Airport Infrastructure

The Emerging Role of the Private Sector

Anil Kapur
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Anil Kapur

The World Bank
Washington, D.C.
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FOREWORD

In recent years there has been a rise in interest in private participation in infrastructure. This began with the power sector, water supply and some modes of transport. Lately this interest has spread to airports. Drawing on extensive interviews with airport authorities in both developed and developing countries, this report analyzes the current ownership and management structure and describes the privatization techniques used. It describes the growing importance of air transportation within the framework of other infrastructure, the types of ownership and management structures of airports, the privatization techniques used and their experiences, the financial performance of selected airports, the regulatory environment, and the external challenges.

A central finding of the report is that among the five different ownership structures, there is no single model that has emerged in promoting efficiency and competition. Changing ownership structure has been a response to the curtailment of public investment funds for airport development. Alongside this trend, which is expected to continue, policy makers will be faced with new challenges that are likely to place additional pressures on the aviation sector. These emerging challenges--managing capacity constraints under conditions of cyclical growth, globalization of world industry, combined with continuing pressures to deregulate and privatize airlines, adapting to the growing importance of air traffic control--will test the managerial capabilities of the traditional airport managers.

The analysis presented in this technical paper is intended to provide political leaders, policy makers, and the broader development community a clearer picture of the complexities of the world's changing airport ownership structure and the benefits achieved under each institutional structure.

_Airport Infrastructure: The Emerging Role of the Private Sector_ is the first publication undertaken by the World Bank in this area. The report raises a number of issues that merit further research, especially in the areas of airport privatization techniques and the role of regulation beyond technical and safety issues.

Sri-Ram Aiyer
Director
Latin America and the Caribbean Region

October 1995
ACKNOWLEDGMENTS

This report was prepared in joint collaboration with the Co-financing & Financial Advisory Services and Transportation, Water & Urban Development Departments. A number of World Bank Group staff assisted in the preparation of this report. Ellis Juan provided information on selected country specific cases, Albert Amos provided research and analytical support, and William Mayville provided presentation and editorial support. The report benefitted from valuable comments and suggestions from Malcolm D. Rowat, John Flora, Kevin Young, Vivek Talvadkar, as well as from government and airport authority representatives from numerous countries.
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<td>ACI</td>
<td>Airports Council International</td>
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<td>ACNZ</td>
<td>Airways Corporation of New Zealand</td>
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<td>ADC</td>
<td>Aéroports du Cameroon</td>
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<td>ADP</td>
<td>Aéroports de Paris</td>
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<td>AENA</td>
<td>Aeropuertos Españoles y Navegacion Aérea (Spain)</td>
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<td>ASA</td>
<td>Air Service Agreement</td>
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<td>ASC</td>
<td>Airline Scheduling Committee</td>
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<td>ATC</td>
<td>Air Traffic Control</td>
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<td>BA</td>
<td>British Airways</td>
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<td>BAA</td>
<td>British Airports Authority (United Kingdom)</td>
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<td>BBO</td>
<td>Buy-Build-Operate</td>
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<td>BIA</td>
<td>Belfast International Airport</td>
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<td>BOO</td>
<td>Build-Build-Operate</td>
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<td>BOT</td>
<td>Build-Operate-Transfer</td>
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<td>BOOT</td>
<td>Build-Operate-Transfer</td>
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<td>CAA</td>
<td>Civil Aviation Authority (Colombia, New Zealand, United Kingdom)</td>
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<td>CAD</td>
<td>Civil Aviation Department (Hong Kong)</td>
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<td>CRA</td>
<td>Comandos de Regiones Aereas (Argentina)</td>
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<td>EATCHIP</td>
<td>European Air Traffic Control Harmonization and Integration Program</td>
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<td>ECAC</td>
<td>European Civil Aviation Conference</td>
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<td>FAA</td>
<td>Federal Aviation Administration (United States)</td>
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<td>FAC</td>
<td>Federal Airports Corporation (Australia)</td>
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<td>Flughafen Immobilien Gesselschaft (Zurich, Switzerland)</td>
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<td>GATS</td>
<td>General Agreement on Trade and Services</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>IATA</td>
<td>International Air Transport Association</td>
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<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>Local Airport Authority (Canada)</td>
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<td>LDO</td>
<td>Lease-Develop-Operate</td>
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<td>MAW</td>
<td>Maximum Authorized Weight</td>
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<td>MEBO</td>
<td>Management and Employee Buy-out</td>
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<td>MMC</td>
<td>Monopolies and Mergers Commission</td>
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<td>MTOW</td>
<td>Maximum Take-Off Weight</td>
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<td>MWAA</td>
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<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
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<td>Organization for Economic Coordination and Development</td>
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<td>ZAA</td>
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EXECUTIVE SUMMARY

i. The contribution of infrastructure to national economic growth is receiving close scrutiny by developing and developed economies alike. It is increasingly clear that the emergence of regional and global trade relations will depend to a large extent on optimizing market efficiencies involving infrastructure. Over the last decade, governments faced fiscal crises that severely curtailed meeting critical investment needs in maintenance and rehabilitation of national stock vital for full participation in emerging global markets. To meet the urgent investment requirements and to increase competitiveness and sector efficiency, private sector involvement in infrastructure is a key element of economic growth strategies worldwide.

ii. One sector that has received limited systematic attention in this regard is airports. This is surprising given the deregulation of the airline industry and the longstanding competition among private airline operators. Airports have evolved into multifaceted commercial operations. They contain hotels, conference centers, duty-free shops, shopping malls, and car-parking and rental activities, as well as provide a range of facilities and services for airlines. In this sense, they are the hub of a multimodal transport network that serves as host to a myriad of economic activities. The tremendous increase in international trade and passenger traffic has revealed capacity gaps that affect all airport constituencies: airlines, passengers, exporters and importers, and related services and industries. Closing the gaps will require more money, better management, and a sector policy framework, plus suitable harmonization of local, national, and international regulatory frameworks. If this occurs, airports worldwide, and particularly in developing economies, will be able to optimize their contribution to and become more fully integrated in the global marketplace.

Ownership Structure

iii. There is great variety in the ownership structure of airports with a tendency to experiment with more private sector modes of management and operations. There are five general types of airport ownership structure: (a) national or federal public ownership and public operation, usually managed by a government department—financed by direct government subsidies or multilateral and bilateral lending; (b) public ownership and public operations but run on a commercial basis (corporatization); and (c) regional ownership and operations (state governments, local communities, and municipalities, with user services occasionally run on a commercial basis)—(b) and (c) financed by debt with government guarantees and by municipal bonds; (d) public ownership with operations contracted to the private sector; and (e) private ownership and operations often with a regulatory structure—(d) and (e) financed by debt with government guarantees; BOT (build, operate, transfer), BTO (build, transfer, operate), and leases; and quasi-equity and equity instruments.

iv. Most airports worldwide are owned and operated by the Federal Government; however, there is an emerging trend to change the airport ownership structure. Among the countries involved in this process are, by region: Russia, Hungary, and Greece; China, Hong Kong, Malaysia, and Australia; and Bolivia, Colombia, Mexico, Venezuela, and
Regional government ownership is the mode in the UK, the USA, and in France. Corporatization is the mode in Austria, Canada, Germany, the Netherlands, and Spain; Singapore; Brazil; and Nigeria and South Africa. Experimentation with private sector participation is beginning in Austria (Vienna Airport), Japan (Kansai), Venezuela (Maracaibo), Mexico (Mexico City), Turkey (Istanbul), and Cameroon. The biggest shortcoming of publicly-owned airports is the potential for political interference in management and operations, restrictions on access to private capital, and management know-how.

**Financial Performance and Pricing Policy**

v. Financial performance of airports is mixed because of inconsistent pricing of services and a failure to capitalize on potential for landside versus airside revenues, the two primary sources of revenue generation. Landside revenues are derived from non-airport traffic activities that arise directly from the operations and landing of aircraft, passengers, or freight. Landside revenues flow mainly from non-aircraft-related commercial activities in the terminals as well as rents from airlines and concessions. Findings from a sample of airports show that governmental department airports have the lowest average levels of aircraft movement and passenger volumes and a high dependence on airside revenues, representing more that 70% of total revenues generated (compared to 40% for privatized airports, and somewhere in between for other ownership structures).

vi. Pricing of airport charges falls into three categories: aircraft landing and parking charges, passenger fees, and miscellaneous airport charges. To a large extent, aircraft landing and parking charges are price driven based on international, bilateral, and national government agreements. However, in response to privatization initiatives, a few countries have established or are experimenting with some form of market-driven pricing mechanism for landing aircraft charges. Since airside charges for passenger fees and other airport charges are largely discretionary and contract driven, there is no standardized pricing methodology for these airport services. While there is uniformity in the structure of airport charges, the level of charge varies considerably. In the current environment, with the privatization and deregulation of airlines, the growing incidence of litigation between airlines and airports, and the need for increased commercialization of airports, governments are now faced with increasing pressure to establish and regulate prices for airport services.

vii. Significant scope exists for exploiting landside revenues, which ranks last in average revenue per passenger at government-department-owned airports. A number of airports now are beginning to shift to a more commercial orientation in response to rapidly changing market conditions. Diversifying sources of revenue is one of the major challenges facing airport managers, as governments are increasingly unable to meet airport financial obligations.
viii. The lack of a systematic approach to encourage commercial operations of airports seriously compromises investment requirements of the airport sector. The International Civil Aviation Organization (ICAO) estimates that US$259-350 billion will be needed over the next 10 years to meet forecast demand and to modernize existing airport facilities. The cost increases to US$500 billion if the cost of upgraded air traffic control systems, environmental regulations, intermodal linkages, and unreported quality constraints are included.

ix. Currently, only a limited number of airport facilities are being developed to meet the increase in air traffic demand mostly in East Asia (Singapore, Japan, Hong Kong, Malaysia, and Thailand). Existing airports in North and South America and Europe are being reconstructed and/or modernized. However, few primary airports are being constructed in Africa, Latin America, the Middle East, and South Asia, where existing infrastructure is among the oldest in use.

Regulatory Framework

x. In most countries, the market for transport services has evolved into an area of public jurisdiction going well beyond health and safety regulations. Due to the strategic composition of the aviation industry, regulatory authorities in fact are dominated more by the needs of the airline industry than the changing requirements of airport infrastructure. There is an urgent need to develop a consistent regulatory framework for the airport sector. Economic regulatory frameworks are currently under review by a number of countries because of the profound structural and ownership changes within the aviation industry. Sector-specific economic regimes have been implemented in only three countries (Austria, South Africa, and the UK), but no independent airport economic regulatory entity exists.

xi. Most airports are regulated by a civil aviation authority within a department or ministry of transport, responsible for related infrastructure, and economic matters, including air traffic control (e.g., Austria, Canada, Jamaica, and the United States). Less common are commercial airports regulated and administered by the military (Angola and Argentina). A few countries have created semi-autonomous airport authorities, which is a growing trend. They are publicly owned and generally self-sustaining, with access to private debt capital.

xii. The current institutional framework for airport regulation includes the ICAO, bilateral agreements, national aviation authorities, and local government airport authorities. External influences on these participants include industry associations, regional trade blocs, domestic airlines, and local interest groups. Of increasing importance to the development of appropriate regulatory frameworks are environmental and economic factors. Environmental concerns pertain to noise abatement, emissions, water, sewage, fuel storage, and waste disposal. On the economic side are cost-recovery pricing, ownership structure, asset valuation and land use, market access, subsidies and cross-subsidies, concessions, economic pricing, and price versus profit controls.
Challenges Ahead

xiii. In general, there is an urgent need for a coherent, integrated airport privatization strategy, reduced political interference, and increased transparency. Most airport divestitures are site-specific and rarely occur within an integrated strategy for restructuring and privatization of a national system. Most countries have undertaken privatization of large, major airports, leaving unviable operations to be funded by the government. This approach has enabled governments to foster private investment; it also has engendered deleterious economic and social effects given the lack of systematic planning. Whatever the form of privatization, if the government objective is to increase the role of the private sector, then a better grasp of airport revenue performance and pricing will be needed.

xiv External challenges have forced governments and airport authorities to review, and restructure existing ownership, management, and regulatory structures. On the demand side, the biggest challenge facing airports is accommodating air traffic transport with existing capacity constraints. Between 1982 and 1993, total world air passenger and cargo transport, which is highly sensitive to economic growth trends, grew 3.7% and 4.1%, respectively. Some of this growth can be attributed to the globalization of industry as well as airline industry deregulation and restructuring. Air traffic forecasts for the next 10 years range from 3% to 6%. Many existing facilities will need to be rehabilitated to accommodate larger planes that service long-haul destinations and carry loads of between 375 and 800 passengers. In addition, the growing awareness of environmental considerations will force airports to change operating schedules, prohibit certain users, and alter expansion and greenfield projects to meet higher standards. Also, airports will need to improve intermodal linkages to better integrate with national transportation structures and facilitate airport access. Finally, airports have historically relied heavily on government funding, and to a lesser extent, internally generated funds and commercial loans. Given the need for governments to reduce fiscal expenditures, private sector funding will need to be sought to meet anticipated investment requirements.

Conclusions

xiv. To meet future challenges facing the aviation sector, a number of countries have initiated programs to improve the efficiency of air transport, especially their airport infrastructure. Given the variety of responses by government relative to private sector involvement, a strategic framework will be needed to provide a blueprint for capturing the potential economic benefits of the airport sector to the national economy and to stimulate private sector involvement. This framework will need to consider the development of an integrated transport policy framework; facilitating private sector participation; a restructuring agenda; a privatization agenda; and a regulatory agenda at both the national and international level.
I. INTRODUCTION

A. Infrastructure and Economic Development

1.1 Infrastructure services are a basic ingredient to the activities that promote economic growth and production, on average accounting for between 7% and 11% of GDP, with transport being the largest contributor. According to the 1994 World Development Report, infrastructure capacity grows in concert with economic output: a 1% increase in the stock of infrastructure is associated with a 1% increase in GDP across countries. Importantly, as national income rises, infrastructure adapts to support changing patterns of demand, with the shares of power, transport, and communications increasing relative to basic services, such as water and irrigation.

1.2 Developing countries invest about US$200 billion annually in new infrastructure or 4% of national output, which is nearly 20% of total investment, and between 40% and 60% of public investment. The average economic rate of return for completed World Bank infrastructure projects is 16%, slightly above the Bank's threshold of 15%. Returns are highest for transport and telecommunications and lowest (and declining) for power and irrigation projects. In the transportation sector, the Bank's portfolio has performed better in roads and ports compared to rail and airports (see Figure 1.1).

FIGURE 1.1: Average Economic Rates of Return, World Bank Projects, 1983-92

1.3 Many countries made impressive strides in infrastructure expansion during the earlier stages of this public sector initiative; however, recent experience has revealed serious and widespread misallocation of resources, as well as failure to take into account actual
demand. Moreover, the preemptive instruments of public ownership, financing, and operation have not demonstrated any significant advantages. These deficiencies in performance are embedded in the prevailing system of institutional incentives for infrastructure supply. Consequently, some problems common to all infrastructure sectors are apparent: operational inefficiencies, inadequate maintenance, excessive dependence on fiscal resources, lack of user responsiveness, limited benefits to poor populations, and insufficient attention to environmental responsibilities.

1.4 According to the WDR, the efficiency and effectiveness of infrastructure derives not from general conditions of economic growth and development but rather from the institutional environment, which varies across these sectors. In response to such constraints, governments worldwide have embarked on market liberalization initiatives and are experimenting with different forms of private participation. During the past decade, the traditional monopolistic public utilities—airlines, telecommunications, and power—have undergone dramatic changes in ownership, structure, and performance. On consequence is that US$61.6 billion was obtained between 1988 and 1992 by developing countries from the privatization of state-owned enterprises. About one-third (US$21 billion) of this can be attributed directly to the privatization of infrastructure entities. Aggregate proceeds from infrastructure privatization have been highest in Latin America, with most activity in telecommunications. Some Asian countries, such as Malaysia and Korea, have opted for partial privatization. Outside Latin America and Asia, however, privatization has been limited. Figure 1.2 portrays the changing pattern of ownership in selected infrastructure sectors.

**FIGURE 1.2: Ownership Structures in Infrastructure Sectors**

![Ownership Structures in Infrastructure Sectors](image)

Source: World Bank Staff

1. Reg Govt = Regional Government, which includes municipal, county, state, and provincial governments.
1.5 Given successful initial experiences, governments are beginning to privatize where market-friendly or competitive environments exist, and to put in place appropriate regulations in monopolistic or less open markets. In 11 of the 12 cases studied by the World Bank, divestiture led to a net increase in wealth. This increase in wealth was distributed unevenly, but with surprisingly positive consequences: foreign and domestic investors gained; some governments lost, but only marginally; employees as a group did not suffer in any case, and in a few instances profited substantially; consumers lost in only three cases as a result of much-needed price increases, but were not affected in five cases, and actually benefited in four. Behavioral changes within organizations were positive, with productivity increasing in three-quarters of the cases and remaining constant in the others. Investment constraints were often relaxed after privatization, enabling expansion in capacity and service enhancement.¹

1.6 Foreign investment flows from new infrastructure entrepreneurs are on the rise. The poor quality of infrastructure in most emerging economies has led to inertia, just when economic growth is needed to generate funds to upgrade infrastructure quality; moreover, the existing uneven and poor quality of infrastructure restrains the economic growth that could attract the required private investment. A survey of investors found that infrastructure quality is the most important determinant of multinational investment in manufacturing and high technology (see Figure 1.3).

**FIGURE 1.3: Impact of Infrastructure Quality on Development: Investors' View**

![Figure 1.3: Impact of Infrastructure Quality on Development: Investors' View](image)


B. An Agenda for the Transport Sector

1.7 In most developing countries, the demand for freight and passenger transport is growing faster than population and GDP growth rates. Moreover, the structure of freight transported has shifted dramatically. Globally, the share of raw materials moving between regions has declined while the share of cross-movements of manufactures and semi-manufactures has increased. Manufacturing exports now represent over 50% of total exports in low-income developing countries, more than 60% in middle-income countries, and in excess of 90% in Asia's newly industrialized economies. The adequacy of infrastructure quantity and reliability is a key factor in the ability of countries to compete in international trade, even in traditional commodities. For example, infrastructure problems contribute to high shipping costs borne by the exporter. Thus, the competition for new exports and location of global industries largely depends on the quality of infrastructure.

1.8 During the past two decades, increased globalization of world trade in many countries arose not only from the liberalization of trade policies but also from advances in communications, transportation, and storage technologies. About two-thirds of production and sales in OECD countries are processed directly to order, with "just-in-time" delivery of products becoming the norm in many sectors. Significantly, 60% of all exports from developing countries are directed to OECD markets and must meet OECD standards. As service, delivery, and quality become increasingly more critical factors, transportation will replace labor costs in establishing an international competitive cost advantage. Shippers in developing countries wishing to compete in global markets or participate in global sourcing, must have access to state-of-the-art multimodal transport systems involved in containerization, which requires precise coordination by shippers across rail, ports, air, and road freight modes.

1.9 Despite many previous successes, inefficiencies in the current transportation system increasingly impedes the ability to respond to the changing requirements of world businesses and consumers. The transport sector historically has enjoyed the largest share of public investment among infrastructure sectors, typically absorbing 5% to 8% of total paid employment. Unlike other infrastructure sectors, transport has been slow to meet new development challenges. This is surprising given that it has outperformed all other sectors in rates of return achieved for Bank-sponsored projects. Currently, many national transportation systems are overbuilt with many non-viable components.

1.10 The transportation vision for the twenty-first century will need to focus on three key players in the industry: shippers, passengers, and carriers. Shippers must have an efficient, integrated transportation system that will create a level playing field for global competition; passengers must have a multimodal transportation system that is safe, reliable, and affordable; and carriers must be able to compete for business on an equitable basis.
C. The Growing Importance of Air Transport

1.11 The world is facing an era of greatly increased communications, more freedom of travel, international trade, and investment across borders. The growth in travel and tourism, which is now the world's largest industry, has been fueled largely by a shift in attitudes. Travel was considered a privilege of the moneyed elite; it is now viewed as a basic human right and economic necessity. The expansion of tourism, apart from widening cultural opportunities for millions of people, has led to greater economic prosperity in previously underdeveloped regions.

1.12 In addition, air transport has prompted a number of industries to expand their geographical markets and introduce "just-in-time" innovative distribution techniques. The globalization of production and markets has contributed to improving the use of resources worldwide. Today, fresh-cut flowers, vegetables, fruits, and a multitude of perishable commodities are available from remote corners of the world. To a large extent, this shift has occurred as a result of advances in air transport.

1.13 The supply of international air transport is provided by some 300 airlines that directly employ more that 3 million people and serve 14,000 airports worldwide, with a total fleet of about 15,000 aircraft. In 1993, the total number of passengers (both scheduled and charter flights) was more than 2.2 billion, of which a quarter were international passengers, while over 37 million tonnes of freight transported by air accounted for almost a quarter of the value of the world's manufactured exports (see Figures 1.4 and 1.5, respectively).

FIGURE 1.4: Regional Distribution of Air Passenger Traffic (1993)

Source: Airport Council International, World Bank Staff
1.14 To meet these challenges, many governments are reexamining their role in the air transport sector. A number of state-owned airlines around the world were privatized during the 1980s. Based on the successes achieved during the first wave of privatizing public enterprises, many developing countries are now embarking on the privatization of public services. At the head of this list is the privatization of airports.

D. Objectives of the Report

1.15 Traditionally, the World Bank has viewed airports as extensions of the tourism sector. The Bank's involvement in the aviation sector generally has been limited to financing or expanding airport runways owned by the public sector as well as airport maintenance through Development Finance Credit (DFC) loans. Furthermore, the Bank's airport lending experience has not been impressive (see Figure 1.1). Air transport infrastructure (airports) is critical to serving the growing demands of international trade and development. Airports should be integrated with other modalities of transport—seaports, trains, rail, and highways—and serve as key links in the globalization of world business. In light of emerging trends, the Bank will need to reexamine the role of airports in the context of national development objectives.

1.16 To further improve the Bank's knowledge in this sector—especially reducing the role of the state and improving the efficiency of airport administration and regulation—a research report was initiated by the Bank in May 1994. This is the first review the Bank has undertaken in this area, and is intended to stimulate discussion on the experiences and preliminary lessons learned from an array of ownership structures and private sector participation in airports.
 Numerous articles and conference papers have appeared in recent years dealing with various aspects of airport management. However, the literature is limited on how different forms of airport ownership structures are responding to changes in strategic aviation policies, such as the consequences of airline deregulation. Due to the limited availability of literature and the diversity of structures and approaches, the study team complemented its research with visits to selected airports in three geographical regions. The research team has met with government officials, representatives of airport regulatory agencies, airport and air traffic control managers, and consultants for selected airports. The selection criteria were to examine the conditions that permitted private sector participation in these ventures, the differences in regulatory structures, and the policy frameworks. Case studies on each airport selected will be included in a forthcoming report to be published by the Cofinancing and Financial Advisory Services Department (CFS).

 The objectives of this sector report are to: (i) increase the awareness of policy-makers and Bank staff about the emerging trends in air transport and its links to global industry; (ii) analyze the different forms of airport ownership structures and regulatory frameworks, especially their effect on the cost and revenue structures of airports; (iii) assess the lessons learned from recent privatization experiences and their effects on the future role of the state; and (iv) develop an inventory and bibliography of recent experiences with airport corporatization and privatization. The next chapter focuses on the characteristics and ownership structures of airports.
II. AIRPORT FUNCTIONS AND PUBLIC OWNERSHIP STRUCTURES

A. The Functional Activities of Airports

2.1 An airport can be defined as one or more runways for aircraft together with associated terminals and buildings where passengers and freight are transported and processed. Domestic and international airports are considered to be large complex industrial enterprises. (Airstrips or "aerodromes" do not meet this definition and are therefore excluded from this study.) Airports act as a forum for disparate functions and related activities that combine to facilitate air transport traffic and the interchange between air and surface transport. The extent of an airport authority's involvement in these functions substantially affects revenue and cost structures and creates comparability differences among airports. Such differences are compounded when airport owners are conglomerates with substantial non-aviation activities, e.g., BAA Plc or the New York Port Authority.

2.2 For historical, legal, and commercial reasons, the activities performed within an airport vary among countries, and often among airports within the same country. In many developing countries, the three principal airport functions are typically owned and operated by a government entity, whereas in many industrialized countries, ownership functions are diffuse. Due to fiscal constraints, government entities are increasingly divesting many airport operational activities. A number of these countries have corporatized air traffic control systems, and police and security of the airport are frequently undertaken by private firms. Furthermore, traffic-handling activities (excluding customs and immigration) can either be supplied by an airport administrator or contracted under private provision to airlines, while commercial activities are generally provided under private concession. Fire, ambulance, rescue services, and maintenance continue to be handled by an airport authority. Within the overall umbrella, airport services and facilities can be classified into three groups:

(a) Essential operational services and facilities. Such services are primarily concerned with ensuring safety of aircraft and airport users. This includes air traffic control (ATC) services to facilitate the approach and landing of aircraft, meteorological services, telecommunications, police and security, fire and ambulance services (including search and rescue), and runway and building maintenance. These facilities and services are generally provided by the airports themselves or by local or central government departments. The costs for such services differ among airports.

(b) Traffic-handling services. Numerous traffic-handling activities occur at airports. Those associated with aircraft are commonly referred to as "ground handling." This includes cleaning, provision of power, fuel, and processing baggage and freight. Other ground-handling activities are more specifically traffic-related and cover the various stages of processing passengers, baggage, and freight through terminals and onto aircraft. Parts of the traffic handling process may be the responsibility of different authorities. In about half the larger European airports these activities are provided by either airlines or specialized handling agents. But there are several larger airports, such as those in Spain
and Austria, where these services are provided jointly by the airlines and the airport authority.

c) Commercial activities. At a number of airports in industrialized countries, commercial facilities are provided by concessionaires who are specialists in their fields. Airport authorities collect concession fees and/or rents from these companies. However, there are other countries where the airport authorities themselves are directly involved in running some or virtually all the commercial outlets. In addition to the usual shops, some of the larger airports provide an extensive range of other services to their customers both within the terminal buildings and on airport property. Depending on the size of the airport, commercial activities range from duty-free shops, catering, and restaurants to car parking and car rental agencies, plus a myriad of other services.

**TABLE 2.1: Principal Airport Functions**

<table>
<thead>
<tr>
<th>Principal Functions</th>
<th>Operational Services/Facilities</th>
<th>Traffic Handling</th>
<th>Commercial Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air Traffic Control</td>
<td>1. Aircraft (Fuel, Ramp, Hanger)</td>
<td>1. Duty-Free and Shopping</td>
<td></td>
</tr>
<tr>
<td>5. Specific Facilities (Terminals, Airbridges)</td>
<td></td>
<td>5. Other (News, Bank, Hotel)</td>
<td></td>
</tr>
</tbody>
</table>

Source: World Bank Staff

B. Current Airport Ownership Structures

2.3 A majority of commercial airports (excluding a handful of new and general aviation airports) were constructed prior to the mid-1960s, except during "the golden age of the public sector." Similar to other infrastructure sectors, airport ownership during this period traditionally was viewed as strategically important. Consequently, most of the airports in developed and developing countries became operational under public ownership. Many countries made impressive strides in airport expansion under this earlier stage of public leadership. The management and ownership of airports has undergone two distinct shifts. The first change began in the early 1970s, when a number of countries created airport corporations under public ownership to improve efficiency and provide access to private capital markets. In the mid-1980s, a second shift occurred within the context of restructuring the role of the state. A number of countries began to turn to the private sector for financing airport investments directly and further improving efficiency.

2.4 For comparative purposes, airport ownership can be classified under five broad categories (i) national or federal public ownership and public operation normally managed by a government department; (ii) public ownership and public operations run according to commercial practices (a form of "public corporation"); (iii) regional ownership and operations (state governments or local communities or municipalities and user provisions that may be run based on "commercial practices"), (iv) public ownership with operations contracted to the private sector; and (v) private ownership and operations, often with a regulatory structure.
Within a country, or sometimes within an airport, a number of variations exist along this ownership spectrum. For instance, only part of the United Kingdom's airport system is completely privatized, while the rest is under local ownership; in Canada, only Terminal 3 at Toronto airport is privatized, with the rest under federal and local government operations. Table 2.2 provides an inventory of current and planned changes (identified in capital letters) of airport ownership structures in selected countries.

**TABLE 2.2: Inventory of Airport Ownership Structures in Selected Countries**

<table>
<thead>
<tr>
<th>PUBLIC PARTICIPATION</th>
<th>PRIVATE PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Department</td>
<td>Public Corporation</td>
</tr>
<tr>
<td>EUROPE AND NORTH AMERICA</td>
<td>CZECH REP, GREECE, HUNGARY, ROMANIA, RUSSIA, SWEDEN</td>
</tr>
<tr>
<td>ASIA AND PACIFIC</td>
<td>CHINA, HONG KONG, MALAYSIA, INDIA, JAPAN, THAILAND</td>
</tr>
<tr>
<td>LATIN AMERICA AND THE CARIBBEAN</td>
<td>ARGENTINA, BOLIVIA, COLOMBIA, HAITI, MEXICO, URUGUAY, VENEZUELA, CHILE</td>
</tr>
<tr>
<td>MIDDLE EAST AND AFRICA</td>
<td>ANGOLA, GABON, KENYA, SAUDI ARABIA</td>
</tr>
</tbody>
</table>

**FINANCING**
- Direct Govt. Subsidies
- Multilateral Lending
- Bilateral Lending

**FINANCING SOURCES**
- Debt with Govt. Guarantees
- Municipal Bonds

**FINANCING SOURCES**
- Debt with Govt. Guarantees
- BOT, BTO; Leases
- Quasi-Equity Instrument
- Equity Instruments

**PUBLIC RISK**

**SHARED RISK**

**PRIVATE RISK**

Source: World Bank Staff
C. Publicly-Owned Airports

2.5 Among the many differences between publicly- and privately-owned airports is the issue of access to financing sources. Publicly-owned airports—government department, public corporations, or regional ownership—have limited access to debt financing. In the case of government departments, debt financing is directly from government sources or indirectly through official lending institutions (multilateral and bilateral agencies). However, in the case of public corporations and regionally-owned airports, debt financing is extended to the private capital markets under some form of “implicit” government guarantee. The following is a description of the three different types of publicly-owned airports:

- Public Ownership and Public Operations

2.6 The majority of airports around the world are directly owned and operated by the central government. In many countries a single government department, usually a civil aviation department or an airport administration, generally under the responsibility of the Ministry of Transport (sometimes the Ministry of Defense), operate all or most of the country's airports. A number of countries in Europe, Asia, and Latin America and the Caribbean are considering changing to the existing ownership structure mainly in response to investment needs of airport infrastructure. In many of the Middle East and African countries, the pace of airport ownership change is slower. There are a few publicly-owned airports, such as Hong Kong, that are efficient and profitable. A large number of publicly-owned and operated airports are generally inefficient, rely on large government subsidies to cover operating expenses, and are normally not in compliance with international safety and environmental standards due to limited government funding.

2.7 In Argentina, the Comando de Regiones Aereas (CRA, an arm of the Air Force), owns, administers, operates, and regulates an extensive airport infrastructure consisting of some 400 airports. Many of these airports are “aerodromes,” general aviation airports, or airstrips owned by private individuals. Of this total, there are about 60 airports that are part of the Argentine National Airport System (NAS). The CRA employs approximately 5,500 staff. In addition to its traditional airport activities, the CRA is also involved in a number of commercial activities through joint ventures with private firms. The ownership and management structure of the airport is shown in Table 2.3.

TABLE 2.3: Argentina—Principal Airport Functions

<table>
<thead>
<tr>
<th>OPERATIONAL ACTIVITIES</th>
<th>TRAFFIC HANDLING</th>
<th>COMMERCIAL ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Traffic Control</td>
<td>CRA</td>
<td>Intercargo</td>
</tr>
<tr>
<td></td>
<td>Ground and Ramp Handling</td>
<td>Duty Free and Shopping</td>
</tr>
<tr>
<td>Police and Security</td>
<td>CRA</td>
<td>Edcadessa</td>
</tr>
<tr>
<td></td>
<td>Freight Handling</td>
<td>Catering and Restaurant</td>
</tr>
<tr>
<td>Ambulance, Fire and Rescue</td>
<td>CRA</td>
<td>Intercargo</td>
</tr>
<tr>
<td>Maintenance</td>
<td>CRA</td>
<td>Car Parking</td>
</tr>
<tr>
<td></td>
<td>Passengers</td>
<td>Caritas</td>
</tr>
<tr>
<td>Specific Facilities</td>
<td>CRA</td>
<td>Intercargo</td>
</tr>
<tr>
<td></td>
<td>Customs and Immigration</td>
<td>Surface Transport</td>
</tr>
<tr>
<td></td>
<td>Customs Unit</td>
<td>Manuel Tienda Leon</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caled Air Force; Province</td>
</tr>
</tbody>
</table>

Source: World Bank Staff.
2.8 This ownership, administrative, and regulatory structure, all combined under one agency, makes it relatively unique compared to other countries. Although many countries began the ownership and administration of airports with Air Force participation due to their strategic nature, many governments have now separated commercial and military air traffic activities. The Argentine Government is among a handful of countries that now has decided to change the ownership structure of its national airports.

2.9 In contrast, the Civil Aviation Department (CAD) of Hong Kong, also a government agency, is managed by a small staff with active advisory participation of airlines and the private sector. The CAD is under the supervision of the Secretary of Economic Services, a government authority responsible for overseeing most public utilities. The existing airport—Kai Tak Airport—is profitable and efficiently managed, with annual profits of about HK$1 billion. CAD employs about 370 staff who provide air navigation services, technical regulation, and the administration of Air Services Agreements. Most of the airport's related activities are subcontracted to private concessionaires who employ some 23,000 staff. The CAD's work is complemented by specific boards and committees with advisory status to the government. The Aviation Advisory Board advises the government on broad policy matters, such as air transport services and operations. The Airport Operations Committee, which is composed of senior members from the airlines, CAD, and a representative of the Royal Air Force, provides assistance and counseling to the Director of CAD on operational issues. Finally, the Airport Facilities Committee is chaired by the airport general manager and senior staff from the airlines, Hong Kong Air Terminal Services, tourist associations, and other members involved in passenger and cargo related activities.

2.10 To modernize its existing facilities and respond to fast-growing regional market needs, the Hong Kong Government has embarked on one of the most ambitious transport infrastructure development programs in building a new airport—Chek Lap Kok—on Lantau Island. The total cost of this mega-infrastructure project is US$21 billion. The Government is contributing 50% of the capital requirements in the form equity investments and public works; and the remainder is being contributed by the private sector in the form of equity investment, commercial lending, and project finance (i.e., BOOT for the Western Harbor Crossing Project). The Airport Corporation Bill, now under review by the Government of China, would create a fully autonomous government corporation. The staff of the Provisional Airport Authority (PAA), currently managing the construction of the new airport, are to be transferred to the new Hong Kong Airport Authority.

Public Ownership and Public Operations with Commercial Orientation

2.11 Airport public corporations were established to improve managerial and financial autonomy and provide access to private capital markets without foregoing changes in ownership. Established in 1966, the British Airport Authority (BAA) was the first national airport authority to be run according to commercial practice. Several national airport authorities were created in the 1970s and 1980s, some of which were modeled on BAA. Examples of corporatized airport authorities include: The Israeli Airports Authority; Aeropuertos Espanoles y Navegacion Aerea of Spain (AENA) and Aer Rianta of Ireland; the Federal Airport Corporation of Australia (FAC); Infraero (Brazil); the Airport Authority of Jamaica (AAJ); and the Local Airport Authorities of Canada (LAA).
2.12 In Australia, the FAC was established by passage of the 1986 Federal Airports Corporation Act, assuming responsibility for 23 airports, of which 8 were international and 3 owned jointly with the Department of Defense. One of these airports, Cambridge, was sold by FAC in 1993. The FAC Board of Directors is nominated by the Government and consists of members from the political, business, and academic arena, reporting to the Minister of Transport. The Board of FAC must focus its operations on achieving agreed performance targets and objectives determined in corporate plans within the accountability framework under which they operate.

2.13 In Canada, the Minister of Transport established a Task Force in 1985 to examine alternatives to the existing airport system. A year later, the Task Force recommended the establishment of "Local Airport Authorities (LAA)," which would be devolved to provincial and municipal governments. In 1992, the international airports owned and operated by Transport Canada in Vancouver, Calgary, Edmonton, and Montreal (Dorval and Mirabel) were leased to the LAAs. Each authority is a non-profit corporation headed by a board of directors. Members are nominated by local municipalities and other representative local groups, but cannot be elected politicians or civil servants. Profits generated by LAAs are plowed back into future airport improvements, while losses are offset by Transport Canada through a reduction in lease payments. The LAAs are responsible for management, operation, and maintenance, as well as capital investment projects of the airports they lease. This includes runways, terminal buildings, industrial properties, parking, ground transportation, emergency response services, and financial, personnel, and administrative functions.

Regional Ownership and Operations (State, Municipal, and Local Community)

2.14 An alternative to federal participation is regional government ownership, in which there are co-ownership arrangements between state, municipal, and local entities. This approach has been used most extensively in some of the larger industrialized countries, such as the United States, the United Kingdom (for airports not owned by the British Airport Authority), and France. Due to centralized governmental systems, developing countries have almost no experience with this type of ownership approach. Regional airport structures are usually established for the promotion of regional economic development (some are "non-profit"). A disadvantage of this structure is that many regional airport authorities have experienced the heavy-handed bureaucracy of the Federal Government through management and operational intervention.

2.15 The structure of regional ownership in industrialized countries is varied and complex. At some airports, regional ownership was the initial structure while for others this framework was established by government action. Management is selected by either federal/regional governments and/or the private sector. A number of regional airport authorities operate more than one airport, e.g., Aéroports de Paris (four), Aéroports de Montreal (two), the Port Authority of New York and New Jersey (three), and Metropolitan Washington Airport Authority (two). Much more widespread are local airport authorities that operate a single airport. Individual airport authorities generally have a single owner, namely the local municipality or government. A unique case is Basel-Mulhouse Airport on the French-Swiss border, which is jointly owned and administered by two regional governments.
2.16 In the United States, the Washington National and Dulles Airports are an anomaly because both entities remain federally-owned. In June 1987, the US Government established the Metropolitan Washington Airport Authority (MWAA) and defederalized airport operations from the Federal Aviation Authority (FAA). MWAA was given a 50-year lease to operate the two airports. It established an 11-member board of directors, one of whom is a Presidential appointee, while the others are elected officials from the District of Columbia and the others from the States of Maryland and Virginia. Congressional legislation and Presidential signature are required to overturn board policies. In addition to the board, the US Congress appointed an independent body, the Board of Review, to oversee and exercise veto power if necessary over decisions of the board of directors. However, in 1991, the Supreme Court ruled that the Board of Review's veto power was unconstitutional.

2.17 Publicly-owned airports, with a few exceptions, generally have not performed at the same level of efficiency as compared to airports with private sector participation. Reasons contributing to the inefficiency of publicly-owned airports include: political interference in the appointment of management, uneven commercial structures, operational inefficiency resulting primarily from overstaffing and limited commercial orientation, inadequate maintenance, a fiscal drain on the national economy when funds should be diverted to more social programs, the lack of responsiveness to user needs, and inadequate economic and environmental regulations.

2.18 To overcome these constraints and meet the future investment needs of airports, governments are pursuing changes in airport ownership structures. Table 2.1 shows that most of the ownership movement in airports is being spearheaded by publicly-owned airports, who are bypassing the intermediate stage of corporatization and proceeding directly to some form of privatization. Within the public corporation structure, Australia and Jamaica are among the few countries that have announced plans to privatize their airports. Regionally-owned airports have offered resistance in changing the ownership structure, especially airports operating in the United States and France. The next chapter addresses the techniques and experiences with airport privatizations.
III. THE PRIVATIZATION EXPERIENCE OF AIRPORTS

A. Privatization Approaches

3.1 Deregulation and privatization policies in large measure have been driven by disenchantment with public sector performance, fiscal crises (often related), and technology changes that have increased the scope for competition. Privatization has been achieved by changes in either the management, capital, or ownership structures of the entity. In the airport sector, the use of privatization techniques is limited and no single model has emerged. Hence, the observation that privatization of airports is not a single theory with a single definition. The range of options to date include divesting an entire airport system, individual airports, management, airside functions, or landside activities. Table 3.1 delineates the techniques used in the privatization of airports.

TABLE 3.1: Techniques Used for Private Sector Participation in Airports

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Landside</th>
<th>Airside</th>
<th>Airport (private)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State</td>
<td>State</td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>State</td>
<td>Private</td>
</tr>
<tr>
<td></td>
<td>State</td>
<td>State</td>
<td>Private</td>
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<tr>
<td></td>
<td>Private</td>
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<td></td>
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<tr>
<td></td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
</tr>
<tr>
<td>PPI Options</td>
<td>Management</td>
<td>BOOT</td>
<td>BOO</td>
</tr>
<tr>
<td></td>
<td>Contract</td>
<td>BTO</td>
<td>BOOT</td>
</tr>
<tr>
<td>Service</td>
<td>Concession</td>
<td>LDO</td>
<td>Management Contract</td>
</tr>
<tr>
<td>Capital</td>
<td>BOO/BTO</td>
<td>LDO</td>
<td>Wraparound Addition</td>
</tr>
<tr>
<td>Markets</td>
<td>Wraparound</td>
<td>MEBO</td>
<td>Addition</td>
</tr>
</tbody>
</table>

Source: World Bank Staff.

3.2 Airport privatization has been facilitated by outright asset sale through stock flotations, concessions, long-term leases, and joint ventures. Equity flotations have occurred in only a few cases, and almost exclusively in Europe. The largest single airport privatization took place in 1987 with the full divestiture of the British Airport Authority (BAA), which includes the three large airports in London. Private sector participation in airports in East Asia has revolved primarily around greenfield projects, e.g., Kansai (Japan), Hong Kong, and Kuala Lumpur (Malaysia). In the development of these new airport facilities, governments have maintained majority ownership. Although not limited to developing countries, the most common technique for airport privatization involves some variation of a Built-Own-Transfer (BOT) and/or management contract. These schemes are site-specific with long-term concessions and the transfer involve of operational functions to a private sector operator.

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B. Public Ownership with Private Operations

3.3 Unlike the sale of productive tradable enterprises, the privatization of infrastructure and services typically requires the creation of innovative financing and operating structures. For example, the state can continue to "own" infrastructure assets but still effectively privatize them. It can achieve this by allowing either the private sector to be a partner with the state (through joint ventures, majority, or partial shareholdings), or it can allow the private sector to bid for the right to collect user fees over a specific period, after which the government re-auctions the improved asset. Within this ownership structure, there are several models of privatization that have been implemented. The definitive element in a privatization project is the manner in which the public and the private sectors share risk, responsibilities, and rewards. The following are definitions of the modalities of this form of ownership arrangement:

3.4 Joint Ventures. The newly created Kansai International (KIA, Japan) which became operational in 1994, has a unique ownership structure. This is a joint venture between the public and the private sectors. The Government owns two-thirds of the shareholdings, with the remainder divided between 12 different local governments and 803 private companies and individuals. The total project cost was in excess of US$20 billion. This included the development of an artificial island, terminals, runways, and transportation links to the mainland. KIA is administered as a private company, but is subject to the general supervision and control of the Ministry of Transport. Despite this joint venture structure, KIA has limited managerial and financial autonomy. Furthermore, there is no independent economic regulator to oversee airport pricing mechanisms. Due to its newness, it is too early to discuss the merits of this ownership structure.

3.5 Majority/Partial Divestitures. This form of ownership structure is more evident among the smaller European countries, which have used this technique as a means to obtain private equity funding for future airport expansion. An example of this ownership structure is Zurich Airport in Switzerland. Although the Canton of Zurich is the legal owner and operator, a private real estate company, Flughafen Immobilien Gessellschaft (FIG), has taken over airport operation from the Canton. Though the Canton maintains a 50% shareholding in FIG, the remaining shareholders are private, so that it operates as a private company.

3.6 Airport equity has changed in four other countries: The United Kingdom, Austria, Denmark, and Italy. In the United Kingdom, Liverpool (76% owned by British Aerospace), and East Midlands were partially divested to the private sector. In 1992, the Government of Austria divested 27% of its equity shareholdings in Vienna International Airport (VIE), which had previously been a public corporation. Due to the success of the initial flotation and requirements for additional equity capital, the Austrian Government recently announced the sale of an additional 22.1% of equity. In one of the first examples of strategic partnerships between two airports in different countries, Schiphol Airport in Amsterdam was to acquire 1% of VIE's capital. In 1994, Copenhagen Airport utilized this technique to float 25% of its share capital on the stock exchange. In addition, some of the larger Italian airports are managed by companies holding an airport concession, with both public and private
shareholders. Alitalia, which is 30% privately owned, holds 56% of the shares in Aeroporti di Roma, 15% in Genoa, 10% in Florence, 5% in Naples, and 1% in Turin. Lastly, Birmingham Airport (UK) announced that 51% of its share capital would be sold in August 1995. Shortlisted bidders include Aer Rianta (Ireland) and Lockheed Martin. BAA plc. is likely to be excluded from the bidding process since they already own seven major airports in the UK.

3.7 Management Contracts. The management of all or part of the airport is contracted by the airport authority to a specialized operator for a given period of time and under specified conditions: performance criteria, economic incentives, maintenance and infrastructure commitments. Management contracts take different forms depending on the type of services managed, the level of autonomy in day-to-day operations, and economic incentives. Generally, the airport operator will subcontract commercial activities via concession agreements to a number of external specialists. In some cases, management contracts have included equity participation by the private entity. This mechanism is frequently used when the government wishes to maintain ownership and has made or is committed to major investments in airport infrastructure, but desires to divest operations and management functions to the private sector. This technique can also be used to privatize airport operations through the creation of a joint venture.

3.8 Under a management contract scheme, in 1993 the administration and operations of airport activities of 7 of 14 airports in Cameroon—including the newly-constructed Yaounde International Airport—were transferred to Aéroports du Cameroun (ADC). To facilitate this transfer, the Government of Cameroon created Aéroports du Cameroun (ADC) through a joint venture arrangement. Aéroports de Paris (ADP) is the largest shareholder of ADC (34%), followed by the Government of Cameroon (29%), and ASCENA, a pan-African aviation and air traffic control entity (20%). The remaining equity was distributed among three carriers that operate domestically—CAMAIR (8%), UNITAIR (3%), and Air Affaires Afrique (3%)—and BICIC (3%), a major bank. ADC was granted a 15-year concession and is required to reinvest a percentage of its profits in the airport system. Investment responsibilities are relatively low and largely associated with remodeling and redesign of commercial space with some minor airside repairs. In consultation with the Government and airport users, ADC is responsible for establishing airside and landside charges. ASCENA retains responsibility for providing air traffic control and fuel concession services, maintaining military facilities, and the acquisition of safety equipment. In addition, ASCENA receives 2% of all fees at selected airports.

3.9 Build-Operate-Transfer (BOT). As a result of experiences in other infrastructure sectors, a number of countries are experimenting with private investment of airport terminals, runways and facilities as a means of reducing the capital financing requirements of airport owners. A BOT scheme is when a government grants a concession or a franchise to finance and build or modernize a specific facility to a private firm and to operate

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2 ASCENA, or Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar, is an African multinational agency legislated by the 16 signatories of the Dakar Convention of 1974.
and obtain revenue from the operations—airside, landside, or full airport for a designated period (10 to 50 years). The private sector operator typically assumes all commercial risk under the concession. At the end of the concession period, the government retakes ownership of the improved asset. Arrangements between the government and the private operator are set out in a concession contract that may or may not include any regulatory provisions. BOTs are widely used for infrastructure development and in airport privatizations generally have a long-term duration (20 to 50 years is typical).

3.10 Due to its attractiveness, this form of privatization has been completed or is underway in 17 countries. A number of such projects are underway in Eastern Europe and the former Soviet Union, and BOT airports or terminals are also beginning to appear in Latin America, Asia, and the Caribbean. Of the 18 BOT projects under consideration, 9 involve entire airports rather than simply a new terminal or runway. Figure 3.1 shows the airport BOT projects that are completed or underway.

FIGURE 3.1: Summary of Airport BOT Projects, July 1994

3.11 While not all these projects will go forward, the trend is toward this form of privatization. This initiative is increasingly attractive to host governments because it provides access to private capital markets, transfers project risk to the private sector, and enables the project to benefit from the skills and experiences that may not be available in the host country. To the private sector, airport and airport terminal BOTs are attractive instruments due to relatively predictable (and usually rising) revenue streams and limited exchange rate exposure, especially at international airports. Several variations of this framework have been used, but most involve long-term leases and predetermined investment commitments.
3.12 A long-term concession, which has a duration of 20 to 40 years, is given to a private firm for the exploitation of a particular service or facility—passenger terminal, cargo terminal, runway, or airport. The private firm has the responsibility to finance, build, and operate the facility for a specified period after which ownership of the facility reverts to the government at a notional cost. In return, the private firm collects revenues generated from the facility, which is used to cover accounting, capital and concessionaire costs. Excess revenues are accrued as profits to the private operator. This scheme allows governments to use private capital at no cost without project and commercial risk.

3.13 A notable example of a BOT scheme is El Dorado Airport in Bogota, Colombia. In 1994, the Civil Aviation Authority (CAA) of Colombia launched an international public bidding process for the development and maintenance of a second runway (3800m). Funding for the US$100 million project will be provided through a 20-year concession in which the private sector operator will collect revenues from landing fees above a guaranteed minimum. The selected private operator will also receive a 20% equity stake in the facility. The CAA will continue to provide air traffic control services, while the private sector operator will be responsible for maintenance of both runways at El Dorado. The selection process commenced in January 1995 and construction is expected to begin later this year.

3.14 Build-Own-Operate-Transfer (BOOT). A BOOT scheme is similar to a BOT except the private firm takes the property title of the facility during construction. Title is transferred to the government at the end of the long-term concession. BOOT schemes typically are used when loan guarantees are required. The new airport in Athens, Greece and Terminal 3 in Toronto are examples of a BOOT.

3.15 One of the first airport BOOT projects was developed in Toronto, Canada. In 1987, Transport Canada, the national aviation authority, brought in a private consortium headed by a property development company to finance, construct, own, and operate a third terminal at Lester B. Pearson Airport in Toronto. Ownership is shared among two private entities—Claridge Properties (73%) and Lockheed Air (27%). The latter through a 60-year lease agreement with Transport Canada (20-year lease with two 20-year renewal options), is responsible for the administration and maintenance of Terminal 3 facilities, property and adjacent roadways and receives a 6% management fee for its services. Land ownership was retained by Transport Canada, which continues to operate the other two terminals at Pearson. Terminal 3 operations are primarily limited to landside activities and begin at apron approach, when the aircraft switches from general to Terminal 3 tower control. Revenues are generated from airline rents and charges (50%), concessions (30%), and parking (20%), which are divided according to the existing ownership breakdown. Terminal 3 operates on a not-for-profit, cost-recovery basis with excess revenues from carriers used to offset future charges. Revenues from concessions are not shared with the airlines until a predetermined plateau is reached. In 1993, the Conservative Party administration attempted to privatize Terminals 1 and
2 through a Lease-Develop-Operate (LDO) scheme using fast-track bidding procedures. This
transaction has yet to be completed as there are a number of pending legal issues.

3.16 **Lease-Develop-Operate (LDO).** A long-term concession is granted to a
private firm on an existing facility. The private firm upgrades and expands the facility
and manages cash flows. In return, the government holds the property rights of the
facility throughout the concession period and receives lease payments on the assets.
Examples of a LDO scheme include: Atlantic City, New Jersey; Morristown, New Jersey;
and Maracaibo, Venezuela. The experience of La Chinita Airport in Maracaibo
provides several important lessons. The LDO scheme was initiated with the creation of
the Zulia Airports Authority (ZAA), an autonomous corporation under the jurisdiction
of the governor of the state of Zulia in 1993. Three airports—Maracaibo, Oro Negro,
and Santa Barbara—were transferred to ZAA. Bidding took place in early 1993, and the
LDO contract was awarded in May of that year to Consorcio Aeropuertos del Zulia, a
consortium between a US-based consulting firm, a local civil engineering firm, and an
international airport equipment supplier. The terms of the LDO arrangement included:
(i) a 20-year concession for the exploitation of all landside and selected airside services;
(ii) an investment program; (iii) a 5% fee paid to ZAA; (iv) 15% charge of gross
revenues to be placed in a local government trust fund for investment purposes; and (v)
the imposition of economic regulation for passenger terminal fees. However, the
scheme was unsuccessful as the consortium defaulted in a series of obligation included
in the concession contract. Moreover, the changes in the political situation in the state
of Zulia resulted in the cancellation of the LDO scheme in February 1994.

3.17 **Wraparound Addition.** An existing government-owned facility is
expanded by a private enterprise, which holds title and operates the addition through a
concession contract. This scheme is frequently used when existing passenger terminal
areas need to be expanded through private sector participation. Also, this arrangement
allows carriers to vertically integrate operations, especially at airport hubs, e.g., United
Airlines at Chicago O’Hare or British Airways at Birmingham International Airport.
However, vertical integration frequently results in excessive carrier influence and can
lead to decreased competition at some airports. Wraparound additions can also be used
to avoid assigning an initial value to an older terminal during the privatization
transaction to achieve greater economies of scale.

C. **Private Ownership and Operations**

3.18 At the end of the ownership spectrum are commercial airports owned and
operated by the private sector. Full private ownership of airports has been more widespread
among general aviation and aeroclub airfields. Two methods have been used for the
privatization of airports. The first is the full or partial divestiture of existing airport assets after
the airport has been established and has a track record as a public corporation. To date, full
privatization of airport facilities has occurred primarily in the United Kingdom. The second
mechanism, which has been used to a limited extent, is the creation and/or expansion of a new
airport facility (for example a new terminal building) under private ownership.
3.19 Operating for more than 20 years as a public corporation, the British Government, in 1987, sold 500 million shares of BAA on the London Stock Exchange. In this divestiture, which was limited to the domestic market, 260 million ordinary shares were offered to the general public and 240 million shares were tendered to institutional investors. To encourage the stable ownership of shares, the UK Government instituted a bonus share program. Moreover, in an effort to avoid concentrated ownership and takeover battles, total individual shareholding was limited to 15%. Up to 25% of total capital was reserved for an employee stock program. Significantly, the Government maintained a symbolic “Golden Share,” which legally gave the Secretary of State for Transport a voice over proposed additions and divestitures of airports, the dissolution of BAA subsidiaries, and the right to impose economic regulation. Since privatization, foreign ownership restrictions have been relaxed somewhat and foreign investors now hold 10% of total equity. To date, BAA is roughly 95% owned by individual investors.

3.20 Belfast International Airport (BIA), the principal airport in Northern Ireland and the fourth largest in the UK, is another example of full airport divestiture. Prior to privatization, BIA was operated through Northern Ireland Airports Limited (NIAL), a government corporate entity. In May 1993, the Department of Environment for Northern Ireland drafted legislation for the privatization of NIAL. Ten interested bidders were prequalified, of which four were short-listed for the sale. The winning bid of US$72 million was presented by the Management and Employee buy-out team consisting of 20 managers and 295 employees of NIAL. Significantly, US$49 million of the total bid was generated through employee funds and US$23 million was derived through NIAL’s cash reserves. To date, BIA was not designated by the Civil Aviation Authority of the United Kingdom for economic regulation. Nonetheless, commensurate legislation to the 1986 Airports Act in the UK was drafted shortly after privatization, which could form the framework for future economic regulation.

3.21 A variant of the BOOT scheme is to bring in private capital and management without returning title to the public sector at the end of the concession period. This type of open ended concession can be accomplished through either Build-Own-Operate (BOO) or a Buy-Build-Operate (BBO) schemes. Under a BOO, ownership of the airport facility is not transferred back to the government at the end of the concession period. Within a BBO arrangement, underdeveloped or deteriorated facilities are purchased from the government through a concession agreement. The facilities are upgraded and/or expanded and the property title is retained by the private sector. Examples of a BOO or BBO schemes include: Freeport, Bahamas; London City Airport, United Kingdom; and Punta Cana, Dominican Republic.

3.22 The development of a new US$104 million terminal (capacity 2.5 million passengers) at Sangster International Airport in Montego Bay provides a good example of a BOO scheme. Sangster and Norman Manley International airports in Kingston are presently owned and operated by the Airports Authority of Jamaica (AAJ), which was corporatized in 1974. The privatization initiative involves the creation of two new subsidiaries within AAJ—the
AAJ Holding Ltd. and Sangster International Airport (SIA) Ltd. The latter is expected to be 70% owned by the private sector. To maximize its return on investment, the Government decided to sell shares in SIA, but due to the limited size of the capital market, equity will be sold in stages to local investors. Through a 25-year lease, the management of the new and existing terminals and airside services currently provided by AAJ will be transferred to SIA. In return, AAJ will maintain ownership of airside assets, 30% ownership in SIA, and a notional Golden Share, which will give the Government of Jamaica special rights over foreign ownership restrictions, asset disposal, and company dissolution. As of this writing, SIA was scheduled to take over the management of the existing facilities and begin construction in the new terminal in May 1995.

D. Preliminary Lessons Learned From Airport Privatizations

3.23 Among the airports surveyed, the principal objective for privatization has been to increase private investment as traditional sources of public funds are scarce. Unlike other infrastructure sectors, airports generally are not a drain on the fiscal budget, and are generally not required to adjust to rapid technological changes, meet service, quality, and efficiency standards. In fact, because they are a natural monopoly, airports are revenue producing and provide ample foreign exchange earnings. This means that the incentives for airport privatization differ from other infrastructure sectors.

3.24 The most common lessons learned from the limited number of airport privatizations completed is the need for a coherent, integrated airport privatization strategy, reduced political interference, and increased transparency. The following summarizes the lessons learned:

- **Privatization techniques have varied among countries.** Airport privatization in selected European countries (e.g., Austria, United Kingdom) have generally been undertaken in two-steps. First, governments corporatized airports to rationalize cost structures, expand revenue generation, and improve investor confidence. These corporatized structures were maintained for 10 to 20 years and later, legislative actions were required to privatize. This two-step process has generally been followed by the flotation of shares on the domestic and international capital markets. In many developing countries, due to the limited depth of the capital markets and management talent in the public sector, privatization, though limited, have taken the form of a long-term concession.

- **Privatization of individual versus network airports lacks a strategic framework.** Most airport divestitures are generally site-specific and rarely occur within an integrated strategy for the restructuring and privatization of the entire national airport system. Most countries have undertaken privatization of the large major airports, leaving behind the non-viable operations to be funded by the government. Not all airports are profitable as many airports serve regional and social functions regardless of viability.
Airport size, type of traffic, and investment costs are factors that should be taken into account prior to privatization. Nevertheless, a few policy options are available, which will increase the attractiveness of poorly-performing airports to the private sector. Privatization could take place within the context of a network-system, which transfers the cross-subsidy issue to the private sector, e.g., BAA. Another option is privatizing only those airports that are self-sustaining, while the public sector retains ownership of unviable airports. Additional funding for poorly-performing airports could come from the sale of financially-strong airports. Lastly, the government could choose to auction the operations of unprofitable airports to the lowest bidder. This scheme would have the effect of retaining some commercial risk with the government, but allowing the private sector an opportunity to improve financial performance.

Efficient airport corporations will become global operators. Increasingly, airport (and air traffic control) corporations are expanding the scope of activities outside their respective domestic markets. Airport authorities, especially those in Europe, are providing management, engineering, planning, and commercial expertise to airports in developing and industrialized countries. BAA, which has been one of the more proactive airport operators, has expanded commercial activities at Pittsburgh Airport, assisted in designing the new airports in Kuala Lumpur and Hong Kong, and agreed to take over management functions at Indianapolis Airport (pending FAA approval). Examples of other airport authorities that have diversified activities into international markets include: Aéroports de Paris in Cameroon; Schiphol Airport in Ecuador; Munich Airport at Shenzhen, China; and the Metropolitan Washington Airports Authority in Moscow. Non-airport authorities, such as Lockheed and Aldeasa, have also become players in this market. In the coming years, airport operators will become more globalized with partnerships in different countries and a greater array of products offered. In the coming years, governments will need to decide on the necessity and role for these airport operators.

Awarding and monitoring of private concession contracts generally lacks transparency. The award of concession contracts to private firms for the delivery of public provisions at airports usually does not follow traditional government procurement procedures. As with other infrastructure sectors, the use of transparent mechanisms during the divestiture process, such as public bidding and adequate dissemination of information, tend to increase the economic value of the transaction as well as public goodwill. When governments are restricted to negotiating privatization of airport facilities with one partner, the fewest economic benefits accrue, and often there are inadequate incentives for future investment. In some cases, such as the proposed privatization of Terminals 1 and 2 in Toronto, the lack of transparency contributes to the failure of the initiative. Since concession
contracts are expected to grow in importance, policy-makers will need to strengthen further the procedures for awarding and monitoring such contracts.

* No correlation exists between the type of airport ownership and levels of passenger traffic. While US carriers have the biggest share of overall air traffic, mainly because the domestic market is by far the single largest air transport market, European airlines still retain the lion's share of both international passenger and freight traffic. This distribution is due to the relatively large number of countries on the European Continent and the restrictions that the existing international regulatory regime imposes on the operation of carriers outside their national borders. In 1992, the largest number of international passengers, in rank order, were selected European airports ranging from about 25-40 million, selected Asian airports ranging from about 20-25 million, followed by selected US airports ranging between 10-20 million. International passenger traffic in most developing countries is typically less than 5 million. Figure 3.2 shows the type of ownership structure and passenger traffic for selected airports.

**FIGURE 3.2: Ownership Structure and Passenger Traffic (millions of passengers, 1993)**
A well-designed regulatory entity should be established before airport activities are transferred to the private sector. Due to their unique structure, airports operate principally under monopolistic conditions. Therefore, regardless of the form of ownership structure—public, mixed, or private—policy-makers should be concerned about minimizing monopoly rents resulting from airport operations (see Chapter 5). Due to the public ethos associated with airports, airport revenues and their pricing and regulatory structures have remained somewhat of a mystery to many private investors. To minimize these rents, policy-makers need to analyze the relationships between sources of airport revenues, prices charged for airport services, and the regulatory framework for establishing and enforcing this relationship. Healthy competition in the provision of traffic handling and commercial activities will improve the financial performance of the airport and increase customer satisfaction. Thus, the interrelationship between revenues, pricing, and regulatory framework clearly can either foster or impede private sector participation.

Whatever form of privatization technique is used, if the government objective is to increase the role of the private sector, a better understanding of airport revenues, performance, and pricing will be needed. Airports have traditionally been labeled the "black box" on the ground. The next chapter analyzes the financial structure of airports and advantages realized under each form of airport ownership structure.
IV. AIRPORT REVENUES, PERFORMANCE, AND PRICING

A. Sources of Airport Revenues

4.1 Airport revenues are generated from two primary sources—airside and landside activities. Airside revenues derive from airport traffic activities related to the operation and landing of aircraft, passengers, or freight. Landside revenues are obtained mainly from non-aircraft-related commercial activities in terminals (e.g., shopping, restaurants, car parking, and car rentals) and rents from airlines and concessionaires. Landside revenues also can include nontraditional activities, such as hotel operations, real estate development, and consulting services. Table 4.1 delineates the various activities under the two main sources of revenue.

TABLE 4.1: Sources of Airport Revenue

<table>
<thead>
<tr>
<th>AIRSIDE REVENUES</th>
<th>LANDSIDE REVENUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Landing Fees</td>
<td>Duty-Free Shopping</td>
</tr>
<tr>
<td>Airport Parking Charges</td>
<td>Catering and Restaurants</td>
</tr>
<tr>
<td>Passenger Fees</td>
<td>Car Parking</td>
</tr>
<tr>
<td>Aircraft Traffic Handling (ground and ramp)</td>
<td>Car Rental</td>
</tr>
<tr>
<td>Cargo Handling</td>
<td>News, Shops, Banks, etc.</td>
</tr>
<tr>
<td>Fuel and Oil Concessions</td>
<td>Airline Terminal Rents</td>
</tr>
<tr>
<td></td>
<td>Commercial Rents</td>
</tr>
<tr>
<td></td>
<td>Utility Sales</td>
</tr>
<tr>
<td></td>
<td>Management Consulting</td>
</tr>
<tr>
<td></td>
<td>Real Estate</td>
</tr>
<tr>
<td></td>
<td>Investment Opportunities</td>
</tr>
<tr>
<td></td>
<td>Other (Hotel, Travel Services)</td>
</tr>
</tbody>
</table>

Source: World Bank Staff.

4.2 Just as definitional and accounting system variations exist among countries, there are also differences in traffic volumes and the mix of airport revenues as well. Findings from a representative sample of airports indicate that government department airports have the lowest average levels of aircraft movement and passenger volumes. Although traffic volumes are low, the conventional wisdom that governments provide the safest airports may not always be true given constraints on revenue allocations for this purpose. Government airports also have the highest dependence on airside revenue, at about 70% of total revenues, compared to slightly over 40% for privatized airports, and about 55% on average for all other airport ownership structures. Table 4.2 shows the traffic and revenue distribution of selected airports by ownership structure.

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1 Definitions and concepts for this chapter were based on Doganis Rigas, *The Airport Business*, Routledge, London and New York, 1991
TABLE 4.2: Traffic and Revenue Distribution, Selected Airports

<table>
<thead>
<tr>
<th></th>
<th>Govt. Dept.</th>
<th>Public Corp.</th>
<th>Regional</th>
<th>Public-Private</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Aircraft Movements (000)</td>
<td>78</td>
<td>165</td>
<td>391</td>
<td>169</td>
<td>188</td>
</tr>
<tr>
<td>No. of Passengers (millions)</td>
<td>6.6</td>
<td>11.9</td>
<td>28.4</td>
<td>12.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Airside as a % of Total Revenues</td>
<td>70%</td>
<td>50%</td>
<td>36%</td>
<td>62%</td>
<td>43%</td>
</tr>
<tr>
<td>Landside as a % of Total Revenues</td>
<td>30%</td>
<td>50%</td>
<td>64%</td>
<td>38%</td>
<td>57%</td>
</tr>
</tbody>
</table>

Source: Airport annual reports and ICAO Airport and Route Facilities, and World Bank Staff.

4.3 Airside revenues generated by traffic handling and fuel concessions also vary significantly among airports. This is because these activities either can be owned and operated by a government department, the airport authority, a private operator, or by the airlines. For example, aircraft traffic-handling activities are carried out by the Vienna International Airport Authority and appear as a component of total airside charges. In Argentina and Hong Kong these activities are carried out by the private sector, with the respective airport authorities receiving only concession revenues. In the United States, the airlines perform this function within their dedicated terminal facilities, with no revenues shown on airport authority balance sheets. Given these differences, consolidated airside revenues are not easily comparable among airports.

4.4 To facilitate comparative analysis, airside revenues are subdivided into fixed and discretionary sources. Fixed revenues rely on established pricing schedules for aircraft landing and parking fees. These charges, which vary significantly among airports, are governed by international regulations. Other airside revenue sources—passenger fees, aircraft and cargo handling, and fuel concessions—are discretionary in nature and subject to individual concession contracts or regulation. Joint public/private and privatized airports generate about 40% of their total airside revenues from fixed airside revenues, while government departments and public corporations generate between 45% and 60%, respectively. Figure 4.1 shows the mix of average airside revenue per aircraft movement between fixed and discretionary sources.

4.5 A number of international airlines have argued that if airports were privatized, aircraft charges would likely increase, and thus weaken even more the financial position of the airline industry. Aircraft charges represent anywhere from 2% to 15% of total airline operating costs, depending on fleet composition and route schedules. According to traffic and financial information for a representative sample of airports the average revenue per aircraft movement at government-administered and privatized airports is about US$650, and is even lower for public corporatized and regional airports. The airside charges for jointly-owned airports is at the high end, at US$930, since revenues generated from aircraft handling services are included.

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If these adjustments were made to the revenues for public-private airports, only a marginal difference appears in the structure of airside revenues. For this reason, the hypothesis that airside charges increase as a result of changes in ownership structure cannot be substantiated.

FIGURE 4.1: Average Airside Revenue per Aircraft Movement

<table>
<thead>
<tr>
<th></th>
<th>Govt. Dept.</th>
<th>Public Corp.</th>
<th>Regional Govt.</th>
<th>Public-Private</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>$317</td>
<td>$275</td>
<td>$186</td>
<td>$354</td>
<td>$258</td>
</tr>
<tr>
<td>Discretionary</td>
<td>$357</td>
<td>$174</td>
<td>$232</td>
<td>$576</td>
<td>$384</td>
</tr>
<tr>
<td>Total Airside</td>
<td>$674</td>
<td>$449</td>
<td>$418</td>
<td>$930</td>
<td>$642</td>
</tr>
</tbody>
</table>

Source: Derived from sample airports listed in Table 3-2 using primary financial data and ICAO reports.

4.6 Subject to Federal Aviation Authority (FAA) approval, airports in the US have been able to collect revenues from passenger fees since 1990. Last year (1994), US airports generated between US$700 million to US$800 million from passenger fees. Airports in major cities of other countries (e.g., Buenos Aires, Bangkok, Madrid, Montego Bay, Wellington, and Vancouver) derive a significantly higher percentage of total revenue from passenger fees without government conditionality. It is noteworthy that many airports also collect airport passenger **taxes** that do not appear in the financial statements of airport authorities; instead, they are transferred to the national treasury.

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3 Estimated. Discretionary charges which were calculated using a weighted average of passengers charges during peak and non-peak periods at Heathrow, Gatwick and Stansted multiplied by total airside charges for each listed airport. Fixed charges were determined as a residual after fixed charges at the other four airports were discounted from total airside revenues generated by BAA. The sum of fixed charges at BAA airports was divided by total aircraft movements.
4.7 At several airports commercial facilities are operated by specialized concessionaires who pay concession fees and rents to the airport authority. Commercial sources of revenue improve operational performance, increase resiliency to cyclical economic conditions, and minimize airline dominance. In the past, airport officials typically focused on operational functions, such as baggage handling, and paid little attention to passenger food and shopping needs. At most government-owned airports the concentration of commercial revenues is limited to a small selection of duty-free shops and restaurant facilities and have been reduced due to the deregulation of duty-free facilities (i.e., the advent of in-flight, on arrival, and in-city duty-free shopping). A survey of airports operated by government departments yields the worst revenue generation results (US$4.88/passenger) among the five ownership structures (see Figure 3.2). Hence, significant scope exists for exploiting landside revenues, which essentially rely on a captive audience.

4.8 Historically, US airports have been much more dependent on revenues from automobile-related concessions (parking, rentals, and limousine service). The development is attributed to the size of the domestic market and limited availability of other forms of airport transportation links. US airports have become more proactive in pursuing expanded commercial activities in recent years. At Pittsburgh International Airport, passengers previously spent an average of US$2.50; however, at the new airport facilities, managed by BAA-USA, passenger spending nearly tripled, primarily as a result of the expanded availability of shops.

4.9 A number of airports are beginning to shift from traditional “public utility management” to a more commercial perspective in response to changing market conditions. Diversifying revenues is one of the major challenges facing airport managers, as governments are increasingly unable to meet their airport financial obligations. An example of this new philosophy is BAA, which developed 355 shops within its 7 airports. In 1993, BAA generated US$731 million from landside activities, of which US$454 million was derived from Heathrow Airport. Approximately 25% of all books sold in the UK and 40% of the caviar in Western Europe are purchased at London’s Heathrow Airport. BAA airports also have the highest average landside revenues per passenger, US$11.14 (see Figure 4.2). In addition to commercial activities, BAA has concentrated on hotel and real estate ventures as well as airport management services. The latter includes the development and management of the air mall in Pittsburgh International Airport and drafting designs for new airports in Kuala Lumpur, Malaysia, and Hong Kong.
B. Financial Performance

4.10 Variations in ownership of airport activities, differing objectives, and lack of standardized financial information complicate financial comparisons. Not only do accounting systems vary significantly among countries but often airport financial data within countries is not standardized. The latter frequently occurs where countries undertook decentralization and/or privatization initiatives. Moreover, industry-wide financial performance criteria are limited in magnitude and scope. In the years ahead, countries will need to concentrate on the standardization of financial data within airport systems and establish performance criteria that would facilitate benchmarking. Within these constraints, the following section shows the results of airports' financial performance.

4.11 In 1993, privatized airports had the highest profit margin (35.7%) compared to regionally-owned airports (13.1%). At 31%, the profit margins of government department airports are comparable to those of privatized airports. These profit margins are impressive when compared to other infrastructure sectors. However, the overall financial performance of airports is influenced by the underlying philosophical differences among airports rather than ownership structures. On average, airports included in the survey were profitable in each ownership category, but the level of profitability varied. Regional government ownership, which occurs primarily in the US, shows the lowest profit margins, since these airports operate within a non-profit framework. Conversely, privatized airports are able to maximize shareholder profits. Table 4.3 displays the 1993 financial performance of selected airports by ownership structure.
TABLE 4.3: Average 1993 Financial Performance of Selected Airports* (in US$ millions)

<table>
<thead>
<tr>
<th>AVERAGE</th>
<th>Govt. Dept.</th>
<th>Public Corp.</th>
<th>Regional Govt.</th>
<th>Public/Private</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Volumes</td>
<td>6.6</td>
<td>11.9</td>
<td>28.4</td>
<td>12.0</td>
<td>11.1</td>
</tr>
<tr>
<td>Revenues</td>
<td>87.7</td>
<td>165.4</td>
<td>254.2</td>
<td>274.0</td>
<td>181.7</td>
</tr>
<tr>
<td>Costs</td>
<td>48.1</td>
<td>121.8</td>
<td>231.2</td>
<td>255.7</td>
<td>116.8</td>
</tr>
<tr>
<td>Staff/Total Costs (%)</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td>Oper./Total Costs (%)</td>
<td>53</td>
<td>44</td>
<td>26</td>
<td>48</td>
<td>46</td>
</tr>
<tr>
<td>Profit/(Loss)</td>
<td>39.6</td>
<td>43.6</td>
<td>23.0</td>
<td>18.3</td>
<td>64.9</td>
</tr>
<tr>
<td>Profit Margin (%)</td>
<td>30.8</td>
<td>23.3</td>
<td>13.1</td>
<td>15.9</td>
<td>35.7</td>
</tr>
</tbody>
</table>

Source: Airport annual Reports and ICAO Airport and Route Facilities, and World Bank Staff

4.12 Ownership structures address different objectives. In this sense, there is no optimal ownership structure. For instance, if the objective is to promote a national airport system, government departments and public corporations address this better than other forms of ownership. If the objective is to increase access to capital markets, government departments pose a natural constraint with regard to limitations on direct borrowing from capital markets. In the absence of standardized financial data, the objectives addressed by each ownership structures will be examined (see Table 4.4).

TABLE 4.4: Objectives Addressed under Different Airport Ownership Structures

<table>
<thead>
<tr>
<th>Govt. Dept.</th>
<th>Public Corp.</th>
<th>Regional Govt.</th>
<th>Public/Private</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Promotes a national system</td>
<td>* Promotes a national system</td>
<td>* Promotes a regional system</td>
<td>* Promotes regional system</td>
<td>* Can promote regional system</td>
</tr>
<tr>
<td>* Depends on the federal government</td>
<td>* Increases financial and managerial autonomy</td>
<td>* Increases financial and managerial autonomy</td>
<td>* Raises funds for the national treasury</td>
<td>* Raises funds for the national treasury</td>
</tr>
<tr>
<td>* Encourages subsidies and cross-subsidies</td>
<td>* Minimizes subsidies</td>
<td>* Minimizes cross-subsidies</td>
<td>* Minimizes subsidies and cross-subsidies</td>
<td>* Eliminates subsidies but not cross-subsidies</td>
</tr>
<tr>
<td>* Indirect or no access to capital markets</td>
<td>Provides access to capital markets</td>
<td>Provides access to capital markets</td>
<td>Provides access to capital markets</td>
<td>Provides access to capital markets</td>
</tr>
<tr>
<td>* Minimizes financial and incentives</td>
<td>Defined profit targets</td>
<td>Non-profit objectives</td>
<td>Increased profit incentives</td>
<td>Maximum profits for shareholders</td>
</tr>
<tr>
<td>* Fosters self-regulation</td>
<td>Fosters self-regulation</td>
<td>Fosters self-regulation</td>
<td>Requires regulation</td>
<td>Requires regulation</td>
</tr>
</tbody>
</table>

Source: World Bank Staff.

* National versus regional networks: Most large countries have a sizable network of commercial and general aviation airports. Generally, airports with large traffic volumes are profitable while smaller ones, which serve regional social needs, are

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generally not viable. Of the 22 airports managed by the Federal Airports Corporation of Australia, only 7 are profitable. Public departments and corporations promote a national integrated system, which contributes to greater economies of scale. According to independent studies, airport operations financially can break-even with between two and three million passengers per year. Airports employing some type of private sector ownership optimize the financial performance of individual airports, which places the financial burden on the national system. In the United Kingdom and Austria, only a few airports were privatized, leaving the rest of the system to other types of ownership structures. Prior to changing the management or ownership structure of airports, governments should determine the economic benefits of maintaining a national or regional system, since certain ownership structures can achieve only limited objectives.

*Financial and managerial autonomy:* Financial and managerial autonomy granted by the government to airport managers has contributed to increased revenues, rationalized costs, and improved operational efficiency. Based on the financial information of a selected number of airports, operating costs are between 10% and 25% higher for government department airports compared to other airports. Increased autonomy also reduces the number of bureaucratic procedures that affect airport operations. One government official observed that federal procurement procedures "require 41 administrative steps to replace a carpet, whereas under private management all that is required is a phone call from the maintenance manager to the supplier and the carpet can be replaced within a day." On the other hand, in a number of countries moving away from the government administration of airports has not assured freedom from political and operational interference. For example, the majority of the board members of the Airport Authority of Thailand, which is legally established as a public corporation, are appointed by the Ministry of Finance, Air Force, and Police Departments, respectively, with the Government financing certain operational expenditures and new investments.

*Subsidies and cross-subsidies:* To a large extent, the allocation of subsidies and cross-subsidies is influenced by ownership structure. Generally airports, except those under full private ownership, receive (or formerly received) some form of direct government subsidy. Nevertheless, changes in management and ownership structure have reduced dramatically government contributions, since airports now have improved access to private capital. The most common form of direct subsidy is the investment grant which is disbursed by national/regional governments to fund specific infrastructure projects. Because governments are full or partial shareholders in airports through airport corporations or joint ventures, investment grants are viewed as a means of meeting national economic objectives. Some countries have institutionalized this subsidy through national programs. A notable example is the Airport Improvement Program (AIP), operated by the US Federal Aviation Administration (FAA), which in 1994 allocated $1.9 billion for airport capital investment projects. This amount is funded by a 10% domestic ticket tax, a $6 international departure fee, and a 6.25% air freight tax.
Importantly, indirect subsidies long have been overlooked in the analysis of airport financial performance. The most common form of indirect airport subsidy relates to the use, payment, and valuation of airport land and assets. Typically, the government does not assess the true market value of land in cases of rent or sale of the airport. If taken into account, these subsidies could significantly affect airport profitability. Other forms of indirect subsidies involve debt guarantees and tax exemptions for airport bonds (the latter arrangement is routine for airports under regional ownership). Both forms lower the costs of capital for airports; the former consists of an indirect payment and the latter represents revenues foregone to the government treasury. Neither subsidy appears in airport financial statements. Indirect subsidies also include tax exemptions on airport profits and property taxes. Although some form of cross-subsidy has been institutionalized within all ownership categories, results vary with ownership structure. Cross-subsidies can occur place between airports and/or between airport activities. The divestiture of a system network generally perpetuates cross-subsidies. For example, airport charges at the primary international airport could be used to subsidize the costs of unprofitable airports. Given the ownership structure of regional airports (i.e., one or more airports in the same geographic area), the extent of cross-subsidies among airports is minimized. Cross-subsidizing occurs when landside revenues cover the cost of airside services or vice versa. Regional airports that have low airside charge schedules due to pricing agreements often cross-subsidize activities. The effects of subsidies and cross-subsidies on the financial performance of airports could not be analyzed, since the literature on this subject is extremely limited.

**Access to capital markets:** Airports owned and operated by government departments are largely restricted from obtaining private capital and are dependent on public investment funds for the development of infrastructure projects. However, constraints on national budgets have diminished greatly the level of government funding to airports. Consequently, providing access to private debt and equity capital has been an important objective for changes in airport ownership in several countries. Although not exclusively, US airports rely heavily on the issuance of airport bonds. This is due partly to the relatively large size of the municipal debt market and the increased availability of airport debt instruments. More significantly, US airports benefit from tax exemptions on airport bonds that provide interest rate differentials of 2 to 3 points. Revocation of the tax-exempt status of airport bonds resulting from changes in ownership structure or government policy would limit access to private debt capital drastically. In comparison, airports in some countries already are bound by borrowing restrictions (e.g., interest coverage and debt-to-asset ratios), which constrain total debt financing for government entities and public utilities.

In general, airport credit ratings and subsequently airport cost of capital are mostly contingent on financial performance. There is no linear correlation between airport ownership structure and credit ratings, per se (see Figure 4.3).
FIGURE 4.3: Selected Credit Ratings by Ownership Structure

![Graph showing selected credit ratings by ownership structure.]

Source: Standard & Poors

1. The above credit rating for airport authority (MWAA) which manages the two Washington area airports does not factor in the effect of airport bond insurance. With insurance, these airport bonds have a "AAA" rating.

However, indirect factors, such as government guarantees, financial linkages with users, airport indebtedness, economic regulation, traffic demand, and proposed or actual changes in airport ownership structure can have a significant impact on airport cost of capital. Airports owned by public corporations or joint public-private ventures are more likely to have implicit government guarantees for airport debt (e.g., Amsterdam, Paris, and Vienna) and subsequently have high credit ratings. However, many regionally and all privately-owned airports do not have any government guarantees. Airports with poor credit ratings often have been linked to the poor financial performance and credit backgrounds of the major users, e.g., airlines. The impact of credit ratings on capital costs often is mitigated through bond insurance that guarantees airport debt at the highest possible rating. Typically, US airports have relied more on private debt financing—to the degree that some airports are extremely overleveraged—and interest costs are substantially greater than for airports under other ownership structures.

The few countries that have sought to avoid excessive debt burdens, high capital costs, and onerous government borrowing restrictions have looked to private equity markets through some form of privatization initiative. Even with relatively higher transaction costs, high domestic interest rates in several countries increase the attractiveness of equity capital compared to debt financing. Nonetheless, airports with private sector ownership generally have been limited to accessing equity funds mostly from domestic sources because of legal restrictions on foreign ownership of public utilities. For example, BAA floated only 10% of equity shares on the Toronto Stock Exchange and Vienna Airport undertook only minimal
flotations in New York and Tokyo. Airport financial performance, economic regulation, and the strength of the domestic stock market are the main determinants of the cost of equity funds. In terms of regulation, a rule of thumb is that lower price ceilings increase incentives to investors and thereby reduce the cost of investment capital.

- **Profit objectives, incentives, and efficiency:** The underlying philosophy of each airport ownership structure has produced different effects on profit maximization. For example, airport operators within government departments have limited incentives to improve profitability, as the national treasury is available as a last resort to absorb excess costs. Although staff costs remain relatively low because of lower wages, especially in developing countries, operational and administrative costs remain significantly higher. An extreme example is Bucharest International Airport, which has a cost structure five times greater than revenues. Airports under this structure also are restricted by domestic legal statutes to perform only traditional airport operations and cannot easily diversify into more "lucrative" ventures. However, improved revenue diversification and efficiency have been achieved through changes in ownership structure. Corporatized airport authorities have reduced staff costs by contracting non-essential services to the private sector or through personnel reassignments. The number of staff directly retained by the airport authority is usually a fraction of total airport employees.

Differences in profitability within corporatized ownership structures result from profit-maximizing objectives. Airports under public corporate ownership have been able to achieve consistent levels of profitability by targeting rates of return. For example, the Federal Airports Corporation (FAC) in Australia must achieve an annual rate of return of at least 7.5%, which either has been met or slightly exceeded during the last six years. In contrast, regional government airports, especially those in the US, operate as "non-profit" entities based on airport-use agreements negotiated with servicing airlines. Consequently, airports under this regional government ownership exhibit the lowest average profit margin (13%) of the five ownership groups.

Airports under joint public-private ownership are driven primarily by the need for private funds for infrastructure projects. This arrangement is usually undertaken as a last resort, as government financing constraints usually prevent needed expansion and renovation. The private sector finances the airport infrastructure project in exchange for partial ownership and/or a reasonable rate of return. In this way, profit incentives are increased but not maximized, as profitability is contingent on the terms of the negotiated deal. In the case of equity flotations, the arrangement is more indirect but not substantially different. As a result, airports with mixed public-private ownership structure register an average profit margin of 16%, which is considerably lower than the airports fully owned by government departments, public corporations, or the private sector. The low profit margins of airports with
mixed ownership illustrate the inefficiencies created by dual ownership, such as staff duplication. Contracting out non-essential services is less prevalent. The government, as the majority shareholder, can continue to impose economic and employment priorities on airport operations. On the cost side, joint airport ownership has the effect of increasing tax requirements and minimizing government subsidies. Under mixed ownership arrangements, revenues tend to increase, but few incentives exist to reduce costs and improve efficiency.

Airports under full private ownership exhibit the best overall financial performance due to greater shareholder pressures. For the seven BAA airports, the average profit margin was 35.7%. This figure is roughly 10% greater than the next highest ownership category, airports under public corporate ownership. In addition to enhanced revenue generation opportunities, privatization also has encouraged significant efficiency gains and personnel reductions. Since privatization, there has been a 27% increase in staff productivity and a 6% decrease in total staff. Staff costs under this structure remain low since several nonessential services are typically contracted out to private operators. Improvements in revenue generation and productivity have led to a tremendous increase in BAA's stock price, which increased by a phenomenal 986% between 1987 and 1994. In comparison, the stock price of other privatized transport and utility companies in the United Kingdom increased by 54%. BAA's stock price also vastly outperformed the FT All-Share, a composite of United Kingdom companies, which grew at roughly 60% during the same period (see Figure 4.4).

FIGURE 4.4: Share Price for Selected Public Utilities and Transport Sector Entities
United Kingdom (1987-94)

Source: Financial Times, World Bank Staff
C. Pricing of Airport Services

4.13 While the trend worldwide is toward greater emphasis on maximizing commercial revenues, the generation of airside revenues from landing fees and passenger charges will continue to be critical for at least two reasons. First, activities that generate airside revenues are expected to generate, on average, from 40% to 50% of total airport revenues. For smaller and domestic airports, this percentage is even higher. Second, revenues generated from aircraft landing charges are more stable and predictable than concessionaire revenues. Concession revenues, although increasing, are subject to greater deregulation and competition. For instance, when duty-free shopping for intra-European Community passengers is eventually phased out, the short-term solution may be to cover the revenue loss from higher airside charges. This section focuses on the use and limitations of different pricing techniques used for airport services. It does not consider issues related to developing alternative pricing mechanisms, which is a topic for future study.

4.14 The pricing of airport charges can be grouped into three categories: aircraft landing and parking charges, passenger fees, and other airport charges. Different mechanisms and institutional arrangements influence the behavior of each category. To a large extent, aircraft landing and parking charges are price-driven based on international, bilateral, and national government agreements. A few countries either have established or are experimenting with some form of market-driven pricing mechanism for aircraft landing charges in response to privatization initiatives. In the case of passenger fees, occasionally government approval is required, as is the case in the US and Canada, while in others it is the responsibility of the airport authority. The determination of the level of passenger fees is highly discretionary with no economic rationale. The factors influencing the pricing of these services are outlined in Table 4.5.

<table>
<thead>
<tr>
<th>Revenue Sources</th>
<th>Principal Driving Factors</th>
<th>Governing Bodies</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft Landing Charges</td>
<td>Weight and Cost driven</td>
<td>International guidelines and principles</td>
<td>Limited enforcement; new pricing techniques emerging</td>
</tr>
<tr>
<td>Passenger Fees</td>
<td>Discretionary driven</td>
<td>Govt. approval required only in the US and Canada</td>
<td>Growing in importance; fee levels discretionary</td>
</tr>
<tr>
<td>Other Charges</td>
<td>Contract driven</td>
<td>Terms defined in concession contracts</td>
<td>Discretionary and non-transparent</td>
</tr>
</tbody>
</table>

4.15 Since passenger fees and other airport charges are largely discretionary or contractually driven, there is no standardized pricing methodology for these airport services. Article 15 of the 1944 Chicago Convention of the International Civil Aviation Organization (ICAO) established that airport charges should be based on the underlying principles of cost
recovery and nondiscrimination. After 40 years of debate among the membership of the aviation industry, in November 1981, ICAO agreed that aircraft landing charges should be based on aircraft weight, since this approach was simple and amenable to general application. This weight-based charge is usually the maximum takeoff weight (MTOW) or the maximum authorized weight (MAW). Most airports around the world use these pricing methodologies in calculating aircraft charges. In addition to weight-based charges, there is a complex and diverse system of surcharges on top of the basic landing fees. These relate to distance, type of flight, aircraft noise level, night landing charges, and aircraft parking.

4.16 Considerable uniformity is observed in the structure of airport charges; however, the level of charges varies considerably. For instance, Ezeiza International Airport at Buenos Aires charges $7.19 per tonne for a Boeing 747-300, while Washington Dulles Airport charges $1.95 per tonne for the same aircraft type. At Heathrow Airport, there is a flat weight-based charge for the aircraft which varies between peak and non-peak landing intervals. To improve airside revenues further, both Sydney and Heathrow Airports have instituted an aircraft parking charge that is not assessed at the other three airports. Table 4.6 lists the unit aircraft landing charges for a Boeing 747-300 with 280 passengers at five selected airports.

4.17 Differences in the level of aircraft landing charges delineated above can be attributed to a number of factors. First, airports are considered by many as a public good providing services of strategic and national importance; therefore, social provisions often outweigh internal losses. Second, national air carriers generally were government-owned and it was considered immaterial to develop sophisticated cost-recovery systems. Finally, international regulatory and monitoring capabilities are generally not enforced effectively. The following paragraphs summarize landing charges in use within each airport ownership category:

- The government-owned Ezeiza International Airport follows a pricing method similar to other "traditional" airports established under the general principles of ICAO. The structure of aircraft landing charges involves the averaging airport costs among the users, regardless of the costs imposed by individual users. The traditional weight-based pricing method in effect at many airports has a number of disincentives for airport users and operators. For example, the airlines have limited incentives (a) to use aircraft requiring shorter runways or runways of lower load-bearing strength since airport charges are the same (no change in aircraft weight) or (b) to change flight schedules since there is no penalty or cost for operating during peak periods. Furthermore, this pricing system does not discourage general aviation aircraft during peak periods. Small air-transport aircraft lowers airport efficiency considerably (e.g., reduced gate slots), which adds to delays. A number of airports are reexamining this pricing approach.
TABLE 4.6: Aircraft Landing Charges at Selected Airports in (US$)
Boeing 747-300, 280 passengers, MTOW = 379 tonnes, 2-hour parking

<table>
<thead>
<tr>
<th></th>
<th>Buenos Aires Ezeiza</th>
<th>Sydney Kingsford-Smith</th>
<th>Washington Dulles</th>
<th>Vienna</th>
<th>Heathrow (Peak)</th>
<th>Heathrow (off-peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landing</strong></td>
<td>$2,725.01</td>
<td>$1,490.42</td>
<td>$739.25</td>
<td>$4,603.36</td>
<td>$661.50</td>
<td>$481.35</td>
</tr>
<tr>
<td></td>
<td>$7.19/ton</td>
<td>$3.93/ton</td>
<td>$1.95/ton</td>
<td>$426.77 +</td>
<td>$11.02/ton</td>
<td>Flat fee per aircraft</td>
</tr>
<tr>
<td><strong>Parking</strong></td>
<td></td>
<td>$6.88</td>
<td>$5.73.12</td>
<td>$4.3/15 min.</td>
<td>$0.08/ton</td>
<td>$191.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$6.88 per aircraft</td>
<td>$4.93/5 min.</td>
<td>$0.08/ton</td>
<td>$0.08/ton</td>
<td></td>
</tr>
<tr>
<td><strong>Passenger</strong></td>
<td>$3,640.00</td>
<td>$115.50</td>
<td>$840.00</td>
<td>$2,176.96</td>
<td>$6,607.51</td>
<td>$976.48</td>
</tr>
<tr>
<td></td>
<td>$13/pax</td>
<td>$0.41/pax</td>
<td>$3.00/pax</td>
<td>$7.77/pax</td>
<td>$21.67/pax</td>
<td>$3.49/pax</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td></td>
<td>$115.50</td>
<td></td>
<td>$7.77/pax</td>
<td>$21.67/pax</td>
<td>$3.49/pax</td>
</tr>
<tr>
<td><strong>Terminal</strong></td>
<td></td>
<td>$0.41/pax</td>
<td>$1,201.20</td>
<td>$4.29/pax</td>
<td>$21.67/pax</td>
<td>$3.49/pax</td>
</tr>
<tr>
<td><strong>Peak</strong></td>
<td></td>
<td>$171.88</td>
<td></td>
<td>$4.29/pax</td>
<td>$21.67/pax</td>
<td>$3.49/pax</td>
</tr>
<tr>
<td><strong>Traffic Handling</strong></td>
<td></td>
<td></td>
<td>$4,225.47</td>
<td>$4.29/pax</td>
<td>$21.67/pax</td>
<td>$3.49/pax</td>
</tr>
<tr>
<td><strong>Handling</strong></td>
<td></td>
<td></td>
<td>Flat fee per aircraft</td>
<td>Flat fee per aircraft type</td>
<td>Flat fee per aircraft type</td>
<td>Flat fee per aircraft type</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>$206.25</td>
<td></td>
<td>$2,873.32</td>
<td>$2,067.25</td>
<td>$2,873.32</td>
<td>$2,067.25</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$6,365.01</td>
<td>$2,106.43</td>
<td>$2,780.45</td>
<td>$1,3979.11</td>
<td>$7,302.13</td>
<td>$1,648.87</td>
</tr>
</tbody>
</table>

Sources: Airport authorities of airports listed above

- Public corporation airports in Australia use the "network pricing" methodology when calculating aircraft charges. Since it was established in 1988, the FAC has run its airports as a network operating on a "single till" basis: revenues earned at each airport are pooled into the till and are used for expenditures incurred across the entire network. FAC argues that for low-volume airports, network pricing is more efficient in increasing the overall level of airside cost recovery than location-specific pricing. The FAC operates 22 airports, which facilitates economies of scale resulting from the allocation of overhead costs, better use of cash-flow, pooled investment risks, and lower interest charges. However, the network pricing system supports cross-subsidies among the airports. Prices do not reflect the incremental cost of supply, resulting in allocative inefficiency in that revenues are redistributed from those consuming overpriced services to those consuming underpriced services.

- The regionally-owned airports in the US have developed a unique pricing mechanism for aircraft landing charges in response to the strong influence of the airlines. Generally, the larger and more independent the airport, the greater the use of the "compensatory" or "hybrid" pricing. Smaller airports that are dependent on airline hub operations use "residual" pricing. Under the residual pricing approach, financial
risk is borne entirely by the airlines, who guarantee break-even revenues. In exchange, the airlines receive preferential pricing schedules, veto power over airport long-term decisions, and share excess revenue gains. With compensatory pricing, financial risk is borne by the airport operator; and the airlines agree to pay charges and rates according to a percentage of the facilities used. Excess revenue gains are not shared but can be used to offset the following year’s airside charges. Last, the hybrid pricing approach uses elements of both methods and financial risk is shared jointly by the airport operator and the airlines. This form of institutionalized price discrimination is partially successful because output is maximized. However, incentives for increased efficiency and spending on capital projects are not embodied in the price structure. In fact, capital spending is achieved through excessive debt financing or subsidies.

Despite strong airline influence, the US Department of Transportation, in an attempt to resolve long-standing disputes between airlines and airports over the establishment of certain fees, announced a new framework that will form the basis for evaluating complaints about airport fees. The new pricing policy is organized around five principles: direct negotiations between the airport authority and the users; rates, fees, and charges must be fair and reasonable; unjust discriminatory rates and charges are prohibited; airport owners must adopt a fee structure that makes the airport as self-sustaining as possible; and airport owners may spend revenue generated by the airport only for purposes circumscribed by law. As a result, airports will be required to value their facilities based on current value or any other alternative method in which revenues do not exceed costs.

The privatized British Airport Authority (BAA) pioneered the application of cost-based pricing in the early 1970s. This pricing mechanism has evolved from a fairly simple peak-charging structure to a more complex and sophisticated long-run, marginal-cost-pricing mechanism. This controversial mechanism is among the most advanced. Similar to the FAC pricing model, the BAA also uses the single-till pricing principle, but it is applied differently. In BAA’s case, the single-till concept promotes cross-subsidizes among airside and landside activities and among airports. The BAA is one of the few airports that has introduced peak and non-peak pricing for aircraft, parking, and passenger charges, which reflects peak demand. In 1968, Levine argued that “in the absence of charging, a system that differentiates between peak and non-peak use is socially wasteful in two ways—through congestion and inappropriate facilities it prevents air transport industry from maximizing consumer satisfaction, and by failing to match investment appropriately to output it wastes resources which could be used to satisfy wants elsewhere in the economy.” In response to these innovative pricing mechanisms, in 1988 the US airlines persuaded the US Government to institute arbitration proceedings, alleging a breach of the Bermuda II (bilateral agreement) on the grounds that Heathrow charges were unjust and discriminatory based on time-zone differences. Moreover, the US Government rejected BAA’s use of long-run-marginal cost pricing since all capital expenditures on new capacity were incurred to meet peak demands. However, the international arbitrators did not find BAA’s charges to be unjust or unreasonable; however, they did find the British Government in breach of the agreement on important technical grounds.
The public utility and social service considerations that underpinned early airport development and the ill-defined pricing strategies of cost recovery and non-discrimination are being reviewed by governments and airport operators. The pricing practices among the five selected airports show that the greater the profit incentive, the more innovative and creative the pricing mechanisms are developed. Even among Australian airports, the use of new pricing techniques has emerged in response to Government profit targets. With the privatization and deregulation of airlines, the growing number of litigation suits between the airlines and airports, and the growing need for increased commercialization of airports, governments are now faced with a dilemma in regard to establishing and regulating prices for airport services. The objectives of future pricing mechanisms for airport charges must be based on the following principles:

- generate sufficient revenues to cover costs and ensure a reasonable rate of return to the investor;
- ensure allocation efficiency and use of airport resources; and
- provide a signal for economically efficient capital investment decision-making.

FIGURE 4.5: Airside Landing Charges at Selected Airports by Ownership Structure
Total in US$ - B747-300, 280 passengers, MTOW = 379 tonnes, 2-hour parking

Source: Ibid, Table 4.6 pg. 40

A selected number of primary international airports included in the financial sample shows that government owned airports have performed, within a narrow financial perspective, on par with some of the recently privatized airports. These findings are not conclusive as a number of factors have not been taken into consideration such as monopoly structures, profitability and pricing objectives, and size of the industry. Moreover, the findings are contrary to the evidence that "public and
mixed enterprises are less profitable and efficient than private corporations and the widespread view that privatization improves efficiency. Differences in performance and efficiency among airports are not explained by differences in ownership structure. Given this preliminary finding, additional research will need to be undertaken.

4.20 In response to private sector participation in airports, as well as costly litigation among the airlines and airport operators, a number of governments are considering putting in place suitable institutions or strengthening existing airport economic regulation. Unlike other public utilities, governments have been slower to respond to this emerging need. The next chapter analyzes current institutional and regulatory structures of airports.

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V. AIRPORT REGULATORY ENVIRONMENT

A. The Evolution of Aviation Regulation

5.1 Air transport has grown more quickly than all other modes of transport. In the last 50 years, air travel has become widespread, safer, and routine throughout the world. This has occurred largely because governments granted protection and nurtured an infant industry and during this process began to regulate by fiat most of its activities, including commercial aspects. A certain degree of regulation clearly is necessary in such areas as public safety, operational organization, and international relations. Rate regulations, entry restrictions, the number of air carriers, slot allocation, and airport charges are but a few examples of the myriad of regulatory controls on air transport that have been promoted in the name of public interest. Few argue that these could be left to the airlines alone—although many airlines have adopted their own rules, often more stringent than those imposed upon them, and airlines play a significant public advisory role. Furthermore, as with safety and security, many airlines now have adopted environmental rules tougher than current national or international standards. They have good reason to do so, because “environmentally friendly” aircraft are cheaper to operate.

5.2 In most countries the market for transport services has evolved into an area of public jurisdiction, going well beyond health and safety regulations. For example, rate regulations in railways, entry restrictions in the trucking industry, minimum service levels for urban buses, and cargo restrictions in shipping are but a few examples of the myriad of regulatory controls on transport that were promoted on behalf of the public interest. Due to the strategic composition of the industry, aviation regulatory authorities in fact have been dominated more by the needs of the airline industry than by the changing needs of airport infrastructure. Since the end of World War II, international air transport has been organized in a regulatory pyramid comprising:

- **The International Civil Aviation Organization (ICAO)**, a UN agency that regulates technical and operational aspects (para. 5.5). Sister institutions include the International Air Transport Association (IATA) and the Airports Council International (ACI), which are industry associations representing the interests of the airlines and airports, respectively. In addition, the Association of European Airlines (AEA), African Airlines Association (AFRAA), and the Orient Airlines Association (OAA) provide linkage on regional issues but usually generate long-term policy advice from the various industry-aligned international organizations.

- **The system of bilateral air transport/service agreements between governments**. These agreements determine the routes to be flown, the airlines that fly them, seat capacity, and the prices offered. These Air Service
Agreements (ASAs) are mostly bilateral in form, i.e., between two sovereign states. The intent of ASAs is to create an acceptable balance of traffic between states, commonly achieved by limitations on the number of airlines designated and on the basis of flight or seat capacity. Realistically, wider political considerations often influence the negotiations of these agreements and merely serve to illustrate the extent of governmental intervention in aviation;

- **The National Aviation Authorities** which typically have exercised strong influence over the operations of commercial airlines and airport administration in such areas as capacity, flight frequencies, aircraft choice, passenger and airport fares, technical and operational aspects of airports, cargo rates, and related conditions; and

- **The Local Airport Authorities**, which exercise control either over an individual airport or a group of airports. These authorities are common in the United States and have recently been introduced in Canada as the airport systems are decentralized.

5.3 Figure 5.1 summarizes the current institutional framework for the establishment, enforcement, and implementation of the airport regulatory environment:

**FIGURE 5.1: Current Institutional Framework for Airport Regulation**

![Diagram of institutional framework for airport regulation](Source: World Bank Staff)
B. Current Institutional Structure of Aviation Regulations

5.4 A number of countries, both developed and developing, have deregulated and privatized airlines, and bilateral air service agreements are becoming increasingly liberal, leaving more commercial decisions, including those of capacity and pricing, to the airlines. These activities, coupled with the changing ownership structure of airports, are now causing many governments to re-examine the role and scope of airport regulations. Additionally, there is a tendency to move from bilateral air transport/service agreements to multilateral agreements. One example is including air transport services in a future General Agreement on Trade and Services (GATS) under the umbrella of the World Trade Organization (WTO). Nevertheless, the current aviation regulatory structure has evolved within a complex web of national, bilateral, and international regulations. The following is a brief description of the institutional arrangements that are currently in place for airport regulations.

The International Civil Aviation Organization (ICAO)

5.5 The Chicago Convention of 1944 is widely recognized as the primary vehicle for establishing the basic regulations and institutions essential to the development of organized international aviation. This accord established the legal charter for ICAO and has been ratified by over 150 countries. ICAO is a quasi-independent organization that is legally part of the UN, with headquarters in Montreal, Canada. The formulation of regulation and other long-term policy decisions is directed annually by the Assembly, which consists of representatives appointed by the contracting states. The ICAO Council is appointed by representatives of the Assembly, the most important functions of which are to “request, collect, examine, and publish information relating to the advancement of air navigation and the operation of international air services, including information about the costs of operation and special subsidies paid to airlines from public funds.”

5.6 ICAO carries out its mandate through the instruments of international cooperation and harmonization of national standards to meet minimum safety and access requirements. Specifically, ICAO has been responsible for establishing guidelines and standards for navigational aids, technical characteristics for landing areas, aircraft certification, licensing of pilots and other specialized personnel, market access, safety supervision, and pricing schedules for both airlines and airports. More recently, the issues of environmental protection have taken on greater importance as countries now have to deal with aircraft noise and emissions.

5.7 The 1944 Chicago Convention grew out of the need to define and resolve the contentious issues of air space sovereignty, aircraft nationality, and traffic rights. For this reason, Article 15, which lists the guidelines for non-discrimination and fairness in airport access and pricing, has received the most attention and is based on the following precepts:
uniform conditions shall apply to the use of airport and air navigation facilities in a contracting state by aircraft of all other contracting states;

the charges imposed by the contracting state for the use of such airports or air navigation facilities shall not be higher for aircraft of other contracting states than those imposed by its national aircraft engaged in similar international operations; and

no charge shall be imposed by any contracting state solely for the right of transit over or entry into or exit from its territory of any aircraft of a contracting state or person or property thereon.

5.8 In most signatory countries, these principles have been codified into statutes that are interpreted and enforced domestically by the respective national aviation authorities. Although enforcement provisions exist within the ICAO regulatory framework, national aviation authorities typically make the final determination of perceived discriminatory practices. Nonetheless, some formal complaints are reviewed by judicial entities within the “transgressing” country. Examples of internal judicial review include Air New Zealand vs. The Wellington International Airport Ltd and the London City Airport versus the privately-owned British Airport Authority (BAA). In addition, other lawsuits have been settled by international arbitration, such as US carriers against BAA.

National Aviation Authorities

5.9 Next in the pyramid of airport regulation are the national aviation authorities which establish and enforce safety, technical, environmental, and economic standards, in addition to those instituted by ICAO. The comprehensiveness and scope of regulation and strictness of enforcement mechanisms varies markedly among countries; nevertheless, all signatories must achieve a minimum of the basic framework established by ICAO. At this level, regulatory standards are strongly influenced by bilateral and regional access agreements, industry associations, and above all the concerns of domestic air transport carriers. In many countries, particularly the United States, carriers heavily influence (and often dictate) the scope of economic regulation. To an increasing extent, civil aviation authorities in industrialized countries are also influenced by local associations, especially those concerned with safety and environmental aspects.

5.10 The majority of airports around the world are regulated by a civil aviation administration within the department or ministry responsible for transportation, infrastructure, or economic matters. A unique example is the Civil Aviation Authority of Singapore (CAAS), which not only owns, operates, manages, and regulates airports, but also is empowered to negotiate bilateral air agreements. Less common are commercial airports regulated (and administered) by the military (e.g., Argentina and Angola). Finally, a few countries (e.g., Australia, South Africa, the United Kingdom) have created
autonomous airport authorities, a growing trend in recent years. These entities remain publicly owned and generally have been self-sustaining, since access to private funds is granted through corporatization initiatives. A selected comparison of the institutional framework based on the current ownership structure is shown in Table 5.1.

**TABLE 5.1: Airport Regulatory Agencies by Ownership Structure**

<table>
<thead>
<tr>
<th>Regulatory Agency</th>
<th>Govt. Owned Argentina</th>
<th>Public Corp. Australia</th>
<th>Regional Govt. United States</th>
<th>Joint Public/Private: Vienna</th>
<th>Private Owned United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explicit Linkages with other Agencies</td>
<td>Air Force</td>
<td>Department of Transport and Communications (DOTAC)</td>
<td>Federal Aviation Administration (FAA)</td>
<td>Department of the Civil Aviation Authority</td>
<td>Civil Aviation Authority (CAA)</td>
</tr>
<tr>
<td></td>
<td>Ministry of Defense</td>
<td>Civil Aviation Authority (CAA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status</td>
<td>Under review for change</td>
<td>Under review for change</td>
<td>Air traffic control corporatization under review</td>
<td>Changed price regulations</td>
<td>Air traffic control privatization under review</td>
</tr>
</tbody>
</table>

Source: World Bank Staff

5.11 Most of these national aviation entities, both civil and military, also provide domestic air traffic control and navigational functions, dominating the field of aviation regulation. Safety regulation relates to the type and sophistication of air traffic control and navigational equipment in use, the aircraft certification, licensing of pilots and other skilled personnel, and the infrastructure and maintenance levels for fire, rescue, lighting, and emergency power systems. Specifically, airport navigational equipment is judged by strict international standards (the CAT I-III ratings) that define the maximum level of traffic that can be accommodated safely at any one time given physical capacity constraints. Technical regulation largely (but not exclusively) refers to the ability of existing airside facilities—e.g., runways, taxiways, aprons, cargo centers, traffic-handling areas to accommodate larger aircraft plus a range of traffic handling activities. By extension, technical regulations also include the amount of available terminal space for passenger traffic levels at airports. The historic focus of aviation regulation has been on technical and safety regulations, with a few countries embarking on expanding the roles of economic and environmental regulations. Figure 5.2 delineates the scope and range of airport safety, and technical, environmental, and economic regulation.
5.12 Although institutional and ownership structures differ greatly, the range of regulatory activities is similar across many countries. Compliance with technical and safety regulations is generally achieved through the threat of reduced traffic flows and/or market access to countries with substandard safety regimes, as few international enforcement mechanisms are in use. Thus, there is a need to establish and strengthen enforcement mechanisms for technical and safety regulation at the international and national level.

5.13 In recent years, environmental regulation has assumed greater importance, especially in industrialized countries, but remains uneven in practice and limited in scope. Many countries have largely imposed these regulations unilaterally and often carriers must face different environmental standards on each international flight. Consequently, internationally accepted and enforced environmental regulations should be introduced with the goal of establishing a more standardized regime.

5.14 Economic regulations were considered less important due to the dominant role of the state in both airline and airport businesses. To date, only three countries—the United Kingdom, Austria, and South Africa—have introduced changes to their economic regulatory regimes. Argentina, Australia, New Zealand, and a few other countries are considering introducing some form of "enhanced" airport economic regulation in response to ownership changes and prevailing market conditions between airports and airlines. As the United Kingdom has the longest experience with economic regulation of airports, the following section is a description of the Civil Aviation Authority (CAA) of the United Kingdom.
The Civil Aviation Authority (CAA) of the United Kingdom

In the United Kingdom, the primary airport regulatory body is the Civil Aviation Authority (CAA), which establishes safety, operational, environmental, and economic regulation in conjunction with several government entities. Bilateral and regional agreements are outside the scope of the CAA and are generally negotiated by the Secretary of State for Transport. Prior to the creation of the CAA, the regulation of civil aviation was handled by a series of government ministries and departments. Created as an autonomous corporate entity in 1971, the role of the CAA has been to supervise and enforce the principal regulatory functions in civil aviation and provide air traffic control and other navigational services jointly with the Ministry of Defense. The Civil Aviation Act of 1982 constituted the current legal framework for aviation regulation in the United Kingdom, effectively internalized international norms, consolidated and rationalized CAA activities and structure, and created the rudimentary framework for changes in airport ownership. Under the 1982 Aviation Act, the Secretary of State for Transport has the discretion to appoint the chairman, deputy chairman, and executive board of the CAA. The latter is comprised of a minimum of 6 and a maximum of 16 members.

The financial objectives of the CAA are to recover operational and investment costs and achieve a reasonable rate of return on capital through charges assessed to users of civil aviation and air traffic control services. As a corporatized entity, the CAA has access to private debt financing. Although some discussion has taken place regarding the potential privatization of CAA, political circumstances have forestalled this initiative. Within the CAA, a staff of less than 10 people oversee all aspects of airport economic regulation.

The CAA mandate is to regulate the economic activities of all airports with revenues in excess of £1 million against the following practices: (i) unfair or discriminatory charges; (ii) landing rights discrimination; (iii) failure to achieve a reasonable rate of return on capital; (iv) failure to distribute profit dividends; and (v) borrowing below a prescribed percentage of equity capital. To achieve these goals and limit congestion, the CAA is authorized to impose price controls and institute limits on the categories and time intervals for aircraft traffic. Compliance is secured through financial penalties, mandatory revenue reductions, and rescinding the ability to impose airside charges. In conjunction with the Monopolies and Mergers Commission (MMC), and in consultation with domestic carriers and affected airports, the CAA reviews airport pricing structures of designated airports every five years. The CAA establishes the Rate Plus Inflation (RPI-X) Rule, which limits the maximum amount assessed per passenger through aircraft landing fees, aircraft parking fees, and passenger fees. Price ceilings are calculated by limiting airside charges to a fixed percentage below the UK retail price index. The pricing schedule for airside charges for 1992-97 at BAA's London airports is: RPI-8% for April 1992-94; RPI-4% for April 1994-95; and RPI-1% for April 1995-97. The CAA staggered the RPI-X formula to increase
efficiency in the first two years and to create the incentive for BAA to undertake capital infrastructure projects in the medium term. In addition, the BAA can recover 75% of additional security costs caused by changes in Government security arrangements. Manchester Airport, which is regionally-owned, is also subject to economic regulation.

Airside charges are determined under the “single till” approach, in which estimates of total airport revenues (including revenues from commercial concessions) and total costs are forecast and airside charges are set to meet a specified level of profit. Under this single-till approach, airports with highly profitable commercial activities (e.g., Gatwick) can incur losses in their airside activities and still show a profit. This pricing approach institutionalizes cross-subsidies between an airport’s airside and commercial activities. However, the Secretary of State for Transport has the final authority to rescind CAA price controls to meet the obligations stemming from ICAO, European Union membership, and bilateral agreements. The MMC also undertakes a thorough examination of the economic performance of designated airports during the previous review period and prepares financial and traffic forecasts for the next five years. Based on this information, the MMC makes non-binding recommendations to the CAA about the appropriate level of price controls. Figure 5.3 illustrates the institutional framework for the review and imposition of economic regulation for designated airports within the United Kingdom.

FIGURE 5.3: Institutional Process for Economic Regulation of Airports in the UK

Local Airport Authorities

5.15 The US is a prime example of the use of local airport authorities on a wide scale. Unlike many countries, the US airport system is not federalized. Many of the airports are owned and operated by local (municipal, county, and state) governments. The
Link to local governments has encouraged the use of airports to promote regional economic development. Therefore, the existing airport structure in the US has two regulatory bodies: one at the national level, which is mainly responsible for policy-making and technical and safety aspects (the Federal Aviation Authority), and the other at the airport level, which has jurisdiction over environmental and economic issues. The role of the central government regulatory agency is distinct and unique from other national aviation authorities.

5.16 The Federal Aviation Authority (FAA) oversees and coordinates the activities of over 5,500 public-use airports in the US. Unlike other national aviation authorities, the FAA is a policy-making rather than a regulatory body. The FAA does not regulate the economic activities of airports but can strongly influence airport operational activities. The main price-related regulation is that landing fees must not discriminate against foreign-based or small aircraft. This regulation has led to the unofficial prohibition against peak-period pricing. The FAA also allocates airport landing slots, which are then traded among airlines through Airport Scheduling Committees (ASCs). Previously, airlines had grandfather rights over landing slots, but the FAA now requires airlines to use slots 85% of the time or control is ceded to the FAA. Within this broad context, the local airport authorities operate relatively independently and set their own airport pricing structures.

5.17 In the absence of a central economic regulatory agency, the local airport authorities are de facto operators and regulators of airports. The focus and scope of economic regulation in the United States is limited to pricing issues. Airport rents and landing fees are negotiated directly with the airlines through airport-use agreements that can range from the rental of airport space to the development of new terminal facilities. These forms of pricing arrangements generally lessen some of the tension that exists between airlines and airports in other countries. In the United States, there are three types of airport-use agreements:

i. **Residual Agreements** are in place at certain airports in which the airlines guarantee break-even revenues through higher landing fees and rents. Residual agreements impose revenue ceilings on airports and the difference is shared with the airlines. These agreements are generally in place where airlines have a dominant position in the local market (airline-hub operations). Residual agreements are more likely to include Majority-In-Interest (MII) clauses that confer on airlines veto power over airport development decisions.

ii. **Compensatory Agreements** are in place at airports in which the landing fees are calculated based on the proportional amount of airside/landside space used. Break-even revenues are not guaranteed and shared with the airlines. However, excess revenues can be used to offset the following year's airside charges or reinvested in airport operations. Airports with compensatory agreements are likely to have more control over infrastructure development decisions. Furthermore, these airports have demonstrated
higher operating margins, more favorable credit ratings, and more independence from the airlines.

iii. **Hybrid Agreements** combine elements of both structures but differentiates between airport cost centers. Compensatory and hybrid agreements generally exist where there is no single dominant airline and/or the air transport market is strongly composed of origin/destination points.

5.18 Table 5.2 shows the type of airport-use agreements in place at various US airports:

<table>
<thead>
<tr>
<th>RESIDUAL</th>
<th>COMPENSATORY</th>
<th>HYBRID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas-Fort Worth</td>
<td>Atlanta</td>
<td>Boston</td>
</tr>
<tr>
<td>Detroit</td>
<td>Chicago O'Hare</td>
<td>Charlotte</td>
</tr>
<tr>
<td>Memphis</td>
<td>New York JFK</td>
<td>Denver</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>Phoenix</td>
<td>Houston</td>
</tr>
<tr>
<td>San Francisco</td>
<td>Salt Lake City</td>
<td>St. Louis</td>
</tr>
<tr>
<td>Seattle</td>
<td>San Diego</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>San Francisco</td>
<td>Salt Lake City</td>
<td>Washington National/Dulles</td>
</tr>
</tbody>
</table>

Source: Ibid, see footnote pg. 26

5.19 Despite this close "working/pricing relationship" between airlines and airports, the US Department of Transportation (DoT) has announced new procedures to resolve outstanding disputes on airport rates and fees. If an airport imposes a new or increased fee, the airlines have 60 days to file a complaint with DoT. Within 30 days, the Department must determine whether the complaint constitutes a significant dispute; if it does, the case would be assigned an administrative law judge for a hearing. The judge has 70 days to make a decision, after which the department has 120 days to finalize the decision.

5.20 The lack of clear pricing rules for airport charges and the strong countervailing power of the airlines has led to costly legal disputes between airline and airport operators. The power to set airport prices, and more particularly the obligation to consult, has been contested both in the United Kingdom and New Zealand. These legal cases occurred partly because of changes in ownership structure. In the United Kingdom, the US Government on behalf of its airlines filed suit against BAA on its pricing structure and charges. On the basis of the Bermuda II treaty (the Air Service Agreement between the United States and United Kingdom), the United States initiated arbitration proceedings, alleging that charges at Heathrow were unjust and unreasonable. The main complaint was that: RPI-X is an inadequate form of regulation, and the rate of return at each airport should be separately capped each year; the return at each airport should not exceed that airport’s cost of capital; and the charges should be set on a strict basis of book-cost allocations for each service. The US Government rejected BAA’s use of long-run-marginal-cost pricing (LRMC). Under this system, BAA had concluded that all capital expenditures on new capacity were incurred to meet peaks in demand. The conclusion of a three-member international arbitration panel was that BAA’s charges were not unjust
and unreasonable, but that the British Government was in breach of the Bermuda II Agreement on important specific technical grounds. This case highlights two key issues: first, international regulations override domestic regulations; and second, international practices may need to be redrawn to accommodate the regulatory systems operated within individual countries.

5.21 In the case of New Zealand, Air New Zealand filed suit against Wellington International Airport Ltd. (WIAL) on grounds that airport charges were unreasonable and that the airport had not consulted with the airlines. The Appeals Court noted that: "The importance of the airport and its monopoly position may enable increased costs to be recovered, not by any abuse of monopoly, but simply by setting charges which will cover cost and will enable a proper return to be obtained from an efficiently conducted operation. The substantive issue underlying the airlines' case was that WIAL based its charges on an incremental marginal cost basis." Air New Zealand lost its suit against WIAL and filed in the Privy Council of the United Kingdom.

5.22 In Australia, the Government directed the Price Surveillance Authority (PSA) to undertake an "Inquiry into the Aeronautical and Non-Aeronautical charges of the Federal Airports Corporation (FAC)." This action is among the first independent investigations undertaken by a government agency into airport charges. The main conclusions of this inquiry were that the FAC had used its market power with respect to non-aeronautical services by substantially raising charges and obtaining high economic rates of return at major airports. To overcome its monopolistic pricing techniques, the PSA recommended a number of actions, among which was that FAC adopt "efficient pricing principles" when setting prices for services within an airport, for services provided by different airports, and both aeronautical and non-aeronautical services.

5.23 Divorcing the traditional public ownership structure of the air transport companions (airlines and airports) and continued financial pressure on the airlines will likely result in lengthy legal debates and government review on issues related to airport charges. This effect coupled with increased demand for private investments in airport infrastructure, is causing governments in both developed and developing countries to re-examine the role, structure, and functions of the existing airport regulatory framework. Although some countries have changed, or are in the process of changing their airport ownership structure, only a few have even begun to "tinker" with their regulatory structure.

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1 24 September 1992, McKay J, CA23/92 & CA73/92, pg. 46

C. The Need For a New Regulatory Framework

5.24 In retrospect, the last decade has seen a fundamental shift in the role of the government in the provision of infrastructure. Governments around the world are retreating from the role of owner and operator of infrastructure services and placing greater emphasis on their role as regulator of services provided and operated by private firms. This shift has led to great interest in the quest for improved regulation of private infrastructure, including the use of autonomous regulatory agencies that are intended to ensure regulatory discretion is exercised at arm’s length from the political process. Autonomous regulatory agencies have a long history in the United States, and this model now has been emulated in the United Kingdom as well as in a growing number of other countries which are undertaking major infrastructure reforms. Within the aviation industry it is paradoxical that despite government ownership and apparent freedom of rapid transit through the skies, aviation still is a business bound by a complex regulatory framework.

5.25 In the United Kingdom, the Government’s White Paper (WP) on airports summarizes the need for airport regulations. This report reiterated that “there must be adequate regulatory arrangements in place to ensure that the policies pursued by the management of the major airports fully support the Government’s aviation policies for a liberalized and competitive airline industry; that airlines and consumers are protected against the abuse of monopoly; that the Government can meet its international obligations; and that safety, environmental and security standards are met. Not all of these require new measures.”

5.26 Regulation therefore affords a means of fostering an environment that not only enables potential new entrants access to the market but also provides a means of replicating the effects of competition as closely as possible. With governments the world over considering the liberalization of airlines and creating a larger role for the private sector in airport infrastructure, new airport regulatory regimes are bound to emerge beyond their traditional focus on technical and safety aspects. Unlike other infrastructure sectors, research is limited on airport economic and environmental regulations. Additional research and analysis will need to be undertaken to improve the efficiency and effectiveness of airports and to increase the role and participation of the private sector.

5.27 The following economic and environmental agenda could be considered by governments when designing an airport regulatory framework:

- **The improvement in the effectiveness and coordination of domestic and international airport/aviation regulations.** The flow of information between national airports and international organizations is asymmetrical. The standardization of regulations and information between airports worldwide

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would facilitate the enforcement of regulations and promote the globalization of the airport industry.

- **The establishment of an independent airport regulatory body.** In many countries, airport regulations are consolidated and merged with other aviation activities, principal among which is the delivery of air traffic control services. The merger of policy-making activities, the ownership and operation of airports, and the delivery of auxiliary aviation services provided by one agency could present conflict of interest problems. Given the legal debate that has resulted in a few countries, governments may wish to consider the establishment of an independent and sector-dedicated regulatory agency that would be responsible not only for technical and safety aspects but also economic and environmental issues.

- **The formulation of airport charges should be based on efficient pricing principles.** In the majority of countries, airport charges are based on outdated and historical pricing techniques. Only a few countries have recently adopted newer pricing techniques, which have been legally challenged by the airlines. For instance, in the United Kingdom, the RPI-X mechanism is a forward-looking pricing mechanism set in relation to a price index (the retail price index). It allows a regulated firm a return on capital of the change in the retail price index less some factor to remove excess profits. Theoretically, RPI-X regulation has the advantage over rate-of-return regulation in that it provides an incentive for the monopolist to reduce costs. However, it leads to price instability, as permissible price increases are forecast for the outyears. The other airport pricing techniques—residual, compensatory, hybrid—developed in the US strive to be more consultative in nature between the airlines and the airport authorities. Given the monopolistic nature of the airport industry, a new pricing structure needs to be developed that would promote efficient pricing principles and be acceptable to the users. Whatever the pricing structure, airports need to disclose information about their operations in a more transparent manner concerning revenues and costs.

- **The formulation of other economic regulations to promote and complement airport competition and efficiency.** Limited attention has been paid by policy-makers to expand the economic agenda beyond airport pricing issues. Airport policy makers need to include other aspects of economic regulations to improve airport efficiency and competitiveness. These areas need to include issues of subsidies and cross-subsidies, the effects of vertical and horizontal integration, market access to all users, single versus multiple operators, land and valuation techniques, and the allocation procedures for airport slots. With full or majority privatization, airport ownership no longer exists as a mechanism of control for governments, except to the extent that the State retains a stake in the privatized company and can exercise shareholder rights,
or where the State retains a "golden share," in which case there is a negative control still present through ownership.

The limitation of competition affects different airport services in different ways. Given that the objective of regulation is to promote efficient pricing and investment decisions, the areas in which regulation should apply would be those aspects of airport services that exhibit monopoly characteristics. It is useful to divide airport services into three groups: the first two could be potentially subject to the abuse of monopoly power with prices set above competitive levels:

1. airside operational facilities comprising runway, taxiway, and parking apron facilities

2. provision of accommodation and/or access to the airfield for services that require access to the airside; such as accommodation for transit lounges or air bridges, accommodation and/or access for duty-free retailers, and access to cargo forwarders, maintenance, refueling, and associated services; and

3. provision of accommodation and/or access to activities that do not require access to the airside. These services arise in response to the volume and nature of the passengers and cargo moving through the airport, and include the provision of accommodation for the operation of retail outlets and cargo storage.
VI. THE EXTERNAL CHALLENGES AHEAD FOR AIRPORTS

6.1 The internal challenges faced by airports worldwide have been characterized by reactive ownership and management structures, undeveloped revenue sources, inefficient provision of services, lack of a commercial orientation, distorted pricing schedules, the absence of underlying regulatory structures, and insufficient investment. Historically, airport authorities could downplay and neglect these internal weaknesses, as there were few compelling reasons to alter entrenched courses of action. However, external challenges resulting from capacity and efficiency constraints and changes in market access have forced governments and airport authorities to review, revise, and restructure existing ownership, management, and regulatory structures. The manifestation of these external pressures during the last 10 to 15 years has brought about various airport restructuring initiatives. Moreover, the limited availability of public funds has led a number of countries to seek more private sector participation in airports. Depending on the objectives, countries have sought out private capital, private operations, or private ownership to adjust to the challenges ahead.

A. Capacity Constraints

6.2 On the demand side, airports worldwide are faced with growing capacity constraints due to the dramatic growth of air transport, the globalization of industry, and the global trend toward deregulation and liberalization of the airline industry. Although the demand for airport services has increased asymmetrically among geographic regions and countries, this shift in demand has been across the board by the three primary users of airports—passengers, freight haulers, and carriers. At the very least, strains on capacity will necessitate upgraded air traffic control services to reduce congestion and ensure the safe movement of aircraft. Although many regional and small primary airports have excess capacity to meet increased demand, runway and terminal limits are being reached at several major airports worldwide. IATA estimates that the cost of airport delays around the world is between US$15 billion and US$20 billion each year. Within the next 15 years, 33 major air traffic centers in North America, 13 in Europe, and 5 in Asia will reach maximum capacity. Airport authorities also will need to expand existing facilities or build new airports to accommodate projected increases in air traffic. Airports in the US and Europe mainly have concentrated on expansion, while in Asia the focus has been on constructing new facilities. In light of projected fiscal constraints, public funds will become increasingly scarce. This suggests that airport authorities will need to approach the private sector for increased financial participation in infrastructure projects.

(i) Growth in Air Traffic Activity. Fluctuations in growth rates for air passenger and cargo traffic largely have reflected changes in world and local economic conditions. According to IMF data, world economic growth increased at a compounded average annual rate of nearly 3% during the previous 15 years. The intuitive link between air transport traffic and GDP is predicated on the evidence that economic growth spurs increased consumption of non-essential...
goods and services, which in real terms grew 3.1% globally during this period. The cost of air travel decreased by 70% in real terms during the previous 25 years and is now priced to accommodate wider income distribution. Data supplied by ICAO and IATA indicate that scheduled air passenger traffic increased at an average annual growth rate of roughly 4% worldwide from 1979 to 1993. In particular, the international component recorded average growth rates roughly 1-2% higher than those for overall passenger traffic. Air freight transport, which is more susceptible to oscillations in economic cycles, also increased by 4.5% during the same period. The link between air transport growth is depicted in Figure 6.1. Severe world economic downturns in 1982 and 1991 have brought about sharp contractions in air transport traffic. Negative growth rates in passenger and cargo traffic in 1991 were exacerbated by political instability and concern over international terrorism as a result of the Gulf War.

**FIGURE 6.1: Relationship of Air Transport Growth and GDP Trends**

*World Passenger and Freight Data, 1979-93*

![Figure 6.1: Relationship of Air Transport Growth and GDP Trends](chart.png)

Sources IATA, IMF

*Statistically, this relationship between air passenger and air cargo traffic and GDP can be substantiated as separate regressions yielded significant r², t-test and f-test results.*

The growth in air passenger traffic has been disproportionate among regions. As a rule, areas of the world that exhibited stable economic growth also experienced significant increases in air passenger traffic. The fastest growing regions for air transport were Asia/Pacific and North America, which registered average annual growth rates of 7% and 4.5%, respectively. Air passenger traffic growth in Europe appeared to stagnate during the 1980s and early 1990s. (Table 6.1) However, this statistic is misleading as scheduled passenger traffic in USSR/CIS, which typically constitutes slightly less than half of the total scheduled traffic in the European region, contracted by 40% during the past three years. But when USSR/CIS passenger data
are excluded, total growth in scheduled air passenger traffic becomes a robust 5.4% in the European region. For Latin America, the Middle East, and Africa—which as a whole registered poor to mediocre economic growth during the previous decade—the growth rates for scheduled air passenger traffic correspond accordingly. Historical growth rates and regional passenger traffic totals are summarized in Table 6.1.

TABLE 6.1: Air Passenger and Cargo Traffic Growth by Region

<table>
<thead>
<tr>
<th></th>
<th>North America</th>
<th>Europe</th>
<th>Asia &amp; Pacific</th>
<th>Latin America &amp; the Caribbean</th>
<th>Africa &amp; the Middle East</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASSENGERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millions of Passengers, 1993</td>
<td>1,043.4</td>
<td>569.2</td>
<td>385.4</td>
<td>93.4</td>
<td>86.5</td>
<td>2,177.9</td>
</tr>
<tr>
<td>Average Annual Growth Rate 1982-1992</td>
<td>4.5%</td>
<td>1.7%</td>
<td>7.0%</td>
<td>1.7%</td>
<td>1.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>CARGO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millions of Tonnes, 1993</td>
<td>17.9</td>
<td>7.9</td>
<td>8.7</td>
<td>1.5</td>
<td>1.4</td>
<td>37.4</td>
</tr>
<tr>
<td>Average Annual Growth Rate (1982-1992)</td>
<td>6.8%</td>
<td>5.9%</td>
<td>10.2%</td>
<td>5.2%</td>
<td>3.8%</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

Sources: ACI-Geneva, ICAO, World Bank Staff.
1. Estimated. Complied by totaling passenger traffic data for primary airports within each geographic region.

Two of the principal international aviation organizations, ICAO and IATA, predict that in the next 8 to 10 years total world air passenger traffic will increase by average annual growth rates of 4% and 6.6%, respectively (Figure 6.2). Regional forecasts estimate average annual increases of 8-9% for Asia and Pacific Region and 4-6% for the industrialized countries in Europe and North America. These forecasts are based primarily on recent growth trends and specific industry data. For the purpose of this study, an additional forecasts was conducted—a regression based on historical changes in per capita GDP, population, private consumption, and urbanization rates for 183 countries. Except for the World Bank projection for Africa and the Middle East, these forecasts predict steady growth in air passenger traffic for all regions of the world. ICAO expectations for growth in air cargo transport by region and for the world are shown in the fourth (white) bar of the graph. Based on this information, the implication for airports is that short-run demand pressures will increase.
(ii) Liberalization and Globalization of World Industry. During the previous decade, several countries have opted to remove formal and informal trade barriers through domestic liberalization, bilateral accords, and multilateral agreements. These measures have had an enormous impact on world trade and by extension air cargo transport. Between 1980-92, total world exports and imports grew at an average annual growth rate of 4.9%. ICAO estimates that a 1% increase in world exports has a concomitant 1.5% increase in the demand for air cargo. Deepened liberalization of domestic markets due to the establishment of regional trading blocs—the European Union, NAFTA, Mercosur, Andean Pact, Trans-Tasman Market—and the signing of the Uruguay Round of the GATT is expected to foster increased growth in world trade. The IMF predicts that world trade volume will increase by 5.9% in 1995. Road, sea, and rail modalities currently constitute the majority of global cargo transport. Rough estimates of total trade volumes transported by air range from 2-5%. Nonetheless, current trends in international trade are expected to increase the importance of air cargo transport within the next few years.

As industry becomes increasingly globalized, the need to transport finished and intermediate goods across vast distances in a relatively short time will raise the demand for air cargo services relative to other transport modalities. Between 1983 and 1993, the number of aircraft departures and total tonnes carried of all-cargo flights increased by average annual rates of 3.3% and 4.1%, respectively. The development of just-in-time distribution techniques, the reexport of intermediate goods and the expanded shipment of perishable commodities, i.e., flowers, meat, fish, vegetables, are some of the factors that will have an impact on the air cargo industry. In particular, the demand for fresh fruit and vegetables is expected to increase in the next few years due to the elimination of import quotas and change in dietary habits in industrialized countries.
The dynamic component in air freight transport has been the development of the overnight mail and two-day package industries, a US$30 billion a year industry. By utilizing regional hubs, carriers such as FedEx, UPS, and DHL have been able to improve efficiency and extend operations to provide rapid service worldwide. The air cargo transport industry will continue to expand to new markets as cargo hubs will open in Subic Bay, Philippines and Dubai, United Arab Emirates within the next few years. FedEx and UPS are the two largest US operators, with a combined 70% market share in overnight mail delivery and a 80% share in two-day package service. Among all airlines, FedEx and UPS have the seventh and eleventh largest aircraft fleets, respectively. Internationally, the presence of DHL in Europe, Asia and the Middle East is very strong as the US operators are still striving to establish a stronger foothold. The industry is also served by passenger airlines and several all-cargo carriers. In addition, the maximum weight per package delivered has increased from 50 to 150 pounds, indicating that more manufactured goods are transported by air.

Anecdotal and statistical evidence point to the steady growth in air cargo transport during the next five years. In 1993, total air freight was estimated to be roughly 37 million tonnes (Table 6.1). ICAO predicts that the average growth rate for world air cargo transport will be 4% per year between 1992 and 2003, with the Asia/Pacific region registering a growth rate of approximately 9.5% (Figure 6.2). A more optimistic forecast is offered by Boeing which predicts world air cargo volumes will triple by the year 2013. The rapid growth of the air cargo industry has several important implications for airports. Airport operators will need to determine who will supply cargo handling services--airport authorities, public-private joint ventures, airlines and airline subcontractors, specialized cargo handlers, or private operators--and what level of competition will exist. Most airports have opted to contract out these services, although some airport authorities have decided to undertake these services in-house (e.g., Vienna). Airport operators also must calculate the effect of all-cargo flights on existing capacity constraints. For example, Memphis Airport has adopted the approach of using night hours for all-cargo aircraft. However, this technique may not work for some airports near residential areas because of noise pollution considerations. Furthermore, additional land and increased investment will be required to build specialized facilities such as cargo terminals, warehouses, automated handling systems, and truck ports. Although some of this additional infrastructure is contingent on the degree of involvement of the airport authority in cargo handling services, a basic level of investment will be necessary to accommodate projected increases in cargo traffic.

(iii) **Airline Industry Restructuring.** An important impact of airline industry restructuring has been a steady increase in total aircraft movements and, by extension, passengers. IATA and ICAO report that the average annual growth rate for total aircraft departures increased by 2.9% and 3.5%, respectively, between 1982 and 1993. ICAO predicts that aircraft departures will grow at 2% until 2003. Although regional forecast information is unavailable, secondary data may prove more instructive. For example, the size of the airline industry, which has grown rapidly since industry restructuring began but may contract in the long-term. In 1992, a total of 44 airlines ceased operations but in the following year 84 airlines announced the introduction of new services. Furthermore, IATA membership increased by a net 11 carriers to reach an all-time record of 224 airlines in 1993. The number of aircraft in operation is also expected to
increase. Manufacturers predict aircraft fleets will increase by 3.3% per year between 1993 and 2000. In numerical terms, world fleet size is expected to grow from 10,690 to 13,730 aircraft.

B. Efficiency Constraints

6.3 To a lesser extent, airports also will be affected by efficiency constraints that impact on the supply of airport services. Many existing facilities will need to be renovated and modernized in order to guarantee the cost-effective and safe provision of services. Airports, especially those in relatively large air transport markets, will also be expected to accommodate larger planes that service long-haul destinations and carry loads between 375 and 800 passengers. In addition, the growing awareness of environmental considerations worldwide will force airports to change operating schedules, prohibit certain users, and alter expansion and greenfield projects to meet higher standards. Lastly, airports also will require improved intermodal linkages to integrate better with national transportation structures and facilitate airport access. These factors directly affect the supply of airport services and will necessitate increased spending on infrastructure.

(i) The Need To Upgrade and Harmonize Air Traffic Control (ATC) Systems. A more in-depth analysis of the provision of ATC services could be expected to yield insights relating to the ATC-airport interface; however, this is outside the scope of this report and will need to be undertaken in a future study. The need to upgrade and modernize existing ATC equipment will relieve some of the efficiency constraints experienced by airports and guide additional aircraft during peak periods. Market pressures experienced by ATC structures in many ways mirror the internal and external challenges facing airports. Historically, ATC systems have generally not kept pace with the changing needs of the commercial aviation sector. ATC systems suffer from: (i) inflexible civil service orientations and public procurement procedures; (ii) unclear responsibilities resulting from the provision of services to a variety of commercial and military users; (iii) lack of harmonization across borders; (iv) widespread absence of underlying regulatory structures; and above all (v) limited public funds to replace increasingly outmoded equipment. These factors have constrained significantly the financial and operating performances of the ATC systems and by extension airport operating capacities.

Inadequate ATC systems increase airport congestion and potentially impair air safety. The cost of congestion to airports and airlines is between US$15 billion and US$20 billion each year. In addition, poor customer service and decreased public funding is forcing a reevaluation of the existing ownership structure of national ATC systems. Spinning off ATC to a user-funded corporation has been one approach used to address these structural issues. The Czech Republic, New Zealand, Australia, Portugal, South Africa, and Thailand have corporatized their national ATC systems and Switzerland, Germany and Austria have decided to privatize. Other countries, including the United States, the United Kingdom, Russia, Canada, and Argentina, are reviewing the feasibility of increased private sector participation in ATC systems. Within these ownership structures, governments have remained in charge of regulatory, safety, and environmental functions, while management activities have been transferred to a commercially-run corporation. Airways Corporation of New Zealand (ACNZ),
which was corporatized in 1987, provides several important lessons and illustrates the transformation from a typically money-losing to a consistently profitable venture. The Government of New Zealand had accumulated a deficit of US$70 million prior to corporatization, but has since received roughly US$55 million in taxes and dividends from ACNZ. More importantly, corporatization allowed ACNZ to obtain private debt financing, rationalize expenses, and raise internal funds to finance a US$59 million modernization project. Productivity has increased due to a 40% reduction in staff and the value of ACNZ has increased from US$33 million to over US$100 million during the past seven years. Users of ATC services in New Zealand have benefited from a 37% reduction in fees.

Harmonization of ATC systems is also necessary to reduce inefficiencies due to duplication and incompatibility. For example, there are roughly 54 ATC centers in Europe that use 31 different computerized traffic control systems made by 18 manufacturers. The computers rely on 22 different operating systems and 33 different programming languages. To address these inefficiencies, 32 European nations have agreed to link air space and have established the European Air Traffic Control Harmonization and Integration Program (EATCHIP). The EATCHIP system will extend from Iceland to Bulgaria and cover an area greater than the continental United States. The European Civil Aviation Conference (ECAC) will administer EATCHIP in conjunction with Eurocontrol, the proposed ATC system for the European Union, and each of the national ATC systems. ECAC has completed the first two phases—an evaluation of existing traffic patterns and technological deficiencies. Phases 3-4 will entail the development of new technologies, equipment acquisition, and the installation of satellite navigation and automated air/ground data links. The expected completion date is approximately the year 2000. The cost of EATCHIP is between 1-2% above existing modernization programs undertaken by member states and will be financed by a 7% increase in airline ATC charges. Nevertheless, the attempt to coordinate ATC systems around the world has been uneven due to political and military hostilities between bordering nations. An ICAO-sponsored proposal to reduce flight delays in South Asia foundered because Pakistan decided not to participate.

(ii) The Development of Large Aircraft. Increased traffic volumes, limited slot space, efficiency concerns, and noise curfews at airports have led to increased demand for airport use during long-haul flights. Larger aircraft would double existing passenger loads and could potentially double the flow of passengers during congested periods. To address airport size constraints caused by the widespread introduction of larger aircraft, expanded areas between taxiways, runways, aprons, gates, and terminal areas will be needed. Airport authorities also will have to construct new internal road layouts to accommodate a greater number of support vehicles associated with larger aircraft. In the interim, aircraft that can carry up to 440 passengers (without luxury modifications) will be in use within 1 to 2 years. The use of larger aircraft will affect mainly the operation of gateway hubs, large regional hubs, and airports with strong long-haul markets. However, the development of larger aircraft could be delayed due to

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1 Reduction of ATC fees has not been experienced by the users of the privatized Deutsche Flugsicherung (DFS) in Germany, which absorbed a 27% increase after government subsidies were removed. The expectation is that when the full effect of privatization takes hold, airway charges can be expected to decrease.

2 A single, unified ATC system was not adopted because of the reluctance to cede sovereignty over national airspace.
environmental and safety considerations. Another concern is that bigger fuel tanks would be needed, which could create a greater fire hazard.

(iii) Increased Emphasis on Environmental Issues. Pressures from environmental groups will force airport authorities to rethink airport development strategies, especially the construction of new airports and extensions to additional facilities. The new airports serving Denver, Hong Kong, and Kuala Lumpur were constructed far enough from city centers in order to avoid noise pollution considerations. Significantly, the new airport at Kansai was built on an off-shore island dredged from reclaimed land near three large metropolitan areas to be in compliance with Japanese noise-pollution standards. As a result, Kansai Airport is the only major airport in Japan not subject to night curfews. In Munich, engineers working on the new airport were forced to change the course of a number of streams, canals, and ditches to avoid potential seepage into existing water tables. Environmental considerations also have affected the renovation of existing airport facilities. For example, the development of a new runway at Vancouver Airport required compensation for the destruction of a wildlife preserve.

Concerns over excessive noise pollution, waste disposal, air emissions, and water pollution will to some degree limit the available supply of airport services. The problem is compounded by environmental regulations and enforcement mechanisms that differ among countries. Whereas some governments in North America, Europe, and Asia have begun to codify ICAO standards that prohibit the use of non-reconfigured Stage 2 aircraft, countries in the developing world have been slow to adopt these measures. Airports and airlines have been given grace periods of up to 9 years and have until January 1, 2000 and April 1, 2002, respectively, to meet the deadline imposed by the US and the European Union. The prohibition against Stage 2 aircraft will primarily impact on carriers due to the reconfiguration and replacement of existing aircraft. By extension, the effect on airports will result from changes in operating schedules and the imposition of surcharges and curfews to encourage compliance. Night curfews are already in effect in several countries, e.g., Austria, Australia, Canada, Japan, the Netherlands, the UK, and the US. However, curfews in one location can contribute to congestion at other airports. For instance, primary airports in India experience severe congestion during early morning hours due to curfews in Hong Kong and Tokyo, which define East-Asia-Europe schedules. Furthermore, airports may incur additional expenditures to install noise-monitoring equipment to distinguish polluters from nonpolluters. This equipment is already in place at airports in Australia, the Netherlands, and the UK.

Waste disposal is the second most important environmental issue affecting airports. For example, the amount of trash generated by US airports easily exceeds one million tonnes per year. Since the cost of sending the trash to landfills increased dramatically in the last few years, airports have more than just an altruistic motive to decrease waste. While many airports have instituted voluntary recycling programs for airlines, Vienna Airport has taken the additional

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3 The development of the off-shore island is the cause of US$21 billion project cost.
4 Stage 2 aircraft include: Boeing 727s and 737s; and McDonnell Douglas DC-8s and DC-9s.
step of making this program mandatory. Enforcement is encouraged through the imposition of a surcharge based on available seating capacity for non-compliant aircraft. The amount of waste per flight decreased by 50% since the implementation of this program. Many airports are also affected by national statutes that regulate hazardous and solid waste dumping. For instance, Copenhagen Airport is currently testing a system that collects aircraft de-icing fluid to avoid direct dumping into the sea. Environmental regulation can also limit seepage from airport fuel tanks into nearby water tables. Lastly, some airports (e.g., Amsterdam, Dusseldorf, and Stockholm) have taken measures to control air emissions from aircraft operations. The primary disadvantage of these measures is the cost of measurement equipment plus enforcement measures.

(iv) The Need for Improved Intermodal Linkages. In the coming years, road and rail linkages will be needed to improve access to and from city centers and tourist attractions. New airport facilities are not likely to be located near major metropolitan areas. In addition, existing transport links are usually subject to severe traffic jams, the costs of which are not included as an airport delay factor. Currently, planned intermodal linkages are limited in scope and number. Rail links are planned for Stockholm, London Heathrow, Manchester, Amsterdam, Dusseldorf, and Paris, as well as the new Athens and Hong Kong airports. Government funds have become increasingly more difficult to obtain. Consequently, airport authorities in conjunction with the private sector have begun to finance airport access projects. For example, the US$500 million Heathrow Express project, which would link Heathrow Airport to downtown London will be financed by the BAA (20%) and other private sector investors. Originally, British Rail was to provide a 20% contribution with BAA taking a 80% stake in the project; however, the state-owned company dropped out due to financial difficulties. In the same context, Dusseldorf Airport is trying to persuade the German Federal Railways to go ahead with a US$224 million rail access link to the long-distance rail network in Germany. Dusseldorf Airport has committed US$100 million of the funding necessary for the proposed project.

C. Limited Availability of Traditional Sources of Funds

6.4 ICAO estimates that about US$250-350 billion will be needed in airport infrastructure during the next 10 to 15 years to meet demand and modernize existing facilities. If the costs of new ATC services, environmental regulation, intermodal linkages, and unreported capacity constraints are included, total airport infrastructure investment could exceed US$500 billion. The average life-span for airport assets is between 20 and 25 years. Most airports around the world were built between 1930 and the 1970s, and modernized over 20 years ago. Consequently, the need for renovation or replacement of existing facilities will continue to be a priority in the medium-term. Airports will require expanded taxiways, aprons, and runways, additional airbridges, and larger terminals. Dynamic changes within the airport industry also will require the construction of special facilities, such as shopping, parking, and cargo handling areas. Apart from the enormous fixed costs associated with these investments, airports will be forced to accommodate operational disruptions resulting from infrastructure improvements. Moreover, the average project life-span of airport infrastructure will necessitate

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This amount includes US$100 billion for 43 on-going projects, each in excess of US$500 million.
capacity increases greater than demand forecasts. Typically, several years will elapse before an adequate rate of return on investment can be achieved. Even with additional infrastructure, industry experts believe that insufficient capacity will exist to meet predicted demand in the coming years.

**TABLE 6.2: Inventory of New Airport Facilities**

<table>
<thead>
<tr>
<th>Airport</th>
<th>Cost (US$ billions)</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Munich, Germany</td>
<td>$5.4</td>
<td>1992</td>
</tr>
<tr>
<td>Chiang Mai, Thailand</td>
<td>N/A</td>
<td>1992</td>
</tr>
<tr>
<td>Kansai, Japan</td>
<td>$20.6</td>
<td>1994</td>
</tr>
<tr>
<td>Denver, United States</td>
<td>$6.0</td>
<td>1995</td>
</tr>
<tr>
<td>Macao</td>
<td>$1.0</td>
<td>1996</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>$16.0</td>
<td>1997</td>
</tr>
<tr>
<td>Seoul, South Korea</td>
<td>$5.0</td>
<td>1998</td>
</tr>
<tr>
<td>Kuala Lumpur, Malaysia</td>
<td>$8.0</td>
<td>1998</td>
</tr>
<tr>
<td>Oslo, Norway</td>
<td>$2.0</td>
<td>1998</td>
</tr>
<tr>
<td>Athens, Greece</td>
<td>$2.3</td>
<td>1999</td>
</tr>
<tr>
<td>Bangkok, Thailand</td>
<td>N/A</td>
<td>2000</td>
</tr>
</tbody>
</table>

Source: World Bank Staff

6.5 The problem of inadequate airport capacity will become increasingly serious since only a few new airports are planned or under construction. Based on industry estimates and existing data, the average cost of a new, primary airport is nearly $7 billion. New airport construction primarily has occurred in East Asia with new primary airport facilities in Kansai (which will serve Osaka, Kyoto, and Kobe), Macao, Hong Kong, Seoul, Kuala Lumpur, and Bangkok. The new Hong Kong Airport will have a maximum capacity of 87 million passengers per year, which would be by far the largest airport in the world. In Europe and North America, airport construction has been limited. New airports have been built in Denver and Munich, and additional airports are being developed in Athens and Oslo. Nevertheless, municipal authorities and Government officials are reviewing options for a third airport in Chicago and a new airport in Berlin. At present, few new primary airports are in the works in Africa, the Middle East, South East Asia and Latin America, where existing infrastructure is among the oldest in use. New airports are under study for: San Jose, Costa Rica; Quito and Guayaquil, Ecuador; Bangalore, India; Islamabad, Pakistan; Banjul, Gambia; and Harare, Zimbabwe. African airports are in particularly bad shape due to years of inadequate maintenance, insufficient reconfiguration for jet aircraft, and prolonged periods of political instability and war. The Hong Kong and Kansai projects are the most ambitious to date and involve costly land reclamations and intermodal transportation links to city centers. Also noteworthy is the new Denver International Airport (DIA), which has three-parallel runways that allow the simultaneous movement of three aircraft, even during inclement weather.

6.6 Table 6.3 summarizes the sources of airport funding in over 60 countries. An important conclusion that can be drawn from this table is that the majority of airports (66%) receive some sort of Government assistance for airport infrastructure projects. This percentage is probably higher as the ICAO survey does not include several developing countries where airports are completely dependent on Government funds for airport development. In the medium to long-run, these funds are expected to diminish as spending priorities are shifted to
improving macroeconomic fundamentals and addressing social ills. Other sectors with greater
demand for Government funds (e.g., health, education, etc.) may crowd out new airport
spending. Funds from bilateral foreign assistance programs are also expected to decrease as
Governments in industrialized countries are now reexamining donor contributions. Debt
financing may prove expensive as the cost of financing is inherently linked to economic growth.
The poor credit histories of some countries combined with increasingly rapid movement of
capital may make debt financing prohibitively expensive for airports in many developing
countries. Moreover, the potential elimination of investor tax incentives would have a negative
impact on airport financing costs, especially in the United States. Thus, new financing sources,
mainly from the private sector, will need to be explored. Increased private sector participation
through BOTs and share flotations will assume greater importance.

TABLE 6.3: Funding Sources for Airport Infrastructure in 67 States

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Number of States</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Government</td>
<td>44</td>
</tr>
<tr>
<td>Internally Generated Funds</td>
<td>40</td>
</tr>
<tr>
<td>Commercial Loans</td>
<td>25</td>
</tr>
<tr>
<td>Foreign Government Loans or Aid</td>
<td>24</td>
</tr>
<tr>
<td>International Development Banks or Funds</td>
<td>15</td>
</tr>
<tr>
<td>Regional/Municipal Government</td>
<td>10</td>
</tr>
<tr>
<td>Other (including private sector)</td>
<td>6</td>
</tr>
</tbody>
</table>

Source: ICAO

1. Note that airports may use more than one source of financing.

D. Market Access

6.7 The growing trend toward the deregulation and privatization of the airline
industry has dramatically altered the operational and regulatory landscape of airports that now
must contend with a customer base in constant flux. Expanded market access has altered the
historically close relationship between carriers and airports. During the antecedent period when
governments retained full ownership of national carriers, entry and exit of carriers was tightly
regulated. Furthermore, airports and airlines were envisioned as part of a linked aviation
structure within the national transportation system. Preferential pricing schedules for airlines,
government subsidies, and cross-subsidies between aviation enterprises reflected this
interconnectedness. Airside pricing mechanisms were based on ICAO cost-recovery guidelines
and designed to ameliorate the financial position of national carriers. In turn, airports could
invariably depend on a constant level of service and revenues from the national carrier(s). At a
minimum, this arrangement solely required a regulatory framework focused on technical and
safety criteria. Economic issues such as market access and pricing schedules were largely fixed
by national aviation authorities and thus could be downplayed.

6.8 To varying degrees, airline deregulation and liberalization eliminated entry,
service, and price restrictions in several countries. Many airport authorities have increased
opportunities to enlarge their customer base beyond national carriers and the domestic market to a greater number of destinations. In addition, airports, especially those with some sort of private sector participation, have been granted wider latitude over the imposition of airside charges. In the absence of an industry-specific, economic regulatory framework, these disputes have resulted in protracted and expensive legal battles that resolve little in the long-run. Foreign-based airlines through bilateral agreements and industry alliances are also clamoring for increased market access, improved slot allocation, and the elimination of discriminatory pricing schedules. Thus, the need for a revised regulatory framework has arisen from changes within the airline industry in combination with the trend toward improved market access.

(i) **Deregulation and Liberalization of the Airline Industry.** During the last 10 to 15 years, governments have liberalized competition, deregulated price and service levels, and reduced managerial and financial involvement of airlines. As a result, airfares have decreased on average 70% since 1970 and consumers have much greater access to air transport services. These factors have lowered the profitability of a large number of carriers and led to the dramatic restructuring of the airline industry. With the elimination of entry and exit restrictions, many airlines either discontinued operations or merged with other carriers while survivors expanded or contracted their activities based on market conditions. In addition, airlines purchased minority equity of privatized carriers to obtain improved access to foreign markets. Among the most proactive were American, British Airways (BA), Iberia, and Taca, each of which obtained holdings of three or more carriers. The strategy undertaken by BA and American is to develop a world network, whereas Iberia and Taca seek to dominate regional markets. Other carriers attempted to develop international networks through equity purchases are Delta, SwissAir, and Singapore Airlines (which engaged in a small-scale ownership swap) and KLM which purchased 20% of Northwest Airlines. Table 6.4 summarizes the scope of the airline industry restructuring that has taken place in the last 15 years.

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6 For example, Wellington International Airport Authority vs. Air New Zealand. (Chapter 5).
TABLE 6.4: Restructuring of the Airline Industry

<table>
<thead>
<tr>
<th>Region</th>
<th>Acquirer</th>
<th>Target(s)</th>
<th>Equity (%)</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Continental, Delta, Northwest</td>
<td>Republic, Ozark, Piedmont, PSA</td>
<td>N/A</td>
<td>1987, 1987</td>
</tr>
<tr>
<td></td>
<td>TWAA</td>
<td>USAIR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Euromoney, Air Transport World, World Bank Staff.
1. Sold in 1992 and 1994, respectively.

In lieu of purchasing equity and to avoid large financial investment in financially-weak carriers, several airlines have entered into code-sharing agreements to obtain access to new markets. Code-sharing agreements are powerful marketing tools that allow airlines to affix two-letter identifier codes in computer reservation systems to flights operated by the other partner(s). In this manner, airlines can achieve economies of scale as the flight schedules of both airlines are linked. These arrangements can transform service levels of traditionally noneconomic routes (e.g., Cincinnati-Zurich or Buenos Aires-Amsterdam) into profitable ventures. In the past two years, the use of code-sharing agreements mushroomed to become a common form of strategic alliance across borders. Because of anti-trust concerns, these agreements usually require Government approval. In the US alone, the FAA reports 89 such arrangements since 1987. Some of the more notable non-equity code-sharing agreements involve Lufthansa-United, KLM-Japan Airlines, American-Cathay Pacific, and Delta-Aeroflot. Continued growth of code-sharing agreements could be limited if Governments impose anti-trust regulations.

These changes within the airline industry have altered airport operations. Airlines have eschewed point-to-point service in favor of hub-spoke networks, which generate economies of scale by aggregating passengers bound for various destinations through a few centralized points. Hubs have led to an increase in the number of flights and destinations served and fueled air passenger traffic growth rates. Airport hub service flourished in the US shortly after airline deregulation and has expanded to airports around the world. Three types of hub airports exist: gateway, regional; and secondary. Gateway hubs are few in number and concentrated in the major population centers or international crossroads, such as New York, Los Angeles, Miami, London, Hong Kong, and Tokyo. A large airline customer base exists at gateway hubs, and as a result, changes in traffic volumes are closely linked to macroeconomic growth. In contrast, regional hubs are more susceptible to changes in the airline industry, as a single major carrier
generally accounts for a large percentage of total traffic. Moreover, the financial performance of the airport is linked intrinsically to the dominant carrier. During the last 15 years, traffic at regional hubs has nearly doubled due to aggressive expansion by the lead carrier. Large regional hub airports are located in cities with strategic geographic characteristics such as Atlanta, Dallas, Chicago, Amsterdam, and Singapore. Secondary hubs are the most numerous and are highly susceptible to airline industry restructuring. These airports (e.g., St. Louis, Charlotte, San Juan, and Vienna) serve as either second tier hubs for major carriers or primary hubs for smaller airlines. In a relatively short time, secondary hubs can experience phenomenal growth rates coupled with sharp traffic reductions. For instance, Washington Dulles Airport tripled in size between 1982 and 1992, but experienced a 16% decrease in passenger traffic after Continental reduced hub operations in 1988.

(ii) **Liberalization of Flight Slots.** Flight slots relate specifically to landing and departure times into and out of airport airspace, and differ from gate slots, which concern facility use. Allocation of flight slots was established in the US at heavily congested airports and came to be governed by IATA principles, which were later codified by several governments. Airline Schedule Committees (ASCs) are headed by the dominant airline at each airport, which distributes airport slots. ASCs are supervised by the national aviation authority in each country, which legally controls all slots. However, slot ownership de facto has become airline property and can be traded and exchanged. Some countries have developed secondary markets for domestic slots. However, grandfather privileges reduces competition in certain markets. Consequently, governments are increasingly instituting “use-it-or-lose-it” and “priority-for-regular-service” rules to encourage new entrants. Slot allocation exists in mainly large and heavily congested airports, such as New York JFK, Chicago O’Hare, London Heathrow, and Tokyo Narita. Increased use of market mechanisms (e.g., auctions or lotteries) combined with a corresponding secondary market would increase competition and promote more efficient allocation of scarce airport space. Congestion could be somewhat relieved by pricing out smaller aircraft which do not maximize airport revenues. At the very least, elimination of grandfather privileges would liberalize slot trading, which presently benefits entrenched airlines. These changes require the revision of existing regulatory frameworks, but if enacted could relieve some of the efficiency constraints experienced by airports.

(iii) **Bilateral Agreements.** Another means for carriers to obtain access to international markets is through Government-negotiated bilateral agreements. Airline service between international destinations is regulated by these agreements, which generally do more to restrict international airline service than promote it. The vocabulary of international aviation is revolves around six so-called “freedoms”. The First Freedom is the right to fly over another country’s airspace without landing. The Second Freedom allows a stop in another country for refueling, technical or emergency reasons, but does not permit picking up or landing (disembarking) paying passengers. Most countries grant First and Second Freedom rights quite freely, although even these accommodations cannot be taken for granted; only since the end of the Cold War, for example, have international carriers been able to fly over large stretches of the former Soviet Union in the Far East and Central Asia. Freedoms Three and Four grant rights to carry passengers between two countries. The Fifth Freedom, which is rarely granted, gives an airline the right to carry passengers and cargo between two nations other than its home
country. An example is United Airlines ability to provide service between Tokyo and Singapore. Sixth Freedom rights, also rarely granted, permit a carrier to serve two countries by way of its own. An example is American Airlines' right to pick up passengers in Tokyo and take them, via Seattle, to Santiago, Chile.

Since the Airlines Deregulation Act in 1978, US carriers have been able to fly relatively "unregulated" within the United States. One example for deregulated skies is the United States, which has negotiated "Open Skies" agreements with Austria, Belgium, Canada, Germany, Japan, the Netherlands, the United Kingdom, and Caribbean, and Central American countries. In addition, the US and the UK recently have concluded a bilateral agreement in which the two countries temporarily resolved their long-running dispute over air traffic rights. However, this agreement falls short of the "open skies" arrangements and lacks provisions for increasing rights to internal operations and opening US regional airports to UK airlines. The European Commission contends that these independent deals contravene Article 84 of the Treaty of Rome which authorizes the Commission to negotiate such agreements when there is threat that such deals would be inconsistent with the integrity of the European internal market.

Meanwhile, US attempts to reach agreement with Japan have failed so far as the Japanese government has rejected applications for 11 new cargo routes to Asian destinations via Tokyo. These "beyond rights" are commercially valuable as a means of tapping the booming Asian-Pacific air transport market. The Japanese, however, feel that the original principle was forced on them during the 1950s and the United States has exploited its rights unfairly. Thus, despite recent air transport agreements, a global "open-skies" regime is still proving hard to achieve. Further conflict is likely between the United States and the European community, and potentially with Japan as well.

6.9 While several countries have begun to deregulate air transport services and to provide increased market access, many of these initiatives need to be deepened and widened. Many domestic carriers which have been recently privatized, continue to have a strong market position within their home markets at the expense of new domestic airlines and foreign carriers. Some of the barriers to improve market access are now less explicit and involve the manner in which government entities allocate airport and flight slots. Moreover, the increased proliferation of bilateral or regional agreements has had the effect of providing increased market access for some countries, while excluding non-participating states. In the coming years, countries will increasingly need to design policies that promote equal and fair access for all players.
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