They may be located in remote areas of the United States with limited or no surface transportation options and hence are often the key connection hub used to transport vital goods and services to remote regions. Findings reported in this chapter reveal that GA airports make a significant contribution to local economies. Indeed, the authors report that the airports examined in this chapter exemplify the broad economic value and versatility that GA offers to diverse communities in the United States.

## **5. AIRPORTS AND EXTERNAL COST**

The final section of this volume examines the external cost associated with airport operations. In Chapter 10, Narendra Dalsi, Avin Chourasia, and Yas Pal explain how airport operations introduce cost to society through the emission of harmful pollutants. The authors report that the aviation sector is among the highest carbon emitting businesses worldwide. They show airport operations generate significant greenhouse gas emission through direct and indirect activities such as aircraft operations, ground support services, and other uses of energy. Nonetheless, their data reveal for the aviation industry as a whole carbon dioxide emissions per passenger have declined appreciably since 1990 even though passenger demand has increased during the same time period. Despite the encouraging trend for passengers, the authors show carbon dioxide emission per billion tons of freight hauled has increased with increases in freight hauled. Hence, they argue that while gains have been made, more work is needed to achieve the goal of net zero emissions by 2050. Using a case study approach this chapter describes how leading airports are instituting pollution abatement practices. Examples of such practices include investment in energy efficient technology, use of solar modules, and increased use of renewable and carbon-zero certified electricity. The authors note that while these practices contribute to lowering pollutant emissions, growing global demand will require the continued adoption of pollutant abatement strategies.

## **6. CONCLUSION**

Demand for airline transport services is projected to grow significantly in the coming decades. The International Air Transport Association (IATA) forecasts annual average passenger growth rate of 3–4% and annual average cargo growth rate of 4% for the period of 2023–2043 (IATA, 2019, 2023). These projections underscore the critical role that airports play in ensuring the efficiency and sustainability of the air transport sector. Investment in airport infrastructure not only enhances connectivity for international trade and tourism but also fosters regional growth and development. This volume explores these dynamics through thoughtful analyses of airports and their impacts on regional development.

Using contemporary empirical methods in case studies, the chapters in this volume highlight the multifaceted relationship between airports and regional development. Airports can act as catalysts for economic growth, especially in urban regions, while in rural area their development may be driven by the need to provide essential connectivity where surface transportation options are limited. Furthermore, the integration of airports with other transportation modes, such as rail, underscores their potential to function as critical hubs within broader transport networks. In some cases, airports evolve into aerotropolises – self-sustaining ecosystems supporting diverse business activities directly tied to their operations.

While the benefits of airports are evident, the chapters also address the external costs associated with airport operations, particularly environmental impacts.