

LARGE COMMERCIAL AIRPORTS IN THE UNITED STATES: OPERATING REVENUE FRAMEWORK

by

Victor Rivas

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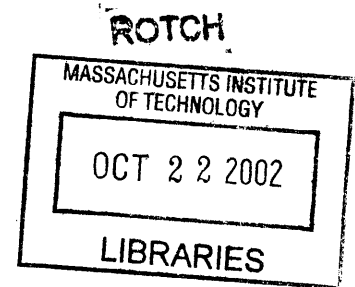
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ABSTRACT

The air transportation system in the United States is in a state of constant change and adaptation. Greatly affected by rapid changes in the industry are the large commercial airports that handle the greater proportion of passenger traffic. To increase capacity, maintain adequate levels of safety and security, and provide increased convenience and comfort to passengers, these airports need to invest heavily in capital programs, whose prices continue to escalate rapidly.

The funding of capital programs for airports in the United States is closely associated with their operating revenue structures. Therefore, this thesis develops a framework for understanding these operating revenue structures. The high concentration of the air traffic in the United States suggests that a large portion of investment in airport infrastructure will be destined to few large facilities. Hence the primary area of concern of this study is the largest commercial airports in the United States

Part I examines the financial data of the airports at the aggregate level to create a consolidated financial profile of these facilities. The consolidated operating revenue is analyzed to identify the most important line items. Special consideration is given to the alternative cost recovery methodologies – residual, compensatory and hybrid – used by airport operators to set their aeronautical fees. The objective of this exercise is to identify the main drivers and factors that shape the revenue structure of large commercial airports. In addition, by synthesizing scattered operational and financial data, the research highlights the impact of airport operations and business practices on the airports' revenues.

Part II contains the case studies of three airports. Each case is evaluated within the basic framework used to analyze the system at an aggregate level in Part I. However, the evaluation of the case studies also emphasizes the unique characteristics of each case. The case studies include Logan International Airport in Boston (BOS), Dallas/Fort Worth International Airport (DFW), and Baltimore/Washington International Airport (BWI).

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PART I

OVERVIEW

Chapter 1

Introduction

1.1 Motivation and Goals of the Thesis

The air transportation system in the United States is in a state of constant change and adaptation. Greatly affected by rapid changes in the industry are the large commercial airports that handle the greater proportion of passenger traffic. Traffic volumes at these facilities continue to grow, showing increasing levels of concentration. For instance, in 2000 the 31 large hub airports which represent about one percent of the airports in the national system handled over 74% of passenger enplanements (FAA 2001, 77, 78).

To increase capacity, maintain adequate levels of safety and security, and provide increased convenience and comfort to passengers, airports need to invest heavily in capital programs. Also, as a direct consequence of the events of September 11, 2001, additional security-related investments will also be required in the U.S. airport network. The system is undergoing a major review of security procedures, since existing design standards of airport facilities may no longer conform to new security requirements. These airports also face the need to invest in special capital programs to adapt their facilities for the introduction of new large aircraft (NLA).¹ Overall, airports face pressure to undertake major capital programs whose prices continue to escalate rapidly.

It is also clear that the capacity, safety and security problems of these airports have to be faced in a systematic and cohesive way. For example, efforts to improve capacity of the airspace, such as the reduction of separation standards, have to be matched with corresponding increased capacity at the individual airport facilities.

The need for investments in security, investments to prepare for the introduction of new large aircraft, and investments in the expansion of airspace and airport capacity call for comprehensive airport financial information and data to help managers and policymakers assess existing financial trends and identify future sources of revenue to fund capital programs.

Today airports are capable of raising large amounts of money to fund their capital programs. However one cannot avoid asking a few questions: Are the resources being used adequately? Is the current model for funding capital programs appropriate? Are there better alternatives? Are the needs of airport operators, the airlines, and the airport system in general being addressed in coordinated fashion? Is the role of the federal government adequate? Do capital programs have a local focus, or address issues of national concern, or both?

¹ The GAO surveyed 14 airports that expect to serve NLA by 2010. These airports estimated that collectively their cost for infrastructure changes to accommodate NLA will be approximately \$2.1 billion. The 14 airports surveyed include LAX, ORD, JFK, SFO, DFW, IAD, MEM, ATL, IAH, MCO, MIA, DEN, Ted Stevens Anchorage International, and Indianapolis International.

A literature review on the topic shows little academic work on the subject. Conversely, the U.S. government, trade organizations and financial institutions, especially credit rating agencies, have contributed and continue to be major contributors to this field. However, a comprehensive analysis of the operating revenue structure of large hub airports is still missing. Existing work usually focuses on specific subjects and lacks a comprehensive approach to analysis and evaluation (e.g., the incorporation of operational issues or policy implications into the evaluation process).

The focus and scope of existing research varies from case to case. Relevant references will be provided in the main body of the thesis. Generally speaking, the work produced by the FAA is by far the most comprehensive, always incorporating a systems view. Reports produced by the GAO are, on the other hand, very focused on specific topics and lack continuity (as they respond to specific requests from Congress). The focus of the Airports Council International-North America (ACI-NA), the Air Transport Association (ATA), and other trade organizations is from the perspective of their constituents, while credit rating agencies are case-specific. The linkage of various types of information and data generated by these organizations has a great value in the aggregate that can benefit all stakeholders in the air transportation industry.

Policy makers and most importantly the general public will benefit from increased access to more comprehensive information. Availability and standardization of airports' financial data can be a valuable tool in the decision-making process for future investment in the nation's air transportation system. Lack of comprehensive information, on the other hand, can lead to investment in capital programs that can be costly in the long-run. For example, a capital program with local focus might be tailored to fit the needs of a specific airline, but might not necessarily foster airline competition. Thus, this type of investment would be a disservice to the general public.

This thesis will analyze the operating revenue framework of the universe² of large hub airports in the United States. By examining first the financial data of the airports at the aggregate level, a consolidated financial profile of these facilities will be created. Then, the study will analyze the

² The data provided by the FAA include information on all large hub airports.

operating revenue framework. The objective will be to identify the main drivers and factors that shape the revenue structure of large commercial airports.

In addition, by synthesizing scattered operational and financial data, the research will attempt to highlight the impact of airport operations and business practices on the revenue structure of large commercial airports. It is hoped that this study will contribute to providing a national perspective for decision-makers addressing local capital programs.

1.2 Structure and Outline of the Thesis

This study has benefited greatly from technical reports prepared by government agencies such as the Federal Aviation Administration (FAA) and the General Accounting Office (GAO) of the U.S. Congress, as well as documents published by the three leading credit rating agencies: Standard & Poor's, Moody's Investor's Services, and Fitch IBCA. In addition, the study relied heavily on reports and data from the Airports Council International – North America (ACI-NA), American Transport Association (ATA), and the 2002 Aviation & Aerospace Almanac published by Aviation Week.

The core financial information was provided by the FAA. The data are based on financial reports that airport operators file with the FAA. Since 1996, the FAA requires that all airports receiving federal assistance or charging passenger facility charges (PFCs) report their financial status at the end of the fiscal year. Fortunately for this project, all 31 large hub airports included in this study are required to file Form 5100-127 with the FAA. Earlier attempts by Airports Council International North-America to consolidate financial data from the airports' annual reports were fruitless due to major differences in reporting and accounting procedures (Plavin 2002).

The financial data from the FAA were complemented with data from the 2001 ACI-NA General Information Survey. This comprehensive data set contains a wealth of information on many relevant issues that include ownership, governance and management, operations, contractual agreements, and capital programs expenditures. This information, as well as the data collected by the FAA, has been used with caution, since the data requested was in several instances subject to

the interpretation of the respondents. To verify the accuracy of some of the data the author relied on telephone calls to airport, FAA, GAO, and ACI-NA officials and on confirming the information against the airports' annual reports. An explanation is provided in every case when adjustments were made to the original data. Given the numerous sources used and the various time frames involved, it is important to mention that all amounts are presented in current dollars.

The study starts with a comprehensive view of issues affecting the operating revenue structure of large commercial airports in the United States. Part I, which includes chapters 1, 2, 3 and 4, examines large commercial airports at an aggregate level. The high concentration of the air traffic in the U.S. suggests that a large portion of investment in airport infrastructure will be destined for the large hub airports³. Hence the primary area of concern of this study is the largest commercial airports in the U.S. Then Part I, links analyzed revenue line items to the drivers that influence the airports' revenue streams. In addition, financial alternatives and funding trends are examined against capital program needs.

Chapter 2 provides an overview of the state of the airport system in the United States emphasizing the importance of the largest hubs to the nation's airport network. The chapter then focuses on ownership, governance and management issues. Next, the chapter elaborates on the types of cost recovery methodologies used by the airports to set their fees. This section analyzes the airport-airline relationship and its impact on the revenue structure. At the end, the chapter addresses issues related to competition among airlines in an airport setting.

Chapter 3 describes the resources most commonly used by large commercial airports to fund their capital programs. Trends in funding explaining the role of key stakeholders are identified next. The chapter further explains the participation of the federal government in the funding process. In addition, the chapter includes a section detailing the vital role of the credit rating agencies in the funding process for capital programs. Finally, the chapter focuses on the funding challenges that airports face today and on the outlook for future funding.

³ The 2001 Aviation Capacity Enhancement Plan published by the FAA uses the term hub to identify very busy commercial airports. This use is different from that of the airline industry, where a hub is an airport where passengers connect with other flights coming from the spokes of the system. The NPIAS does not

Chapter 4 explains the challenges associated with the comparison of financial data. Then it evaluates the consolidated financial data of all large hub airports. Next, it analyzes (at the aggregate level) the operating revenues and operating expenses. The federal government programs used to fund capital programs are also assessed. Then, the chapter gauges the performance of the three cost recovery methodologies used by airport operators to set their fees against operating revenues and expenses, as well as operating margins. The last section of Chapter 4 identifies the main drivers affecting operating revenues of large commercial airports. It shows how the relationship between the airlines and the airport influence aeronautical operating revenues. It further identifies the business practices that shape non-aeronautical operating revenues, and presents the policy factors that shape government funding.

Part II, which includes chapters 5, 6, 7, and 8, contains the case studies of three airports. Each case is evaluated with the basic framework used to analyze the system at an aggregate level in Part I. However, the evaluation of the case studies emphasizes the unique characteristics of each case. The case studies include Logan International Airport in Boston (BOS), Dallas/Fort Worth International Airport (DFW), and Baltimore/Washington International Airport (BWI). Each case includes a 10-year historical review of operating revenues and expenditures, followed by an analysis of their revenue structure at the end of the period. Next, the case studies focus on the participation of the federal government in the funding of capital programs. Finally, each case includes an analysis of the corresponding airport's debt service and current financial standing. It is important to mention that the cases were carefully chosen to ensure that they represent a broad range of issues affecting most large hub airports in the U.S.

Chapter 5 presents an analysis of Logan International Airport operating revenue framework. The chapter assesses the operating revenue framework. Then, the focus shifts to BOS' compensatory method for fee-setting and how its use influences the operator's business decisions. The capital investment program and funding sources are also examined. Special attention is given to recent

differentiate between airports with mostly connecting traffic and those with mostly origin-destination (O&D) traffic (FAA 2001, 76).

developments that include the slow down in the economy and the impact of Sept. 11 on the airport's business.

Chapter 6 assesses Dallas/Fort Worth International Airport. After a general description of the airport, the chapter reviews the airport's operating revenue framework focusing on the revenue line items setting the trends. DFW's rate-setting methodology is highlighted against its revenue trends. At the end the capital program is assessed against DFW funding sources, as well as the airport's debt service.

Chapter 7 features Baltimore/Washington International Airport, one of the fastest growing facilities in the nation in terms of passenger traffic. The chapter highlights the main factors that caused this growth and the links between traffic growth and operating revenues. Then, the chapter focuses on the government contribution to BWI capital program. Finally, the chapter presents recent developments and an outlook for the future.

Chapter 2

The U.S. Airport System

From the early days of commercial aviation the U.S. airport system has played an important role in the world's air transportation system. This is corroborated by the fact that during the last two decades U.S. airports have continuously served about 40% of the world's air travelers. At the end of 2000, 13 of the 20 busiest airports in the world in terms of annual passengers were located in the United States.

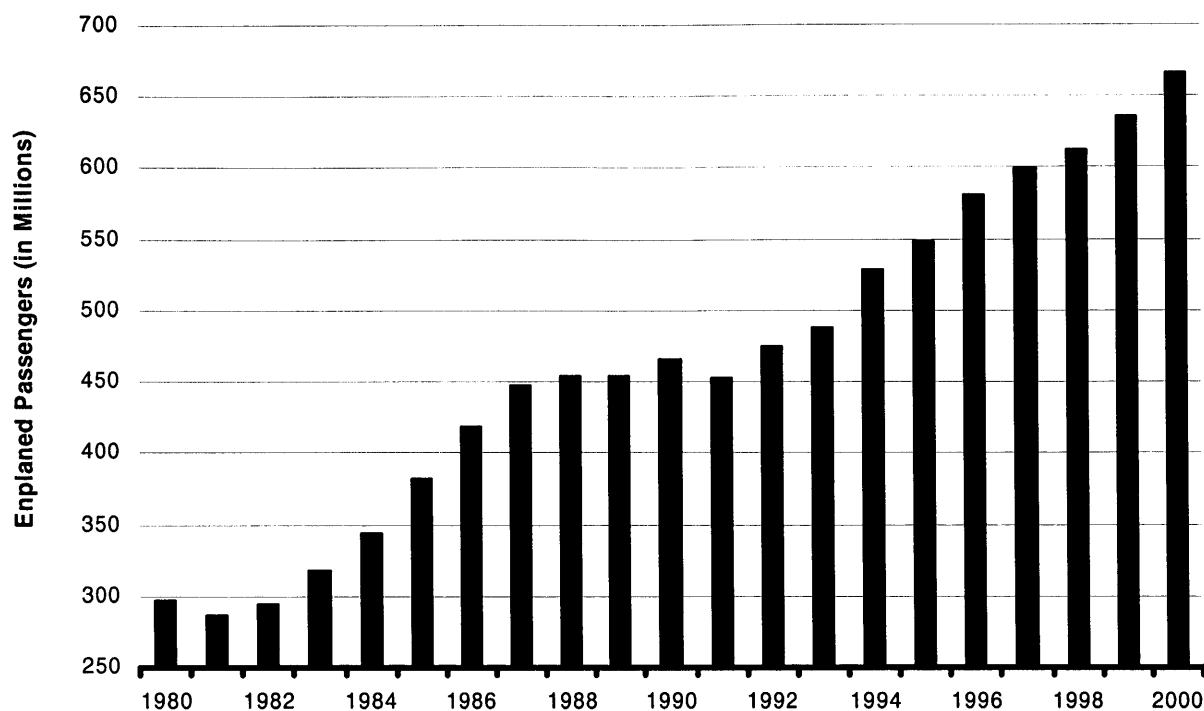
Commercial airports in the U.S. started to be built during the 1930s and 1940s. They were mainly, small, single-runway facilities, constructed to handle propeller airplanes. In the late 1940s, air travel started to gain popularity, and by the 1950s had become a common alternative for long trips (Champeau, Soltz and Fry 2000, 1). Today, air travel continues to grow and is straining existing airport infrastructure as air traffic congestion is taking center stage in the nation's largest commercial airports.

In 2000 over 669 million passengers were enplaned at U.S. airports (Figure 2.1), and latest forecasts suggest that the number will exceed one billion by 2013⁴ (Aviation Now 2002, 1). This represents a 33% growth over an 11-year span. Given the present level of congestion at major airports, government officials, the airlines, and airport operators continuously look for ways to improve traffic flows. But the solution does not seem to be a reduction in traffic volumes or dispersion of traffic. On the contrary, increased traffic volumes and traffic concentration is encouraged and fostered because it represents enormous business potential for airlines and airports alike. The dilemma of maintaining traffic growth while improving capacity in constrained spaces is being addressed, at least in part, through direct investment in ambitious capital programs at major U.S. airports.

After deregulation, as airlines searched for airport facilities suitable for their operations, traffic started to concentrate on airports with advantageous geographical location. Most airline networks began to evolve from a simple point-to-point system serving city pairs into elaborate hub-and-spoke patterns. This configuration allows air carriers to connect to more destinations without having to increase the number of aircraft. Hub-and-spoke networks converge on key hub airports often located in a geographically strategic place, generally away from both the east and the west coast, clustering around the geographical center of the U.S. territory (Figure 2.2).

⁴ In formulating its 27th annual commercial aviation forecast, the FAA took into consideration the negative impact of the September 11, 2001, terrorist attacks on the air transportation system.

Figure 2.1 Revenue Passengers Enplaned in the United States, 1980-2000



Source: Air Transport Association

According to the Federal Aviation Administration (FAA) classification system in 2000 the U.S. had 31 large hubs⁵ (large commercial airports). These airports represent about one percent of the 3,489 facilities of the National Airport System, yet these facilities enplaned over 74% of all commercial passenger traffic in the country. As a result, these facilities have become the bottleneck of the system and are under tremendous pressure to increase capacity and improve their level of service. To cope with the problem there are many initiatives underway including the modification of operational procedures, governance improvements and capital programs

⁵ The 2001 Aviation Capacity Enhancement Plan published by the FAA uses the term hub to identify very busy commercial airports. This use is different from that of the airline industry, where a hub is an airport where passengers connect with other flights coming from the spokes of the system. The NPIAS does not

(FAA and ARP Consulting 2000, 48). The funding of these initiatives is vital to guarantee the safety, security and reliability of the air transportation system of the 21st century.

2.1 Composition of the U.S. Airport System

With over 19,000 airports, the US has the most extensive and complex air transport system in the world. About 16,000 of these airports are very small facilities, most of them with fewer than 10 aircraft on site. However, the focus of this study is on the commercial passenger traffic which takes place through the 3,489 airports that are part of the National Plan of Integrated Airport Systems (NPIAS). All airports under the NPIAS are monitored by the FAA and are eligible to receive federal funding as grants under the federal Airport Improvement Program (AIP) (Section 3.1.2). The FAA airport classification system is adjusted every year since the facilities are categorized on the basis of annual traffic volumes. The following section describes the structure of the NPIAS as of 2000.

National Airport System

The NPIAS divides airports into two main categories: general aviation airports and commercial service airports. General aviation airports are facilities that serve small communities. Commercial service airports are larger facilities located in more densely populated areas. During 2000, the NPIAS had 3,489 airports. Figure 2.2 displays graphically the composition of the United States airport system highlighting the fact that airports with a high number of connecting passengers are clustered away from both the west and east coast. By contrast, most airports along both coasts are mainly points of origin or destination.

differentiate between airports with mostly connecting traffic and those with mostly origin-destination (O&D) traffic (FAA 2001, 76).

General Aviation Airports

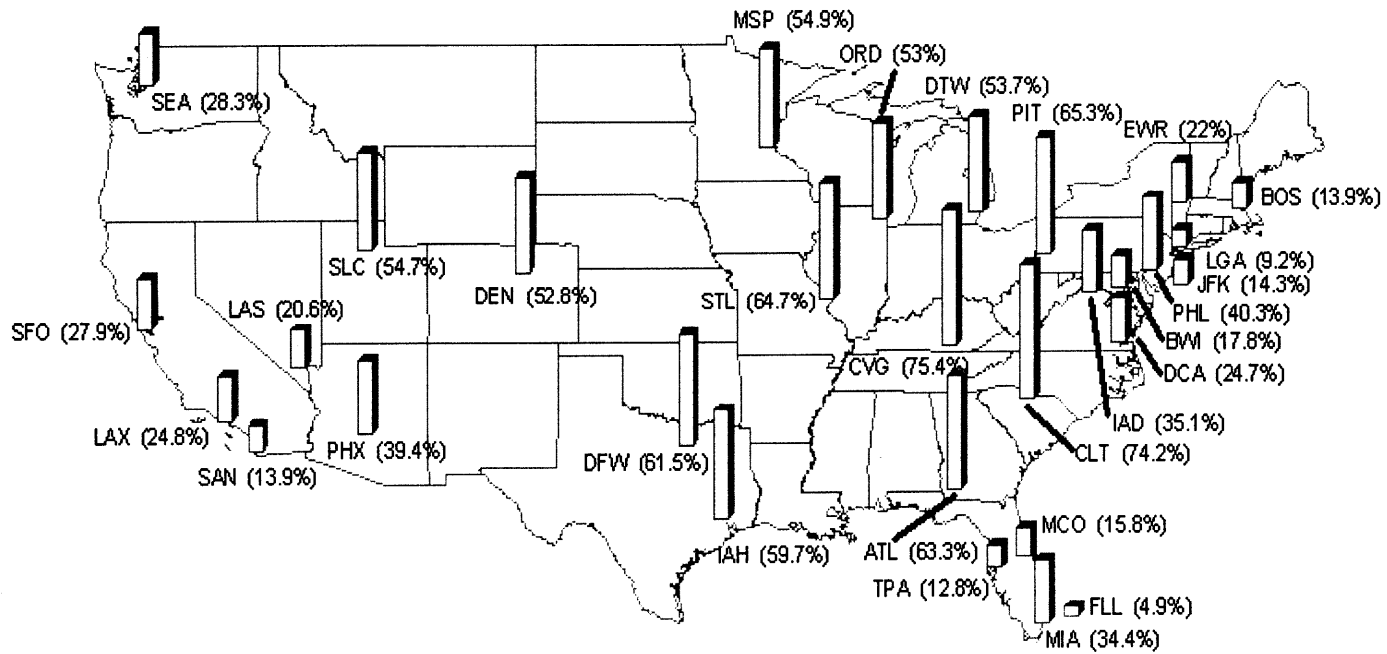
General aviation airports are small facilities that have at least 10 based aircraft and have fewer than 2,500 enplanements⁶ a year. The National Airport System had 2,943 General Aviation Airports in 2000. The FAA has classified 260 general aviation airports as relievers. Reliever facilities are generally located next to major metropolitan areas and can be used as an alternative to larger, congested commercial service airports. Notable airports in this category are: Merrill Field in Anchorage, Alaska, Teterboro Airport in New Jersey, and Van Nuys in California (FAA 2001, 27).

Commercial Service Airports

To be classified as a commercial service airport, an airport must enplane at least 2,500 passengers annually. In 2000 there were 546 airports that met this criterion. Commercial service airports are divided into two main categories: those that enplane more than 10,000 passengers, and those that enplane less than 10,000 passengers. In 2000, 127 commercial service airports enplaned less than 10,000 passengers. The same year a larger number of facilities, that is 419 airports, enplaned more than 10,000 passengers. These are the airports that serve most of the commercial air passengers, thus they are the *primary airports* of the U.S. system. Primary airports are sub-classified by the FAA based on annual enplanements as large hubs, medium hubs, small hubs, and non-hubs. Large hubs are those that account for at least 1% of total enplanements. Medium hubs are airports that account for between 0.25% and 1% of enplanements. Small hubs account from 0.05% to 0.25% of enplanements. Primary airports that account for more than 10,000 passengers, but for less than 0.05% of total enplanements are classified as non-hub airports. Table 2.1 lists the classification of primary airports in the US for 2000.

⁶ One enplanement refers to one boarding passenger.

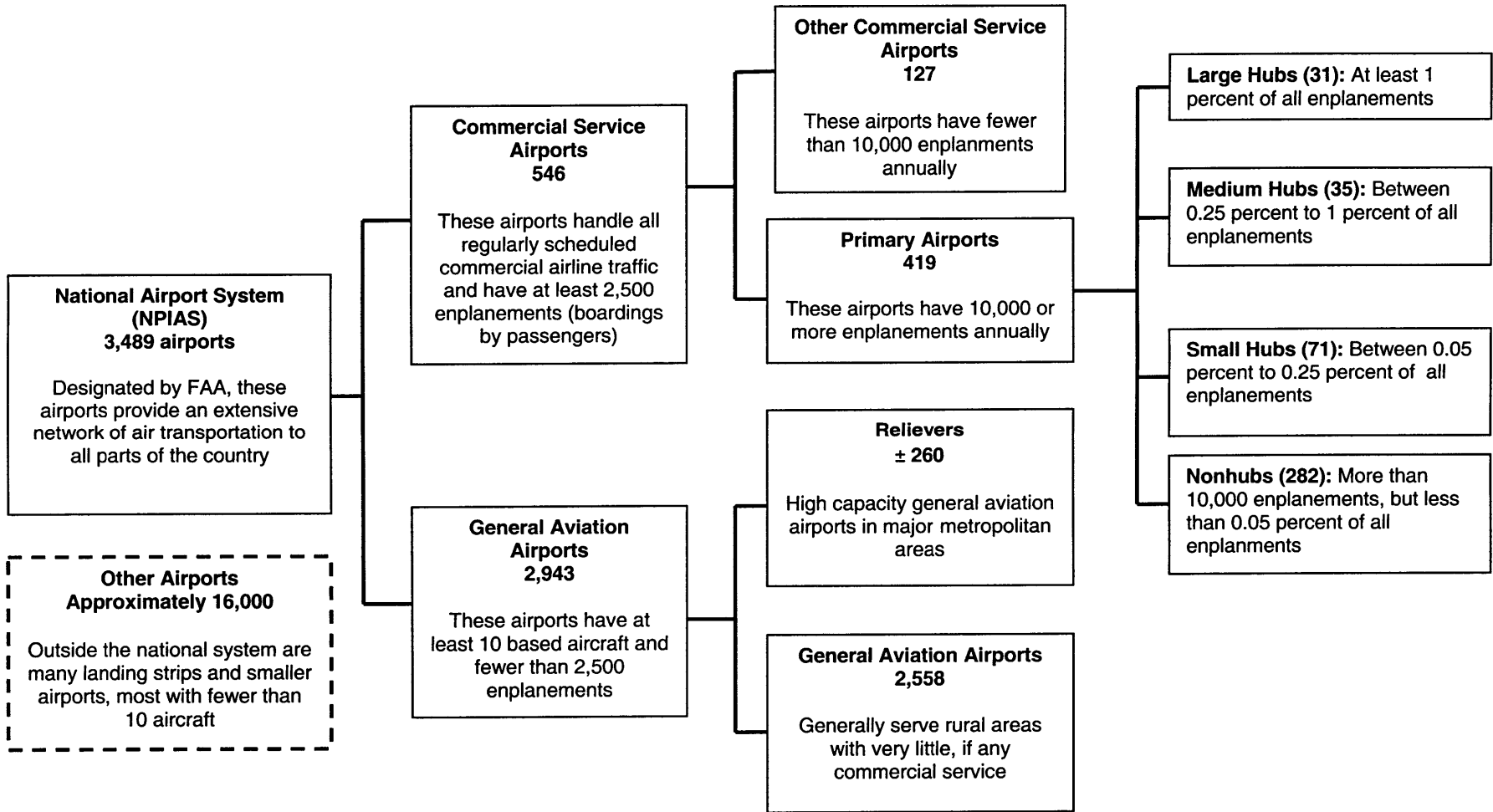
Figure 2.2 Geographical Distribution Of Connecting Traffic At Large Commercial Airports In the U.S., Fiscal Year 2000



Note: HNL (17.0) has been excluded

Source: 2002 Aviation & Aerospace Almanac

Figure 2.3 Configuration of the U.S. Airport System, Fiscal Year 2000



Sources: FAA/GAO, from GAO-02-283 and FAA's 2001 ACE Plan

Table 2.1 Commercial Service Airports in the U.S., Fiscal Year 2000⁷

Category	Number of Airports	Percent of Enplanements	Number of Enplanements		Description
			From	To	
Large hubs	31	70	6.69 million	---	1% or more
Medium hubs	35	20	1.67 million	6.69 million	0.25% – 1%
Small hubs	71	7	334,637	1.67 million	0.05 - 0.25 percent
Non-hubs	282	2.9	10,000	334,637	0.05 percent - 10,000
Other commercial service airports	127	0.1	2,500	10,000	Less than 10,000
Totals	546	100			

Source: FAA's 2001 Aviation Capacity Enhancement Plan

Since the airport designation depends on traffic volumes, the hub classification can change from year to year depending on the changes in traffic volumes. For example, from 1998 to 1999 the number of large hubs increased from 30 to 31 with the addition of the Fort Lauderdale airport. In this case, Fort Lauderdale's annual traffic growth outpaced the nation's traffic growth and thus the airport captured more than one percent of the country's passenger traffic volume. By contrast, during the same period, the number of medium hubs decreased from 42 to 37, and the number of small hubs increased from 70 to 74. In 2000, the number of large hubs did not change, but the number of medium hubs decreased to 35, and the number of small hubs decreased to 71 (FAA 2001, 76).

2.2 Ownership, Governance, and Management

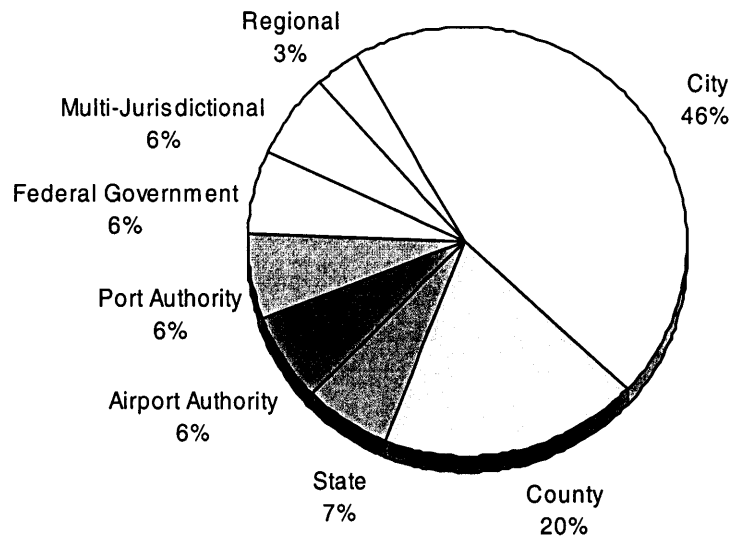
The operators of modern airports must deal in one way or another with legal, financial, planning, public affairs and government relations, administration, human resource, environmental, engineering, technical, commercial, and operational issues (De Neufville and Odoni 2002). The ownership structure, governance and management practices of these facilities largely determine

⁷ According to the FFA 669.2 million revenue passengers were enplaned in the U.S. airport system in 2000.

the interaction of all these elements. The dynamics of these interactions ultimately determine the revenue structure of an airport facility, as well.

In the United States large and medium-sized airports are mostly public entities under the jurisdiction and control of local governments. Most facilities are owned and operated by cities and counties and very few are under state or federal ownership. There are also a few airports which fall under the jurisdiction of public entities specially created to manage airports, in some cases in conjunction with other transportation-related facilities such as seaports, bridges, and tunnels (e.g., Massachusetts Port Authority in New England and The Port Authority of New York & New Jersey).

Figure 2.4 Ownership of Large Hub Airports in The United States, Fiscal Year 2000



Source: ACI-NA and author

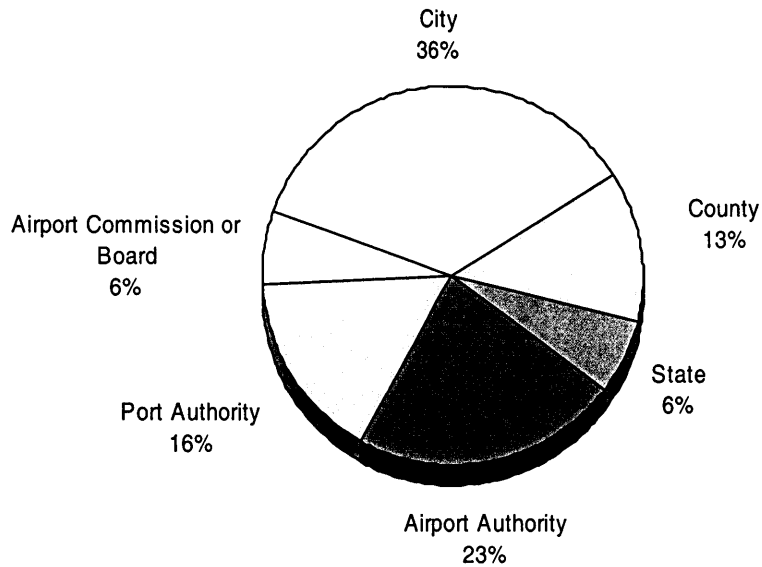
Table 2.2 Ownership And Management of Large Hub Airports in the U.S.,
Fiscal Year 2000

Ranking	Airport Name	Ownership	Management & Operations
11	MSP Minneapolis/St Paul International Airport (a)	Airports Commission	Airports Commission
1	ATL Hartsfield Atlanta International Airport	City	City
2	ORD O'Hare International Airport	City	City
3	LAX Los Angeles International Airport	City	City
6	DEN Denver International Airport	City	City
7	PHX Sky Harbor International Airport	City	City
13	IAH G Bush Intercontinental Airport	City	City
15	STL Lambert-St Louis International Airport	City	City
16	MCO Orlando International Airport	City	Aviation Authority
20	PHL Philadelphia International Airport	City	City
21	CLT Charlotte/Douglas International Airport	City	City
27	SLC Salt Lake City International Airport	City	City
10	EWR Newark International Airport	City	Port Authority
14	JFK JF Kennedy International Airport	City	Port Authority
19	LGA La Guardia Airport	City	Port Authority
8	LAS McCarran International Airport	County	County
9	DTW Detroit Metropolitan Wayne County Airport	County	County
12	MIA Miami International Airport	County	County
30	FLL Ft Lauderdale-Hollywood International Airport	County	County
24	PIT Pittsburgh International Airport	County	Airport Authority
28	TPA Tampa International Airport (b)	County	Aviation Authority
26	IAD Dulles International Airport (d)	Federal Government	Airport Authority
31	DCA R Reagan Washington National Airport (e)	Federal Government	Airport Authority
4	DFW Dallas/Ft Worth International Airport (c)	Multi-jurisdictional	Airport Board
5	SFO San Francisco Airport (f)	Multi-jurisdictional	Airport Commission
17	SEA Seattle Tacoma International Airport	Port Authority	Port Authority
18	BOS Logan International Airport	Port Authority	Port Authority
29	SAN San Diego International Lindbergh Field Airport	Port Authority	Port Authority
22	CVG Cincinnati/Northern Kentucky International Airport	Regional	Airport Authority
23	HNL Honolulu International Airport	State	State
25	BWI Baltimore/Washington International Airport	State	State

- (a) Modified. New information from interview with Patrick Hogan, Public Affairs Official at MSP.
- (b) Modified. New information from Annual Report.
- (c) Modified. New information from Annual Report.
- (d) Modified information.
- (e) Modified information.
- (f) Modified. New information from website.

Source: 2001 ACI-NA General Information Survey

Figure 2.5 Management and Operation of Large Hub Airports in the United States, Fiscal Year 2000



Source: ACI-NA and author

Ownership

As Table 2.2 and Figure 2.4 show, the ownership and management structure of large commercial airports in the U.S. is quite diverse. Fourteen airports or 46% are owned by local municipalities. Six airports or about 20% are controlled by local counties, and two airports or 6% are state owned. Another two facilities are owned by specially created airport authorities. Similarly, two are owned by port authorities. Two facilities are owned by the federal government.⁸ Another

⁸ Through the Metropolitan Washington Act of 1986 Dulles (IAD) and National airports (DCA) were leased and the operating responsibility was transferred from the federal government to the Metropolitan Washington Airports Authority (MWAA). MWAA started operating both airports, which are located in Virginia just outside Washington D.C. on June 7, 1987, under a 50-year lease from the U.S. Department of Transportation (GAO 2000, 1).

two airports belong to multi-jurisdictional bodies,⁹ and one airport is part of a regional government.

Management and Operation

As Table 2.2 indicates, most large commercial airports in the United States are managed and operated by the owner. However, there are a few cases where this does not apply. Eleven airports or 36% are managed by the municipality that owns the facility. Four airports are managed by the county which owns the facility. Two are managed by the Department of Transportation of the state that owns the airport. Seven facilities or 23% are managed by public entities created for the purpose of operating the airport (i.e., airport authorities). Five airports or 16% are controlled by public entities known as Port Authorities. In addition to airport facilities, Port Authorities may control other transportation facilities such as seaports, tunnels and bridges (e.g., Massachusetts Port Authority in New England and The Port Authority of New York & New Jersey). Finally, there are two airports, or 6% of the total, which are managed by an airport commission or board (Figure 2.5).

2.3 Cost Recovery Methodologies

The airlines, the main tenants of an airport facility, are also the main contributors to the airports coffers. Therefore, the relationship between the airport operator and the airlines plays a crucial role in determining the management, operational, and financial structure of airport facilities. The nature of this relationship varies widely from case to case and depends on many factors such as passenger demand, geographical location of the airport, level of revenues from non-aeronautical sources, financial strength of the air carriers, etc. The method for calculating rates (cost recovery methodology) airlines must pay for use of airport facilities and services is generally determined through negotiated use and lease agreements or is set by local ordinances or resolutions (GAO 1998, 4).

⁹ The ownership of the Dallas/Fort Worth airport is shared by two cities. The San Francisco airport

The use and lease agreements establish the terms and conditions governing the airlines' use of the airport.¹⁰ These legally binding documents specify how the risks and responsibilities of running the airport are to be shared. Sometimes use and lease agreements include majority-in-interest clauses, which give the signatory airlines the right to review and to oppose capital programs (Section 2.4.1) (US Congress 1984, 125). In many cases these agreements serve as the foundation for the financing of airport facilities.

As indicated previously, there are some airports that operate without airline-operating agreements, setting their fees by ordinance. This type of arrangement is used by airports whose air traffic demand is based on the strength of the local market. These airports are in an advantageous bargaining position that allows them to set rates unilaterally (e.g., JFK or BOS). This, in addition, gives the airport a great deal of flexibility as the ultimate decision-maker on sharing revenues with the airlines. It is likely under this scenario that the airport will retain control over decisions on investments into capital programs (Whiteman, Hu and Cahill 2000, 12).

To understand the intricacies and differences among the cost recovery methodologies used by airport administrators it is necessary to reflect upon the "cost center" concept. This is a concept that has evolved over time as the nature of the business increased its level of sophistication. During the early years of commercial aviation airports were viewed as public facilities whose main objective was to serve the general public. In the U.S. the overwhelming majority of these facilities were under the jurisdiction and control of local governments who were expected to provide the infrastructure and services needed to allow airlines to operate. The role of the airport administrators at the time was that of a facility manager. As traffic increased and converged at key "hub airports," the sophistication of management practices at these facilities increased as well. Airports that used to place all revenues and costs into a single account learned about the advantages of dividing their operational or business units into "cost centers." The use of this scheme allows airport administrators to assess the operational and financial efficiency of their business units. The definition of cost centers is not standardized and can vary greatly from case

ownership is shared by the city and the county.

¹⁰ "Airport agreement" is used generically here to include both legal contracts for the airlines' use of airfield facilities and leases for the use of terminal facilities. At many airports, both are combined in a

to case (De Neufville and Odoni 2002). However, they are generally defined with reference to their operating function (i.e., terminal buildings, airfields, roads and grounds, and cargo or airfreight areas).

Large commercial airports in the U.S. use one of three cost recovery methodologies: residual, compensatory or hybrid (Table 2.4). It is important to point out that the use and lease agreements can vary dramatically from case to case since they are tailored by attorneys to fit the needs and characteristics of specific facilities. As a result, no two agreements of the same type are exactly the same.

2.3.1 Residual Approach

Under the residual scheme, cost centers are combined into a single system. The expenses of operating the cost centers including administration, maintenance, operations, and debt service¹¹ (including coverage) are put together into a single account (US Congress 1984, 126). Under this type of agreement the airlines assume the financial risk for the operation of the airport and agree to cover any deficit that the airport might have at the end of the fiscal year. Any surplus revenues or deficit from the previous year is credited or charged to the airlines when calculating airline landing fees or other rates for the following year. When the non-aeronautical cost centers generate substantial profits, the airlines can benefit by having their costs reduced. In short, under this type of agreement the air carriers pay landing fees sufficient to ensure a minimum of break-even operations for the entire facility. Thus, the airlines assume the total financial risk and ensure that the airport is kept whole. (Whiteman, Hu and Cahill 2000, 11)

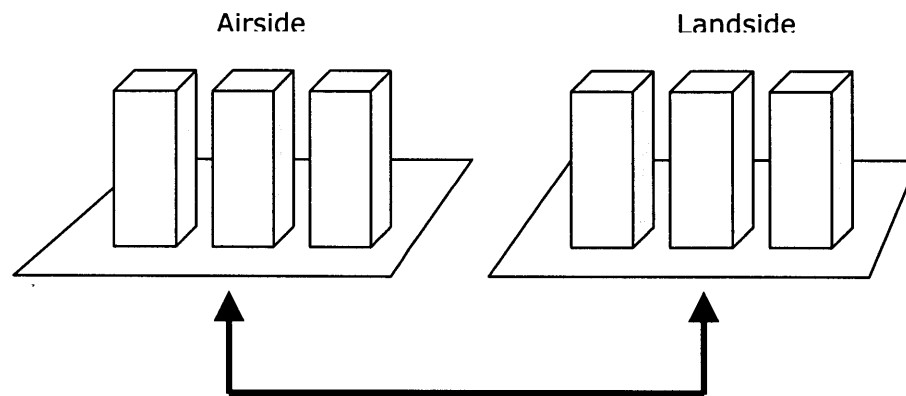
Figure 2.6 shows the way the residual agreement is set up. Each column in the drawing represents a cost center (in this case the airside and landside have three cost centers each). The residual methodology implies transfer of funds from one side to the other. For example, a parking revenue surplus can be transferred to the airside causing a reduction to the landing fees the airlines have to pay. Conversely, losses at the landside cost centers would need to be

single document. A few commercial airports do not negotiate airport use agreements with the airlines, but instead charge rates and fees set by local ordinance.

¹¹ Debt service coverage is the requirement that the airport's revenues, net of operating and maintenance expenses, be equal to a specified percentage in excess of the annual debt service (principal and interest

balanced by money from the airside. In this case, the airlines will have their fees increased to cover the losses of the cost centers on the landside. Chapter 6 analyzes the operating revenue structure of Dallas/Fort Worth International Airport (DFW) highlighting its residual agreement with the airlines.

Figure 2.6 Residual Scheme



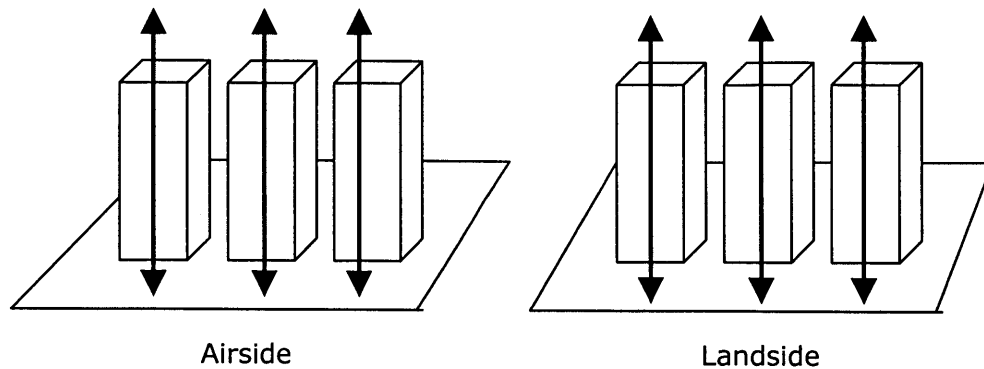
2.3.2 Compensatory Approach

The compensatory approach requires cost centers to be operated as financially independent units, eliminating the transfer of surpluses and deficits among them. Under this type of arrangement, the airport assumes the financial risk associated with the operation of the facility. This of arrangement does not guarantee that the costs associated with running the facility will be covered by the airlines. Therefore, if there are deficits they will be the airport's responsibility. Under compensatory agreements the airlines will pay only for the cost of using a facility, and contrary to the residual approach will not have to cover shortfalls from the centers that they are not using (i.e., retail space, access roads, parking facilities, etc.), neither will they benefit from reductions in

payments) for revenue bond issues. The coverage required is generally form 1.25 to 1.40 times debt service, thereby providing a substantial cushion that enhances the security of the bonds.

aeronautical expenses due to surpluses from non-aeronautical cost centers. Figure 2.7 shows that each cost center operates as an independent unit. Chapter 5 highlights the compensatory arrangement used by Logan International Airport (BOS).

Figure 2.7 Compensatory Scheme

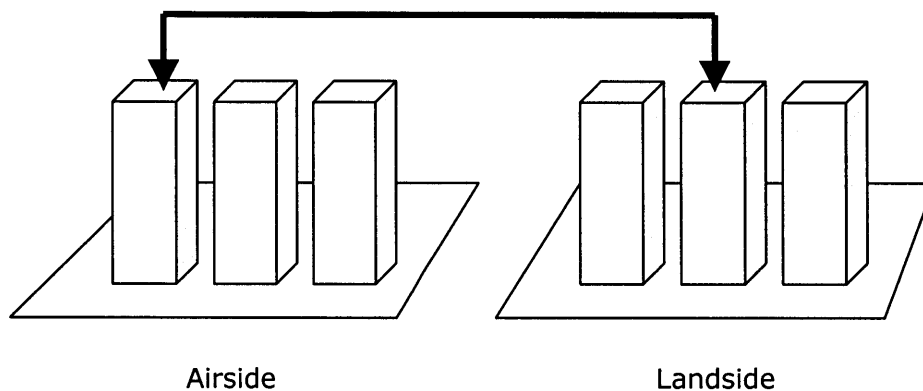


2.3.3 Hybrid Approach

In recent years airports started combining elements of the residual and compensatory cost recovery methodologies. Under this scheme, an airport applies a compensatory scheme to most cost centers, except for one or two cost centers that could help reduce the size of landing or rental fees. Figure 2.8 shows how individual cost centers can be “linked” with each other. For example, in a hybrid arrangement the surplus from parking revenues can be used to lower the passenger building rentals or landing fees. In 1998 the General Accounting Office (GAO) of the U.S. Congress released a study entitled: “*Airport Financing: Information on Airport Fees Paid by Airlines.*” This report highlights Miami airport’s (MIA) hybrid arrangement. MIA has used a combination of the compensatory and residual approaches since 1990. The airport has set fees for the use of terminal space used exclusively by the airlines, such as counters, on the basis of square footage. On the other hand, the fees for shared use areas such as baggage claim, and concourse areas are set on the basis of the share of the number of aircraft seats carried by each airline. These fees reflect such costs as direct and indirect operating expenses and debt service, and are not adjusted to reflect revenues derived from concessions, parking or other non-aeronautical

sources. In the tradition of the compensatory type of agreement, the costs of vacant rentable space are not recovered and represent a “loss” for the airport. By contrast, “landing fees are calculated annually on the basis of budget estimates for the upcoming year and are revised midyear on the basis of updated estimates.” Then, in a residual fashion, “. . . a portion of the concession revenues is used to offset cost in the computation of these fees” (GAO 1998, 7). Chapter 7 describes the operating revenue structure of Baltimore/Washington International Airport (BWI) highlighting the hybrid arrangement with the airlines.

Figure 2.8 Hybrid Scheme



2.4 Cost Recover Methodology Related Issues

2.4.1 Majority-In-Interest (MII) Clauses

Majority-in-interest (MII) clauses allows signatory airlines to review, approve or veto capital projects. These clauses limit the ability of the airport owner to proceed with a capital program if opposed by the signatory airlines. This type of arrangement is far more common in residual agreements where airlines are willing to assume responsibility for part of the financial risks. In exchange for higher risk airlines get the inclusion of MII clauses in the use and lease agreements. As a matter of fact, 90% of large commercial airports with residual agreements had MII clauses in place in 2000. Airports with compensatory arrangements, where airlines are spared the

financial risks are less likely to have MII clauses in place. In fact, in 2000 only 33% of large commercial airports with compensatory arrangements have included MII clauses (Table 2.4). It is important to note that, regardless of the type of agreement in place, most airports have at least a small discretionary fund for capital improvements that is not subject to majority-in-interest clauses (US Congress 1984, 129).

2.4.2 Residual Versus Compensatory

Provided that the expenses of the cost centers on the airside are always covered by the users (i.e., the airlines), the profits or losses of the cost centers on the landside will define whether the contractual arrangement in place is advantageous for the airport operator or the airlines. Residual agreements can be considered a conservative methodology to cost recovery from the airport perspective. The reason is that no matter what happens to the revenues, the airport operator will be covered from any losses. On the other hand, compensatory agreements, can be considered riskier from the airport perspective, because deficits will have to be covered by the airport operator.

Table 2.3 Advantages and Disadvantages of Cost Recovery Methodologies

	Profitable landside cost centers		Landside cost centers at a loss	
	Residual	Compensatory	Residual	Compensatory
Airport	Negative (–) The airport uses the surplus from landside cost centers to reduce airline fees	Positive (+) The airport can use surplus towards capital programs or keep it for any other use	Positive (+) The airlines offset losses on the landside	Negative (–) The airport has to absorb the losses of the landside cost centers
Airline	Positive (+) Surpluses from landside cost centers will help reduce the airline fees	Negative (–) Airline will not have its fees reduced when the airport is profiting from the landside	Negative (–) The airline will pay excess fees to offset losses from landside cost centers	Positive (+) Airlines will not have to cover any losses sustained by landside cost centers.

Source: Author

According to credit rating agency Standard & Poor's "Airports with more compensatory elements to their business profile are expected to achieve average higher debt service coverage (1.75 to 2.5 times or higher) to compensate for the highly elastic association between passenger levels and concession revenues as compared to residual airports. Simply put: Because moderate decline in passengers could likely result in a larger decline in concession revenues, the effect on compensatory airports might be more dramatic than at a purely residual airport that simply raises airline charges" when needed (Forsgren, Wilkins and Greer 1999, 21). Table 2.3 shows two scenarios: one when the landside cost centers are profitable and the other when they are at loss. The table describes the advantages and disadvantages to airports and airlines under two scenarios and under both types of agreements.

2.4.3 Trends In Fee-Setting

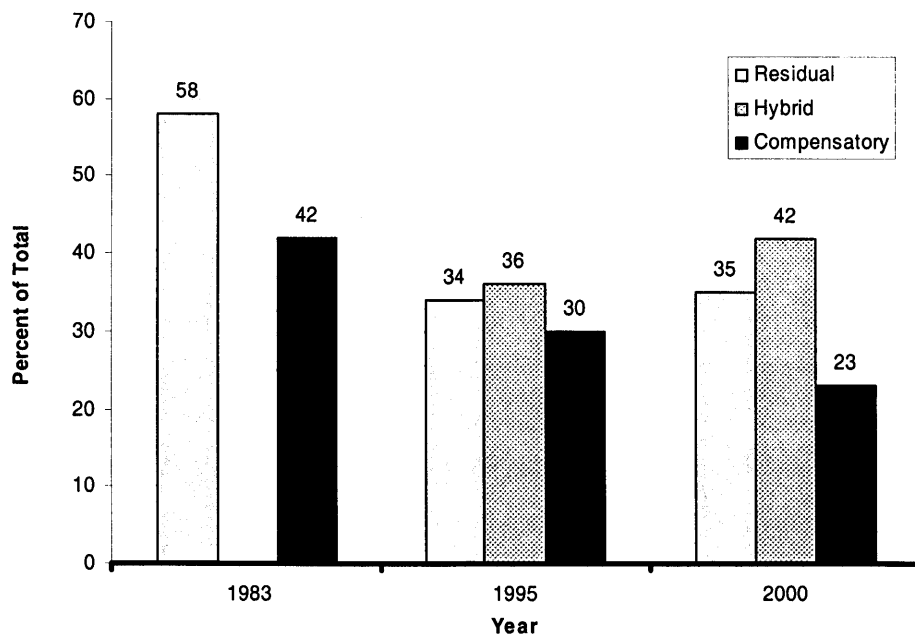
In recent years, as airports became increasingly aware of their potential for generating profits, a trend towards a compensatory approach in setting fees has emerged. This trend includes a switch away from the residual cost approach and a "blurring of the traditional distinction between residual and compensatory rate-setting methodologies." This translates into a large percentage of airports using hybrid approaches (GAO 1998, 8).

Figure 2.9 shows graphically how airports are turning slowly away from purely residual cost recovery methodology into compensatory and hybrid type of arrangements:

- A 1983 the Congressional Budget Office (CBO) survey of the nation's large commercial airports reported that 14 airports (58%) used a residual approach, while the remaining 10 (42%) percent used the compensatory approach.
- A 1995-1996 survey conducted by the American Association of Airports Executives among 200 U.S. airports showed that 34% of the respondents used a residual approach. Another 30% used compensatory arrangements, while 36% used a hybrid scheme (GAO 1998, 8).
- Figure 2.9 shows that, in 2000, 11 airports or 35% of the 31 large commercial airports in the U.S. used residual agreements, 7 airports or 23% had compensatory arrangements, while 13 airports or 42% combined elements of both methodologies with a hybrid approach.

The duration of airport-airline agreements has started to decline. In the past long-term agreements used to be considered a symbol of stability by investors. Today, investors are inclined to value more the flexibility to adjust to changes in the business environment. This means that today short-term agreements can be seen as advantageous. *The Airport Business*, a 1992 book by Rigas Doganis states that in the U.S. agreements between airports and airlines traditionally have been long term contracts ranging between 20-50 years! This perception about the duration of agreements has changed considerably in recent years. For instance, Fitch IBCA in a 2000 report noted: “Historically, airports (in the U.S.) used long-term agreements (10-20 years).” The same report states that today, a large percentage of airports in the U.S. have medium-term agreements (5-7 years) with the airlines. (Champeau, Soltz, and Fry 2000, 4).

Figure 2.9 Cost Recovery Methodologies Most Commonly Used by U.S. Commercial Airports, Fiscal Years 1983, 1995, and 2000



Note: Data for 1983 are from 24 larger commercial airports. Data for 1995 are from a survey of 200 airports (including large, medium and small airports). Data for 2000 include the 31 largest commercial airports.

Sources: Congressional Budget Office, American Association of Airport Executives, ACI-NA and author

Table 2.4 Cost Recovery Methodology Used by Large Hub Airports
(as of 2000)

Ranking	Airport	Cost Recovery Methodology	MII Clause	Percent with MII clause	Expiration Date for Airline Agreement	O&D (%)	O&D Average	Effective Competition Index (ECI)	ECI Average	
1	1	ATL	Compensatory	yes	33.3	1-Sep-00	37	1.8	4.5	
2	3	LAX	Compensatory	no		30-Jun-01	75	7		
3	7	PHX	Compensatory	no			61	3.9		
4	9	DTW	Compensatory	yes		1-Jan-09	46	61.7		2
5	13	IAH	Compensatory	no		30-Jun-05	40			1.5
6	18	BOS	Compensatory	no			86			7.9
7	28	TPA	Compensatory	yes		30-Sep-06	87			7.7
1	6	DEN	Hybrid (a)		72.7		47	2.5	4.0	
2	8	LAS	Hybrid	yes		30-Jun-02	79			6.2
3	10	EWR	Hybrid	no		31-Jan-18	78			2.7
4	11	MSP	Hybrid	yes			45			1.9
5	14	JFK	Hybrid (a)	no		31-Dec-01	86			5.3
6	15	STL	Hybrid	yes		31-Dec-05	35			1.8
7	19	LGA	Hybrid (a)	no			91	64.6		6.8
8	21	CLT	Hybrid (a)	yes		30-Jun-16	26			1.5
9	25	BWI	Hybrid	yes		1-Jan-03	82			5
10	26	IAD	Hybrid	yes		1-Jan-14	65			4
11	27	SLC	Hybrid (a)	yes		30-Jun-03	45			2.1
12	29	SAN	Hybrid	no		1-Jan-02	86			5.9
13	31	DCA	Hybrid	yes		1-Jan-14	75			6
1	2	ORD	Residual	yes	90.9	11-May-18	47	3.4	4.3	
2	4	DFW	Residual	yes		1-Jan-09	39			2.4
3	5	SFO	Residual	yes		30-Jun-11	72			3.9
4	12	MIA	Residual (b)	yes			66			3.3
5	16	MCO	Residual	yes		30-Sep-08	84			7.2
6	17	SEA	Residual	yes		1-Jan-02	72	61.6		6.8
7	20	PHL	Residual	yes		30-Jun-06	60			2.7
8	22	CVG	Residual	yes		1-Jan-15	25			2.3
9	23	HNL	Residual	no			83			6
10	24	PIT	Residual	yes		1-Jan-18	35			1.7
11	30	FLL	Residual	yes		30-Sep-11	95			7.1

(a) Modified by author

(b) In the survey MIA is listed as using a residual methodology. In practice MIA combines elements of a residual approach with compensatory approach resulting in a hybrid cost recover methodology (see Section 2.3.3)

Source: ACI-NA, author

Table 2.5 illustrates the application of the two methodologies for an airport facility under a scenario in which non-aeronautical cost centers are profitable. As seen on the top section of the table the facility has been divided into two areas: the terminal and the airfield. They both have expenses of \$100,000. If the facility uses the residual type of agreement the surplus of the non-aeronautical cost centers can be credited towards the reduction of cost for terminal and airfield as shown in row C. In this case the contribution of the non-aeronautical cost centers reduces the cost of operating the terminal and the airfield to \$80,000 each. Under the compensatory type of agreement there is no reduction of cost. The airlines will pay for what they use regardless of profits generated on other cost centers. In addition, under the compensatory scenario the airport will be able to keep the surplus money.

Table 2.5 Comparison of Residual and Compensatory Fee-Setting Methodology with Profitable Non-Aeronautical Cost Centers

Requirement	Residual		Compensatory	
	Terminal	Airfield	Terminal	Airfield
Maintenance, operations and administration	40,000	40,000	40,000	40,000
Debt service	40,000	20,000	40,000	20,000
Debt service coverage	10,000	5,000	10,000	5,000
Deposits to special funds	5,000	20,000	5,000	20,000
Other	5,000	15,000	5,000	15,000
A Total Requirements	100,000	100,000	100,000	100,000
B Cost center revenues from non-aero sources	20,000	20,000	N/A	N/A
Airline share (percent)	N/A	N/A	65	75
C Residual cost (A-B)	80,000	80,000	N/A	N/A
D Activity level	6,500 sq. ft.	100,000lb gross landing weight	6,500 sq. ft.	100,000lb gross landing weight
Rental rate (per square foot)	12.31	N/A	10	N/A
Landing fee rate (per 1,000lb gross landing weight)	N/A	0.80	N/A	0.75

Source: Adaptation by author of a table produced by the Congressional Budget Office (1984)

Table 2.6 illustrates the application of the two methodologies for the same facility under a scenario in which non-aeronautical cost centers lose money. The top section of the table shows that the facility has been divided into two areas: the terminal and the airfield. They have expenses of \$100,000 each. If the facility uses the residual type of agreement the losses of the non-aeronautical cost centers are “charged” to the airlines to assure that the airport breaks even at the end of the fiscal year. In this case the non-aeronautical cost centers need \$20,000 from the terminal and \$20,000 from the airfield to cover expenditures. Under the compensatory type of agreement there is no increase of cost to other airport users. A compensatory type of agreement is such that the airport carries the risk. The airlines will pay only for what they use regardless of losses at other cost centers.

Table 2.6 Comparison of Residual and Compensatory Fee-Setting Methodology with Non-aeronautical Cost Centers At A Loss

Requirement	Residual		Compensatory	
	Terminal	Airfield	Terminal	Airfield
Maintenance, operations and administration	40,000	40,000	40,000	40,000
Debt service	40,000	20,000	40,000	20,000
Debt service coverage	10,000	5,000	10,000	5,000
Deposits to special funds	5,000	20,000	5,000	20,000
Other	5,000	15,000	5,000	15,000
A Total Requirements	100,000	100,000	100,000	100,000
B Cost center revenues from non-aero sources	-20,000	-20,000	N/A	N/A
Airline share (percent)	N/A	N/A	65	75
C Residual cost (A-B)	120,000	120,000	N/A	N/A
D Activity level	6,500 sq. ft.	100,000lb gross landing weight	6,500 sq. ft.	100,000lb gross landing weight
Rental rate (per square foot)	18.46	N/A	10	N/A
Landing fee rate (per 1,000lb gross landing weight)	N/A	1.20	N/A	0.75

Source: Adaptation by author of a table produced by the Congressional Budget Office (1984)

2.4.4 Legal Challenges to Airport Fee-Setting

The process of setting airport fees can be highly controversial and contentious. As profitable airports move in the direction of compensatory and/or hybrid cost recovery methodologies, airlines fear increases in their costs for the use of airports. Airlines also dislike the fact that they can no longer benefit from cross subsidies from surpluses of non-aeronautical cost centers. Therefore, the switch from residual to compensatory approaches by some airport authorities is vehemently opposed by many airlines. Between 1984 and 1998 there have been 14 disputes over fees that airlines pay to airports. A 1998 study by the GAO describes the administrative procedures used to resolve differences. The Department of Transportation (DOT) encourages airports and airlines to resolve differences through direct negotiations. If this does not work, then there are two administrative alternatives: an investigation by the Federal Aviation Administration (FAA), or an expedited review by the Office of the Secretary.

Eight complaints regarding airport fees were filed between the passage of the Federal Aviation Administration Authorization Act of 1994 and 1998. The Office of the Secretary handled seven of the eight complaints under the expedited procedures with the following results:

- Three cases were dismissed
- A decision was issued in other three cases
- One complaint was settled prior to a decision

For their intervention in disputes, the FAA and the Office of the Secretary rely on the following federal statutes:

The Airport and Airway Improvement Act of 1982 requires that airports that accept federal grants under the Airport Improvement Program must be available for public use on “reasonable” conditions without unjust discrimination (GAO 1998, 8). Likewise, the Anti Head Tax Act requires that the rental charges, landing fees, and other service charges set by publicly owned airports be reasonable.

The nature of the complaints in these disputes has been mixed. Among the factors that gave rise to these differences are a change in the type of agreement from residual to compensatory, increased fees to pay for the construction of new terminals, as well as landing fee differentials for large versus small aircraft. The following two cases have become landmarks and are now used as guidelines for issues affecting fee-setting disputes between airport operators and the airlines.

Table 2.7 Airports Involved in Fee-Setting Disputes Between 1984 and 1998

Year	Airport	Description
1984	Indianapolis International Airport	Airport set new fees by ordinance using a compensatory approach
1985	Miami International Airport	Dispute over property rents and fee increases
1987	Aspen/Pitkin County Airport	Dispute over fee structure differential between general aviation and commercial airlines
1989	Stapleton International Airport	Airlines complained that concessions and airline fees were being used to finance a new airport facility
1989	Logan Airport	Complaint over the increase of landing fees for smaller aircraft while the fees for larger aircraft were decreased
1994	Kent County International Airport	Airlines complained new compensatory fee-setting methodology
1995	Los Angeles International Airport (First case)	Change from residual to compensatory fee-setting methodology
1995	Micronesia/Northern Mariana Island Airports	One airline complaint over "excessive, unreasonable and discriminatory" fees
1995	Lehigh Valley International Airport	Complaint by signatory airlines about subsidies and special landing fees and terminal rental charges to airlines serving specific markets
1995	Denver International Airport	Increased terminal fees to one airline that included amounts needed to pay for unused gates
1997	Los Angeles International Airport (Second case)	Challenge on the compensatory fee structure using fair market values and including police and fire protection in the fee calculation.
1997	Miami International Airport	Controversy on the distribution of the cost of construction of new facilities among airlines
1998	Puerto Rico's Airports	Change by the airport authority to a compensatory rate-setting methodology
1998	Greater Rochester International Airport	Complaint over a \$4 per passenger fee charged only to regional carriers

Source: GAO (1998)

Kent County International Airport (Michigan) Case

Even though this case does not involve one of the large commercial airports, its implications are profound and affect all cases in which airport operators contemplate changes to their fee-setting methodology. The airlines serving this Michigan airport complained that the airport's compensatory approach imposed excessive fees because it did not use concession revenues to offset the fees paid by the airlines. In this case the Supreme Court ruled in 1994 that compensatory agreements were legally permissible and that the fees were not excessive because the airlines were charged only break-even costs. In upholding the airport's use of the compensatory approach, the Court resolved the conflict presented by similar airport decisions at Indianapolis International and Stapleton International (Denver) airports (Table 2.7).

Los Angeles International Airport Cases

The operator of LAX has been involved in two separate disputes. The first case originated when the LAX residual agreement expired in 1993. The airport unilaterally adopted a compensatory approach at that point. Under the new agreement, the landing fees increased by 300% from \$0.51 per 1,000 pounds to \$1.56. The operator used the fair market value for the airfield and land to calculate the new fees. The airport threatened to deny use of the airport to the airlines that did not pay the new fees. In mid 1995, the DOT ruled that LAX was entitled to use a compensatory arrangements, however, the airport's use of fair market value in calculating the fees was not reasonable. The DOT's final decision stated:

“The Department of Transportation, under 49 U.S.C. 47129(c), has determined after a hearing before an administrative law judge (ALJ) that the increased landing fees charged at Los Angeles International Airport (LAX) are unreasonable insofar as those fees include a rental cost for the airfield land based on the land's estimated fair market value. We otherwise find that the airlines have failed to show that the fees are unreasonable. Since the landing fees paid by the airlines have been higher than justified by the airport's costs, we have determined further that the City of Los Angeles must make refunds of the excess amount to the airlines that filed the complaint that began this proceeding. Many of the other airline parties will obtain refunds under an

interim settlement agreement between the City of Los Angeles and the airlines.” (USDOT, Office of the Secretary, Order 95-6-36, Served June 30, 1995)

Again during the 1995-96 fiscal year LAX increased its fees. This time the airlines complained because, among other things, the airport included expenses for a portion of police and fire services in the fee calculation. The DOT concluded that these charges were in part unreasonable and reaffirmed its prior ruling that fair market value should not be used in calculating landing fees. On most other issues, the DOT concluded that the fees computed by using a compensatory fee-setting methodology were reasonable. The DOT’s decisions on the valuation of airfield land in both cases were taken to the Court of Appeals for the District Of Columbia Circuit. The case was argued before the Court of Appeals on January 7, 1999. The case was decided on February 5, 1999. The petition was denied. Judge Silberman summarized the case as follows:

“The City of Los Angeles increased the landing fees at Los Angeles International Airport, and the airlines challenged those fees as unreasonable before the Department of Transportation. The DOT set aside the increased fees, reasoning that the City's attempt to recoup its "opportunity costs" through the fees was impermissible as a matter of statute. In *City of Los Angeles v. DOT*, 103 F.3d 1027 (D.C. Cir. 1997), we rejected that statutory interpretation and remanded for the DOT to consider the opportunity cost issue as a matter of policy. The DOT did so, concluding that the City's claimed entitlement to recover its opportunity costs was unreasonable, and rejected the fees. The City petitions for review. We deny the petition.” (US Court of Appeals, District of Columbia District, No. 98-1071)

The preceding cases have contributed to define the position of the government and the legal system with regards to aeronautical rate-setting disputes. Today, the FAA continues to work with airport operators and airlines to sort out rate-setting differences. The emphasis is in bringing all parties to the table to discuss their differences and solve their problems before going into a *formal complaint process*. This seems to be working quite well as most cases are solved without reaching the judicial system (Heibeck 2002).

2.5 Competition at Airport Facilities

The FAA states that since the beginning of the deregulation era the number of cities serviced by large U.S. carriers has decreased. On the other hand, the number of air carriers has increased. For instance, in 1998 there were 42 scheduled large U.S. carriers, that is 12 more than in 1978. This has resulted in increased frequencies and services, but to fewer cities (FAA 1999, 2). Most of the increase in activity has occurred at the nation's top 50 airports and this is generally attributed to the increasing hub-and-spoke¹² operations by the air carriers. This suggests increased traffic concentration.

2.5.1 Traffic Concentration

The complexity of hub operations obligates air carriers to look for airport facilities where they can connect their flights without having to bump into other carriers' operations. For a hub to be functional air carriers require at least the following minimum requirements: sufficient terminal space that allows passengers to move freely from gate to gate without having to walk long distances; adequate baggage handling infrastructure; and the airside capacity and capability to handle the banks required by the airline to operate as a hub. Airports hosting hub operations for more than one carrier are an exception. These airports have to have extremely large airside and landside capacity in order to accommodate very large numbers of aircraft and passengers during peak hours. One notorious case is Chicago's O'Hare,¹³ where United and American have side by side hub operations.

“[Air] traffic in the United States is heavily concentrated at the largest airports. In 2000 the 31 large hub airports handled over 74% of passenger enplanements, the 35 medium hub airports served another 20 percent, and the small hubs accounted for another 7 percent. Collectively, the 137 hub airports served about 97 percent of passenger enplanements. The remaining 282 primary airports served only 2.9 percent of enplanements, while the other 128 non-primary commercial service airports had only 0.1 percent of enplanements.” (FAA 2001, 77,78)

¹² To increase coverage with fewer aircraft the airlines utilize the hub-and-spoke model, according to which aircraft converge on a single facility to connect flights.

¹³ Chicago's O'Hare has 6 operational runways and is planning to build another two.

An airline's share of boarding passengers at a given airport determines its bargaining position when it comes to negotiating the terms of use and lease agreements. For example, an airline capable of handling over 40-50% of total departures at a given airport presumably will be able to negotiate more favorable contractual terms than smaller carriers with a 5-7% market share. But market concentration with little or no competition allows the airlines to operate as monopolies charging monopolistic fares. This makes the role of the federal government vital to combat monopolistic practices. Since the air transportation system is under a deregulated environment with the absence of price controls, the federal government can address competition issues by tying new federally sponsored funding schemes to anti-monopolistic practices. For example, under AIR 21¹⁴ no large or medium airport at which one or two air carriers account for more than 50% of the passenger boardings may impose a Passenger Facility Charge (PFCs) (Section 3.1.3) unless the airport authorities submit a competition plan (U.S. Department of Transportation 2000, 1).

The most common methods to quantify market concentration and level of competitiveness that can be applied to airport sites are the Concentration Ratio (CR), the Herfindahl-Hirschman Index (HHI) and the Efficient Competition Index (ECI).

2.5.2 Concentration Ratio (CR)

The Concentration Ratio (CR) measures the market share of the main participants in a given market. The CR methodology focuses only on the firms with larger market shares. For example, an airport whose main carriers have 40, 25, 10 and 5 percent market share will have the following concentration ratios:

$$CR_2 = 40\% + 25\% = 65\%$$

$$CR_4 = 40\% + 25\% + 10\% + 5\% = 80\%$$

¹⁴ Wendell H. Ford Aviation Investment and Reform Act for the 21st Century signed into law by President Clinton in 2000.

2.5.3 Herfindahl-Hirschman Index (HHI)

The Justice Department uses extensively the Herfindahl-Hirschman Index (HHI) as a tool to determine the level of market concentration. The index is calculated by squaring the market share of each firm competing in the market and then adding the resulting numbers.

$$\text{HHI} = s_1^2 + s_2^2 + s_3^2 + \dots + s_n^2$$

Where s_i is the market share of firm i , and n is the number of firms in the market. In the airline industry an airport facility can be considered a “market” and the airlines that serve that particular facility are the firms competing in it. If an airport hosts 5 airlines each with 20% of market share, the HHI is calculated as follows:

$$20^2 + 20^2 + 20^2 + 20^2 + 20^2 = 2,000$$

HHI can range from 10,000, which represents a pure monopoly with one firm in total control of the market (i.e., $100^2 = 10,000$), to values closer to zero with a very competitive environment representing a large number of participating firms in the market. As Table 2.8 shows the Justice Department considers HHI values under 1,000 to be “unconcentrated” markets. Markets with HHI values between 1,000 and 1,800 are considered moderately concentrated; and markets with HHI values above 1,800 are considered highly concentrated and negative for competition. “Transactions that increase the HHI by more than 100 points in highly concentrated markets (with HHI values above 1800) presumptively raise significant antitrust concerns under the Department of Justice and Federal Trade Commission 1992 Horizontal Merger Guidelines” (US District Court District of Columbia 1997, 7).

Table 2.8 U.S. Department of Justice Classification of Market Concentration

HHI Values	Level of Concentration
< 1000	Unconcentrated
1000 - 1800	Moderately concentrated
1800 +	Highly concentrated

2.5.4 Effective Competition Index (ECI)

The Effective Competition Index is a variation of the Herfindahl-Hirschman Index. This index assigns values close to 1 to markets with a monopoly and little or no competition, and values closer to 10 or higher to very competitive environments. In other words, the higher the number the “better” for consumers who can benefit from competition. The Effective Competition Index is computed as follows:

$$\text{Effective Competition Index} = 10,000/\text{HHI}$$

When comparing the various methods for measuring market concentration it is evident that the concentration ratio (CR) does not account for the competitive situation of the entire system. It provides a good idea of who dominates the market, but it only focuses on a specified number of players. Financial researchers and the U.S. Department of Justice favor the Herfindahl-Hirschman Index (HHI) perhaps due to fact that it better captures the state of competitiveness by incorporating all participants into the calculation of market concentration.

Table 2.9 Competition Index Comparison, Large Hub Airports, Fiscal Year 2000

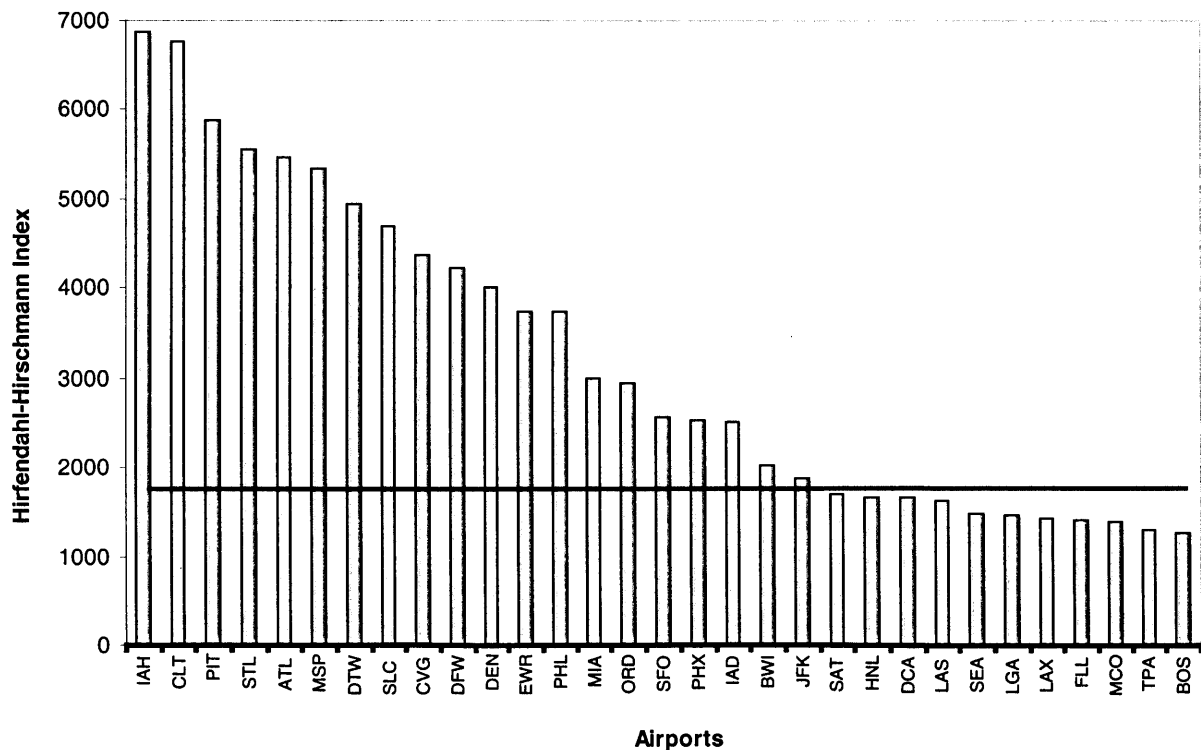
Airports		CR* 2-firm %	CR* 4-firm %	Herfindahl- Hirschman Index	Effective Competition Index	Dominant Airline	Dominant Airline Market Share	
1	Atlanta	ATL	82	90	5,471	1.8	Delta	73.0
2	Chicago O'Hare*	ORD	75	85	2,949	3.4	United	43.4
3	Los Angeles	LAX	42	66	1,419	7.0	United	24.2
4	Dallas-Ft. Worth	DFW	79	89	4,219	2.4	American	62.1
5	San Francisco	SFO	57	72	2,564	3.9	United	47.1
6	Denver	DEN	69	82	3,998	2.5	United	61.7
7	Phoenix	PHX	68	79	2,533	3.9	America West	41.1
8	Las Vegas	LAS	48	67	1,620	6.2	Southwest	31.2
9	Detroit	DTW	78	83	4,947	2.0	Northwest	69.4
10	Newark	EWR	68	81	3,736	2.7	Continental	53.7
11	Minneapolis/St. Paul	MSP	80	87	5,332	1.9	Northwest	72.2
12	Miami	MIA	70	81	2,992	3.3	American	49.6
13	Houston	IAH	86	91	6,869	1.5	Continental	82.7
14	New York	JFK	52	78	1,874	5.3	American	19.8
15	St Louis	STL	85	91	5,557	1.8	TWA	73.4
16	Orlando	MCO	41	57	1,389	7.2	Delta	27.1
17	Seattle	SEA	42	64	1,474	6.8	Alaska	28.5
18	Boston	BOS	38	62	1,270	7.9	Delta	20.6
19	La Guardia	LGA	43	67	1,461	6.8	Delta	24.7
20	Philadelphia	PHL	67	79	3,733	2.7	US Airways	59.4
21	Charlotte	CLT	91	95	6,763	1.5	US Airways	81.7
22	Cincinnati	CVG	83	96	4,372	2.3	Delta	61.4
23	Honolulu	HNL	47	74	1,660	6.0	Hawaiian	25.5
24	Pittsburgh	PIT	88	92	5,885	1.7	US Airways	75.6
25	Baltimore/Washington	BWI	60	72	2,020	5.0	Southwest	34.8
26	Washington Dulles	IAD	60	79	2,499	4.0	United	44.5
27	Salt Lake City	SLC	78	91	4,699	2.1	Delta	66.9
28	Tampa/St. Petersburg	TPA	39	63	1,292	7.7	Delta	20.5
29	San Diego	SAT	48	68	1,694	5.9	Southwest	33.4
30	Fort Lauderdale	FLL	40	63	1,414	7.1	Delta	25.4
31	Washington D.C. (National)	DCA	49	70	1,654	6.0	US Airways	30.4

* Concentration Ratio

Sources: 2002 Aviation & Aerospace Almanac Data, calculations performed by author

Table 2.9 displays the market concentration of the 31 largest commercial airports in the United States. It is evident from the various measuring methodologies that most of these facilities have a very high market concentration. Figure 2.10 displays graphically the level of airline concentration at large commercial airports. Values above the horizontal line (1800) are considered highly concentrated (less competitive). According to the concentration guidelines established by the Justice Department (measured by the HHI) 12 airports or about 39% of the nation's large commercial airports are considered moderately concentrated (values between 1000 and 1800), while the majority, that is 19 airports or 61% are considered highly concentrated (values above 1800). Figure 2.10 highlights IAH and CLT as airports with highest HHI values, thus the lowest level of competition. By contrast, BOS, TPA and MCO offer the most competitive environment.

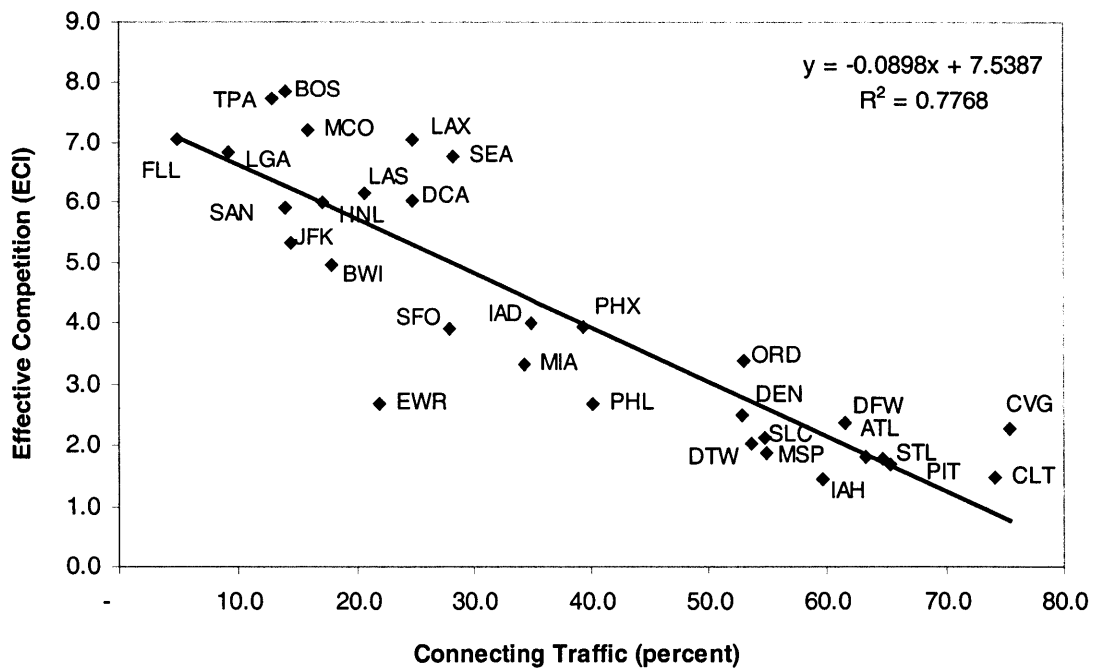
Figure 2.10 Traffic Concentration at 31 Largest Commercial Airports in the U.S. According to the Herfindahl-Hirschman Index, Fiscal Year 2000



Sources: 2002 Aviation & Aerospace Almanac Data, calculations performed by author

Figure 2.11 shows a clear relationship between the level of competition and connecting traffic. The graph indicates that as connecting traffic increases the level of competition¹⁵ decreases. This is explained by the fact that airlines tend to concentrate their operations at airports located in strategic geographical locations (see Figure 2.2), avoiding (in most cases) facilities used by competitors as a hub for operations. As a result, airlines increase considerably their market share at key airports making them dominant carriers and causing a decrease in competition.

Figure 2.11 Effective Competition Versus Connecting Traffic at 31 Largest Commercial Airports in the U.S., Fiscal Year 2000



¹⁵ The Efficient Competition Index is used in Figure 2.12 to measure the level of competitiveness at U.S. large commercial airports. According to ECI 10 is the value given to an airport with perfect competition (infinite number of airlines), and 1 is the least competitive environment with one airline in control of 100% of the airport facility.

Chapter 3

Funding for Capital Programs

All airlines in the United States are privately owned, in contrast to what has been the case in most of the rest of the world until the 1990s. Likewise, most airport facilities in the United States have been designed, built and operated with ample participation from the private sector. Even more important, most of the infrastructure of large commercial airports has been financed by private sources, primarily through the bond markets (De Neufville and Odoni 2002). This has made the financial performance of commercial airports a focus of scrutiny from the credit rating agencies, which provide risk analysis to investors.

Large commercial airports in the U.S. are run through a form of partnership between the federal government, the airport owner and operator, which is usually a local government entity or a

specially created airport authority, and private companies (airlines, concessionaires, car rental companies, and other service providers). Increasing traffic volumes and the urgent need for capital programs, as well as the operational complexity of large commercial airports, makes imperative a high level of coordination and cooperation between the airport operator and all other stakeholders. But the cooperation and coordination goes beyond the technical and operational aspects of airport management; it goes into the very heart of the financial structure of capital programs.

Aeronautical and non-aeronautical elements of airports are funded differently. The planning process and major elements of aeronautical projects related to air traffic control and runway systems are funded in large part by public money from the FAA (De Neufville 1999, 8). By contrast, the local authority in control of the airport leads the development on the landside. The airlines are very active participants in the process, both because their operations are directly affected by capital programs, and because the fees the airlines pay for the use of the facilities are often used as the primary financing vehicle for the issuance of bonds. The level of cooperation, consultation and mutual participation in the United States is such that can be considered a model of extensive public-private collaboration (De Neufville 1999, 9). A recent example of this level of cooperation is the new \$1.2 billion Northwest Airlines terminal inaugurated in February 2002 at Detroit Metro (DTW). The airport and the new facility is owned by Wayne county. The project was financed with airport revenue bonds, however Northwest Airlines, which has a 30-year lease at DTW, had control over essentially the entire project from start to finish (Flint 2002, 67).

3.1 Funding Sources

To provide service and keep up with increasing air traffic demand large commercial airports spend billions of dollars in capital programs every year. To fund these projects airports rely on a variety of funding sources. In 1998 the General Accounting Office (GAO) of the U.S. Congress released a study that highlighted sources of capital programs for the 71 largest commercial airports in the United States. The study showed that in 1996 these airports raised about \$7 billion for capital programs. Tax-exempt bonds generated over \$4 billion or 58% of the cash needed for

capital programs. By contrast with models outside the United States, where government participation is often dominant, the direct contribution by the federal government through Airport Improvement Program (AIP) grants was only \$1.3 billion or 20%. Revenues from the Passenger Facilities Charges (PFCs), an user-fee scheme, contributed 16%. The study showed a relatively small participation of state and local funding (4%) and airport revenues (2%).

Table 3.1. Capital Programs Funding Sources for 71 Larger U.S. Airports, Fiscal Year 1996 (in Billions of Dollars)

Funding Source	Amount	Percent
Tax-exempt Bonds	4.104 ^a	58
Airport Improvement Program (AIP) Grants	1.372	20
Passenger Facility Charges (PFC)	1.114	16
State and Local Contributions	0.285 ^b	4
Airport Revenues	0.153 ^c	2
Total	7.028	100

Source: GAO 1998

As Figure 3.1 shows, the funding pattern of airport capital programs varies dramatically from year to year. For instance, funding between 1989 and 1990 more than doubled, contrasting with a sharp reduction of about 45% between 1992 and 1993. Capital programs are usually very large and expensive and can be initiated at any given year. For example an airport¹⁶ might not have a major capital program in place for years, but then propose a new plan whose total cost could range between \$2 to \$4 billion. According to a 1998 GAO study, other factors that contribute to this variability includes the year-to-year changes in the amount of funding available from bonds, which in turn is affected by changing interest rates, the demand for air travel, and airline agreements with airports (GAO 1998, 6).

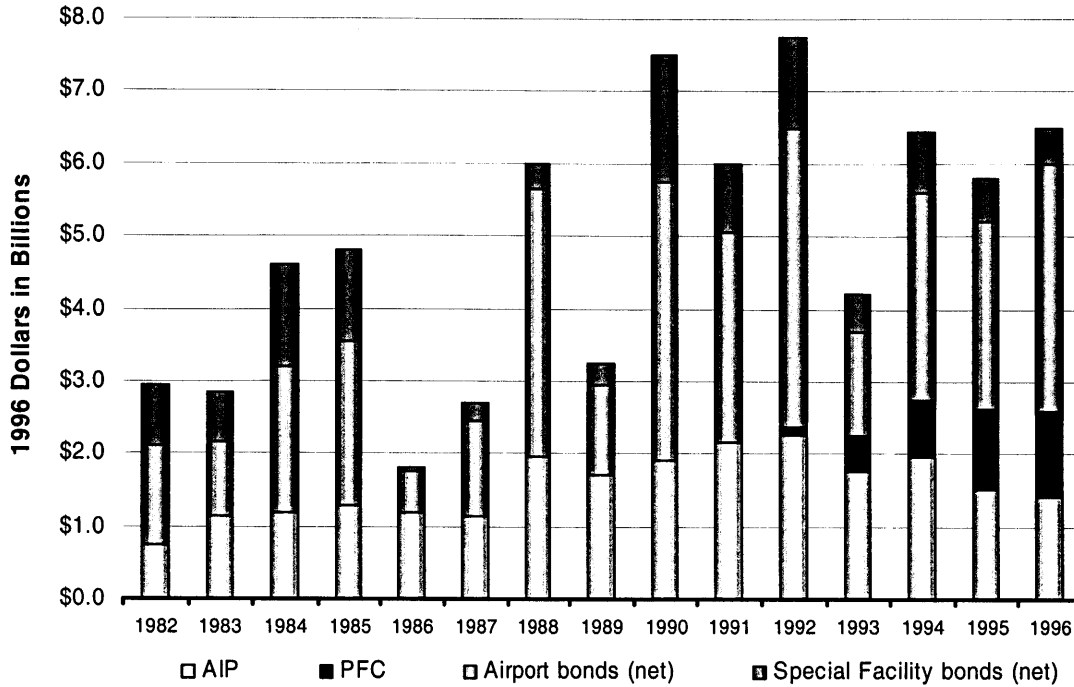
^a Net of refinancing. Of this total, a little over \$400 million is special facility bonds issued on the behalf of nonairport beneficiaries, such as airlines.

^b State grants only. Amounts for local capital subsidies are unknown. GAO believes these amounts are minimal.

^c Net operating revenue in excess of a minimum coverage ratio of 125 percent of the debt service (principal and interest payments).

¹⁶ This applies to large commercial airports.

Figure 3.1 Airport Funding: Primary Sources, 1982-1996



Source: GAO 1998

There are five main sources of funding for capital programs of commercial airports in the United States: revenue and special facility bonds, the federal Airport Improvement Program (AIP), passenger facility charges (PFCs), state and local grants, and airport revenues.

3.1.1 Bonds

For a long time the largest source of financing airport development in the United States has been the issuance of bonds. This scheme continues to be the primary source of funding for capital programs. A 1998 GAO report entitled “*Airport Financing: Funding Sources for Airport Development*” highlights the importance of airport revenues that allow large commercial airports to raise bond money: “More than 95% of all airport debt issued [between 1982 and 1996] has been in the form of general airport revenue bonds (GARB), which are secured by the airport’s

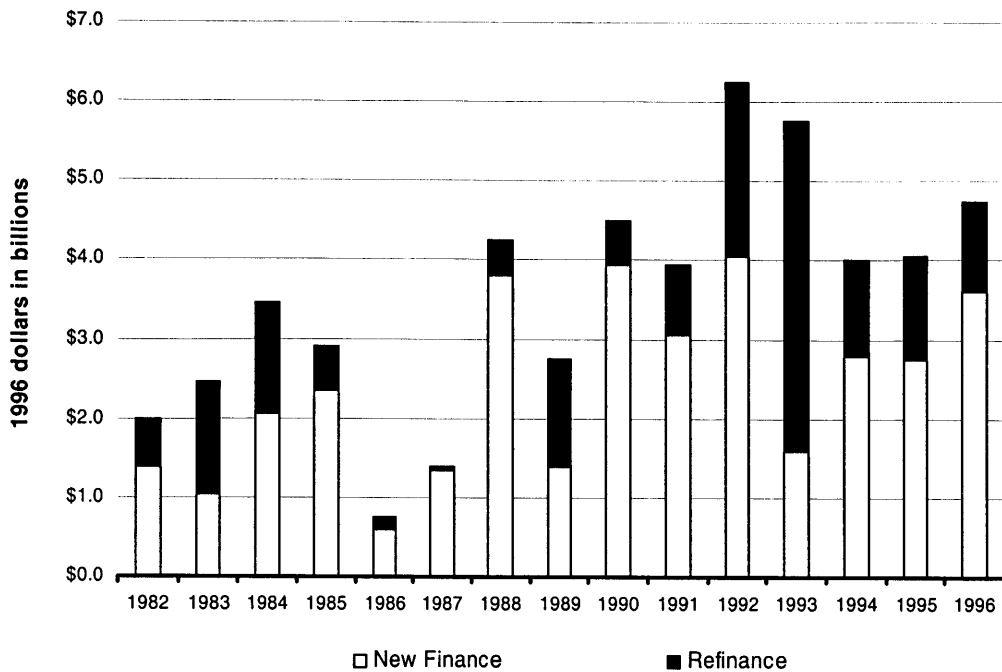
future revenue. Thirty years ago, general obligations bonds, which are backed by the taxing power of a governmental unit, were far more common because of their stronger credit standing and therefore lower financing costs” (GAO 1998, 38).

An important feature of airport bonds is that not all money is destined to capital programs. A good portion of bond revenues is used to refinance previous debt. As Figure 3.2 shows, from 1982 through 1996, airports in the United States issued \$53 billion worth of bonds. Of this amount about one third or \$17.3 billion was used to refinance previous debt and \$36.3 billion was destined to new capital programs. The total amount of money raised through bond issuance as well as the split between refinancing and new financing varies dramatically from year to year, depending on the state of the economy and the specific needs of the issuer. For example, when the interest rates were very low in 1992 and 1993, airports used a larger portion of their debt to refinance previous obligations (GAO 1998, 36). Data collected by the FAA and displayed in Table 3.2 indicates that between 1996 and 2000, large commercial airports in the U.S. raised over \$18 billion, a yearly average of over \$3.5 billion.

Credit rating agencies, specifically Standard & Poor’s and Moody’s, expect an increase in the use of alternative financing mechanisms such as special facility bonds, which are secured by contractual lease payments of the airline or airlines for which the facility is constructed, rather than the airports’ general revenue. Some large airports favor *special facility bonds* in order to obtain tax-exempt status. According to Moody’s, this financing alternative can result in project design, construction and completion earlier, and possibly at lower cost that would have been possible through the issuance of airport revenue bonds (Hu, Whiteman and Francoeur 1997, 1). The introduction of PFCs as a new revenue source in 1992 has also led to the creation of a new financing vehicle: *PFCs backed bonds*. Because of the conservatism of the tax-exempt bond market, this type of bonds requires special commitments from the FAA¹⁷ to assure the stability of the revenue stream (FAA and ARP Consulting 2001, 35).

¹⁷ The FAA holds the right to discontinue the PFC program at a particular airport if the established guidelines for its implementation are not followed.

Figure 3.2 Airport Bonding, Total and New Finance for U.S. Airports, 1982-1996



Source: GAO 1998

3.1.2 Airport Improvement Program (AIP)

Since the mid 1940s the federal government has played a vital role in the process of planning and developing airport facilities. The role has not been one of direct involvement with local processes, but of providing financial support through grant programs, especially the Airport Improvement Program (AIP). The funding has supported and continues to support programs that allow the U.S. airport system to expand while meeting high standards of safety and security and promoting competition at airport facilities (DOT/FAA 1999, 47). The Office of the Associate Administrator for Airports of the FAA administers both the AIP and PFC programs.

At the end of World War II the federal government initiated a grants-in-aid program to promote the development of a system of civil airports to meet the needs of the increasingly important air

transportation system. The Federal-Aid Airport Program (FAAP) was instituted through the passage of the Federal Airport Act of 1946. Program funding was obtained through general funds of the Treasury. The grants of this program could be used for airfield construction, passenger terminals, access roads, and the acquisition of land for the airport (DOT/FAA 1999, 47).

By 1970 the needs of the airport network had increased substantially and the federal government started to devise a plan to expand its support for civil aviation. The Airport and Airway Development Act of 1970 established a more elaborate program to support commercial aviation. This grant program was divided into two main categories, the Planning Grant Program and the Airport Development Aid Program. This time the source of funding shifted from the Treasury to the Airport and Airway Trust Fund, which derived its revenues from aviation related activities such as airline fares, air freight, and charges on aviation fuels (DOT/FAA 1999, 47). The grants from this program could be used to finance investments in the airport and airway system and could also be used to cover operating costs, whenever possible. It is important to note that the funding structure of this program has been modified many times through the years.

The Airport and Airways Improvement (AAI) Act of 1982 established the successor program. This time the planning and airport development programs of the 1970s were combined into one cohesive program: the Airport Improvement Program (AIP). AIP took into consideration issues related to the environment and included noise compatibility programs. The AAI Act has been amended to allow the conversion of unused apportioned funds for use in the form of discretionary grants (DOT/FAA 1999, 48).

The Airport and Airway Safety and Capacity Expansion Act of 1987 extended the AIP grant authority until 1992. This time the law authorized \$1.7 billion each fiscal year through 1990 and \$1.8 billion for 1991 and 1992. In the meantime, the Aviation Safety and Capacity Expansion Act of 1990 authorized the FAA to initiate the PFC program as a complement to the AIP program (see Section 3.1.3). The Airport and Airway Safety, Capacity, and Noise Improvement, and Intermodal Transportation Act of 1992 (Public Law 102-581, October 31 1992) authorized the extension of the AIP program at a funding level of \$2.05 billion through the end of 1993. Almost two years later, the Federal Aviation Administration Authorization Act of 1994 (Public Law 103-

305, August 23, 1994) extended AIP until the end of September, 1996. The Federal Aviation Authorization Act of 1996 (Public Law 104-264, October 9, 1996) extended AIP for two more years until September 1998 (DOT/FAA 1999, 48). The Taxpayer Relief Act of 1997 (Public Law 105-34) enacted on October 1, 1997 extended the AIP program for ten years through September 30, 2007. The bill retains the existing freight waybill and general aviation fuel/gas taxes. It also converts the 10 percent *ad valorem* tax on domestic passenger tickets to a combination *ad valorem*/flight segment¹⁸ tax. Between January 1, 2002, and December 31, 2002, the tax is to be applied at 7.5% plus \$3 per segment. After 2002, the \$3 segment rate will be indexed to the Consumer Price Index. While held by the Treasury, the AIP funds are invested in government securities. Any interest earned is deposited into the Trust Fund and amounts are withdrawn from the Trust Fund as they are needed and transferred into each FAA appropriation to cover necessary outlays. At the end of 2000 the uncommitted balance of the Trust Fund was approximately \$7.6 billion (FAA 2000, 21).

AIP funds are apportioned by formula each year. Each primary airport's apportionment is based on the number of passengers boarding at the airport. In 1997 the minimum amount apportioned to the sponsor of a primary airport was \$500,000, and the maximum was \$22 million. Obligated funds in 1997 were \$1.46 billion. The apportionment was calculated as follows:

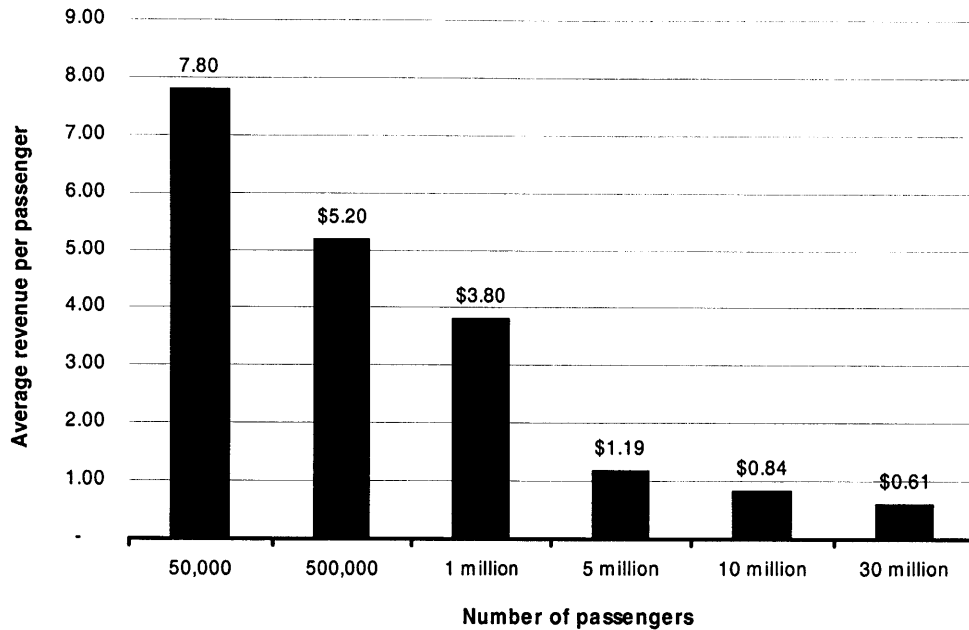
- \$7.80 for each of the first 50,000 passenger boardings
- \$5.20 for each of the next 50,000 passenger boardings
- \$2.60 for each of the next 400,000 passenger boardings
- \$0.65 for each of the next 500,000 passenger boardings
- \$0.50 for each passenger boarding in excess of 1 million (FAA 1999, 12)

Table 3.3 shows the application of the 1997 AIP apportionment formula to six airports with different traffic volumes. The airports' traffic volumes range from 50,000 to 30 million boardings (LAX enplaned about 32 million passengers in 2000). Figure 3.3 highlights the average AIP amount per passenger received by each airport that is depicted in Table 3.3. The

¹⁸ A domestic flight segment is a flight involving a single takeoff and a single landing at two domestic airports.

scale set by the FAA determines that the larger the number of passengers served, the lower average per passenger amount the airport receives. The AIP apportionment formula clearly favors smaller airports with lower traffic volumes.

Figure 3.3 Application of 1997 AIP Apportionment Formula to Airports with Different Passenger Traffic Volumes



Source: Author calculations

3.1.3 Passenger Facility Charges (PFCs)

The Aviation Safety and Capacity Expansion Act of 1990 (Public Law 101-508, November 8, 1990) authorized the FAA to approve the collection and use of Passenger Facility Charges (PFCs) by public agencies owning or operating commercial service airports. The PFC program was created to complement the AIP program. The revenues from PFCs can be used to fund airport-related projects that meet the following objectives: preserve or enhance safety, capacity, or security; reduce airport noise; or serve as a catalyst to further competition among the airlines (DOT/FAA 1999, 48).

Table 3.2 Airport Bonding for U.S. Large Hubs, Fiscal Years 1996-2000
(Figures in Dollars)

Ranking	Airport	Airport Name	1996	1997	1998	1999	2000	Five-year Totals
1	ATL	William B Hartsfield	286,185,506	0	0	0	546,871,945	833,057,451
2	ORD	Chicago O'Hare International	454,333,675	560,205,610	0	409,553,367	70,460,000	1,494,552,652
3	LAX	Los Angeles International	205,875,000	0	0	0	0	205,875,000
4	DFW	Dallas/Fort Worth International	0	0	0	0	335,000,000	335,000,000
5	SFO	San Francisco International	615,841,772	516,214,087	683,655,121	1,082,998,088	367,738,425	3,266,447,493
6	DEN	Denver International	525,801,152	702,636,124	293,027,020	0	735,390,356	2,256,854,652
7	PHX	Phoenix Sky Harbor International	0	0	0	163,045,638	0	163,045,638
8	LAS	Mc Carran International	402,750,000	0	40,000,000	0	208,142,000	650,892,000
9	DTW	Detroit Metro Wayne	0	0	0	0	0	0
10	EWR	Newark International	63,921,000	58,154,000	99,893,000	68,474,000	101,988,000	392,430,000
11	MSP	Minneapolis-St Paul International	5,505,000	0	383,875,000	262,597,000	277,997,000	929,974,000
12	MIA	Miami International	351,010,000	130,385,000	433,085,000	0	220,156,000	1,134,636,000
13	IAH	George Bush Intercontinental	21,200,000	3,100,000	17,000,000	627,960,000	0	669,260,000
14	JFK	John F Kennedy International	80,408,000	98,566,000	105,960,000	80,189,000	33,825,000	398,948,000
15	STL	Lambert-St Louis International	0	0	164,149,608	0	0	164,149,608
16	MCO	Orlando International	7,200,000	0	772,290,000	202,990,000	0	982,480,000
17	SEA	Seattle-Tacoma International	103,530,435	140,360,000	363,610,000	243,983,729	372,220,350	1,223,704,514
18	BOS	General Edward Lawrence Logan	51,000,000	0	159,795,000	402,345,000	192,840,000	805,980,000
19	LGA	La Guardia	19,793,000	29,672,000	31,886,000	56,443,000	25,257,000	163,051,000
20	PHL	Philadelphia International	138,534,931	0	77,608,001	0	0	216,142,932
21	CLT	Charlotte/Douglas International	0	0	0	0	0	0
22	CVG	Cincinnati/Northern Kentucky	58,090,000	29,872,000	56,368,000	0	0	144,330,000
23	HNL	Honolulu International	0	0	0	0	0	0
24	PIT	Pittsburgh International	0	450,590,000	0	63,130,000	0	513,720,000
25	BWI	Baltimore-Washington International	0	0	0	0	0	0
26	IAD	Washington Dulles International			130,949,805	130,949,805	7,863,180	269,762,790
27	SLC	Salt Lake City International	82,932,773	0	42,757,656	15,618,301	1,153,477	142,462,207
28	TPA	Tampa International	78,685,487	0	0	0	0	78,685,487
29	SAN	San Diego International	67,554,559	0	0	0	0	67,554,559
30	FLL	Ft. Lauderdale International Airport				190,185,000	0	190,185,000
31	DCA	Ronald Reagan Washington National	180,448,197	128,428,804	29,295,324	29,295,324	5,242,120	372,709,769
Totals			3,800,600,487	2,848,183,625	3,885,204,535	4,029,757,252	3,502,144,853	18,065,890,752

Source: FAA's Form 5100-127

Table 3.3 Application of 1997 AIP Apportionment Formula to Airports with Different Passenger Traffic Volumes

Number of Passengers	Apportionment	Airport A		Airport B		Airport C		Airport D		Airport E		Airport F	
		PAX	Dollars	PAX	Dollars	PAX	Dollars	PAX	Dollars	PAX	Dollars	PAX	Dollars
0-50K	\$7.8	50,000	390,000	50,000	390,000	50,000	390,000	50,000	390,000	50,000	390,000	50,000	390,000
50K-400K	\$5.2			400,000	2,080,000	400,000	2,080,000	400,000	2,080,000	400,000	2,080,000	400,000	2,080,000
400K-500K	\$2.6			50,000	130,000	500,000	1,300,000	500,000	1,300,000	500,000	1,300,000	500,000	1,300,000
500K-1M	\$0.65					50,000	32,500	1,000,000	650,000	1,000,000	650,000	1,000,000	650,000
1 million +	\$0.5							3,050,000	1,525,000	8,050,000	4,025,000	28,050,000	14,025,000
Totals		50,000	390,000(a)	500,000	2,600,000	1,000,000	3,802,500	5,000,000	5,945,000	10,000,000	8,445,000	30,000,000	18,445,000
Average per PAX		\$7.80		\$5.20		\$3.80		\$1.19		\$0.84		\$0.61	

(a) Airport will receive the minimum \$500,000

Source: Author calculations

Airports wishing to impose a PFC must apply to the FAA for such authority. When first implemented, approved airports could charge enplaning passengers a \$1, \$2, or \$3 passenger facility charge (PFC). Since the PFC Program is complementary to the AIP program, large and most medium hub airports authorized to charge PFCs are assessed up to a 50% apportionment reduction in AIP. The reduction becomes effective the year following the approval of authority for PFC collection. The apportionment money withheld as a result of PFC collections is redistributed within the AIP program as follows:

- 25% to the AIP discretionary fund; and
- 75% to the “small airport fund.”

Of the 25% distributed to the discretionary fund, half of the amount must be spent at primary, small-hub facilities. Of the 75% distributed to the “small airport fund,” one-third is distributed among general aviation facilities (including reliever airports). The remaining two-thirds are distributed to nonhub commercial service airports (DOT/FAA 1999, 18). Since 1997 the authority to approve many of the PFC applications has been delegated to the FAA’s regional offices.

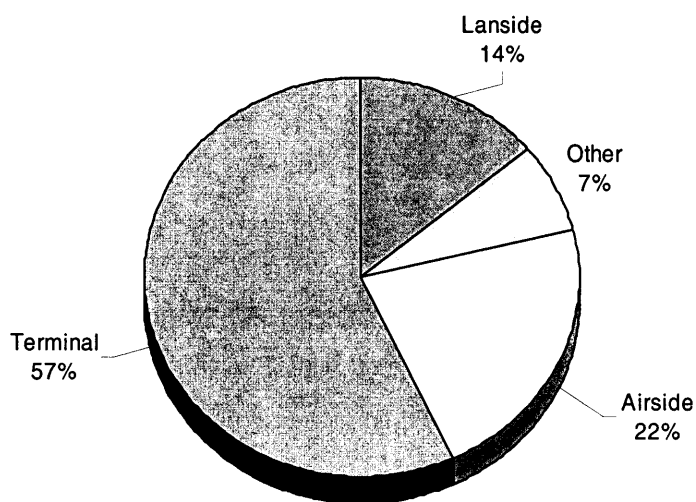
In 2000 President Clinton signed into law the “Wendell H. Ford Aviation Investment and Reform Act for the 21st Century” (AIR 21). This legislation allowed for the PFCs to be increased to \$4 and to a maximum of \$4.50. It is important to note that airports whose PFCs are to be kept at \$3 or less will continue to have a 50% reduction in their AIP apportionment. However, those airports requesting PFCs above \$3 will have a 75% reduction in their AIP apportionment. Under AIR 21 no large or medium airport at which one or two air carriers account for more than 50 percent of passenger enplanements may impose a PFC, unless the airport authorities submit a competition plan (U.S. Department of Transportation 2000, 1).

3.1.4 State and Local Grants

State and local governments provide some financial support for capital programs. The funds are derived from a variety of sources that include matching funds to secure federal funding, aviation

fuel and aircraft sales taxes, highway taxes, bonds, as well as general fund appropriations. Considering the large amounts of money needed, local governments in the United States do not provide substantial support to capital programs of large commercial airports. For instance, 1996 the revenues from state grants for large commercial airports accounted for only 4% of capital programs funding (Table 3.1) (GAO 1998, 40,41).

Figure 3.4 Use of Capital Program Funds, Fiscal Year 2000



Source: ACI-NA

3.1.5 Airport Revenues

Large commercial airports generate most of their revenues from landing fees, terminal rentals, and commercial activities that include retail activities, rental car and parking services. Operating revenues of large commercial airports are usually sufficient to cover the facility's operating expenses, debt service, and to the extent available, other non-operating expenditures including some capital development funding. The use of airport revenues to pay directly for development

programs is known as “pay-as-you-go” financing. However, this is not the preferred method for funding capital programs. As Table 3.1 shows only 2% of capital programs are funded directly from airport revenues (GAO 1998, 41).

3.2 Capital Programs

The 2000 General Information Survey conducted by Airports Council International – North America (ACI-NA) gathered information on airports capital programs planned or underway for the period 2001-2006 (Table 3.7). The combined cost of capital programs for the U.S. large hubs for that 5-year span was estimated to be about \$24 billion, averaging just over \$4 billion annually (Table 3.4). This not only shows tremendous construction activity at large airport facilities in the United States. It also demonstrates the capacity of airport operators to find the means to fund such capital projects.

The ACI-NA survey also shows how the money for large commercial airports capital programs was being used (Figure 3.4). Clearly most of capital investment goes to terminal buildings (57%). Investment on airside projects (i.e., runways, aprons, taxiing areas, etc.) took 22%. Another 14% was spent in landside related projects (e.g., parking structures, access roads, etc.) and 7% was allocated to remaining projects.

Table 3.4. Projected Capital Expenditures at Large Hub Airports,
Fiscal Years 2001-2006

Ranking	Airport	Airport Name	Amount
1	ATL	William B Hartsfield	2,345,713,000
2	ORD	Chicago O'hare International	1,300,000,000
3	LAX	Los Angeles International	856,000,000
4	DFW	Dallas/Fort Worth International	2,030,900,000
5	SFO	San Francisco International	533,500,000
6	DEN	Denver International	774,021,560
7	PHX	Phoenix Sky Harbor International	1,350,500,000
8	LAS	Mc Carran International	1,245,000,000
9	DTW	Detroit Metro Wayne	1,529,000,000
10	EWR	Newark International	284,000,000
11	MSP	Minneapolis-St Paul International	1,303,640,000
12	MIA	Miami International	3,088,000,000
13	IAH	George Bush Intercontinental	887,000,000
14	JFK	John F Kennedy International	917,000,000
15	STL	Lambert-St Louis International	1,100,000,000
16	MCO	Orlando International	820,000,000
17	SEA	Seattle-Tacoma International	0
18	BOS	General Edward Lawrence Logan	673,000,000
19	LGA	La Guardia	239,000,000
20	PHL	Philadelphia International	640,000,000
21	CLT	Charlotte/Douglas International	235,000,000
22	CVG	Cincinnati/Northern Kentucky	57,300,000
23	HNL	Honolulu International	197,000,000
24	PIT	Pittsburgh International	130,256,000
25	BWI	Baltimore-Washington International	593,000,000
26	IAD	Washington Dulles International	0
27	SLC	Salt Lake City International	33,229,840
28	TPA	Tampa International	327,217,000
29	SAN	San Diego International	126,200,000
30	FLL	Ft. Lauderdale International Airport	419,000,000
31	DCA	Ronald Reagan Washington National	40,000,000
Total			24,074,477,400

Source: ACI-NA

3.3 Credit Rating Agencies

To cope with the high cost of capital programs airport operators have to borrow large amounts of money using the bond market. Investors interested in airport bonds turn to the credit rating agencies for financial advice. The credit rating agencies provide independent insight analysis about the creditworthiness of a bond issuance. The leading rating agencies in the U.S. are Standard & Poor's (S&P), Moody's Investors Services and Fitch IBCA.¹⁹ Credit rating agencies are very influential and their opinion has a major bearing on the final cost of a capital program.

Table 3.5 Credit Rating Definitions

MOODY'S	S & P	FITCH	Definitions	Type of Investment
Aaa	AAA	AAA	Highest quality	Investment grade
Aa	AA	AA	High quality	
A	A	A	Upper medium quality	
Baa	BBB	BBB	Medium grade	
Ba	BB	BB	Somewhat speculative	Junk bonds
B	B	B	Low grade, speculative	
Caa	CCC	CCC	Low grade, default possible	
Ca	CC	CC	Low grade, partial recovery possible	
C	C	C	Default, recovery unlikely	

The credit rating agencies have developed a set of rating criteria that reflects the financial strength of the evaluated investment vehicle. Table 3.5 synthesizes the rating range for airport bonds. Since bond ratings reflect the probability of default, the higher a bond is on the rating scale the lower the probability of default. The highest quality bonds are rated triple-A by all credit rating agencies. Conversely, the C type category reflects high risk and is the least desirable type of investment. In the credit rating process airport operators benefit from highly-rated bonds since the yields on these bonds will be set lower, resulting in a lower cost of debt.

¹⁹ In March 2001 Fitch IBCA, a subsidiary of FIMALAC, SA, a diversified French company acquired Duff & Phelps Credit Rating Co. (D&P). Stephen W. Joynt, Fitch IBCA's president and COO stated in early 2001: "This merger enable us to offer a full service alternative to S&P and Moody's and allows us to be a strong competitor to the industry giants."

In general, airport revenue bonds are highly regarded and considered a safe type of investment. *It is very unusual to find an airport revenue bond in the junk bond category.* Historically, airport operators have demonstrated financial stability even when the airline industry has performed poorly (Forsgren, MacDonald, and Whitestone 2002, 1). In fact, no large commercial airport has defaulted on its financial obligations in the last 50 years (Whiteman, Hu and Cahill 2000, 17). Although airport revenue bonds will continue to be the primary funding source for airport capital projects, passenger facility charge (PFCs) bonds, special facility bonds, project finance debt, and double-barrel letter of intent bonds (LOIs) are expected to play a larger role in airport financing in the future (Gilliland, Champeau and Soltz 2001, 1).

It is important to point out that credit rating agencies focus their analyses on specific deals or projects (i.e., bond series for fuel complexes, cargo facilities, or a new international terminal) assessing the ability of the sponsoring entity to honor the acquired obligation. For this reason it is easy to find multiples ratings (for different projects) in the same airport (see Tables 3.6 and 3.7).

It is a mistake to assume that all airports operate in the same way and can be evaluated with a “cookie cutter” formula. Moody’s emphasize that each airport is a unique operating entity that must be analyzed on a case-by-case basis (Whiteman, Hu and Cahill 2000, 18). When measuring the creditworthiness of a bond issue, the credit rating agencies basically assess the capacity of the sponsoring entity to serve its debt. To establish the financial viability of the bond issuance, the rating agencies look at different factors that could impact (positively or negatively) revenues. Credit rating agencies evaluate factors such as the local market strength, management practices, and the cost recovery methodology used; as well as external factors such as environmental issues and the political climate.

The next section displays a basic outline of key factors that credit rating agencies look at to set their credit ratings. It is important to emphasize, however, that the following section provides only an overview of “key factors.” Credit rating agencies make in-depth analyses that also capture the unique characteristics of each financing arrangement. The rating methodology synopsis was compiled from the following publications:

Fitch IBCA. *Airport Revenue Bonds Flying High*. April 28, 2000.

Moody's Investor Services: Municipal Credit Research. *Worldwide Airport Industry: Rating Methodology*. May 2000.

Standard and Poor's. *Standard & Poor's Public Finance Criteria: Transportation Bonds (Airports)*. 2000.

3.3.1 Fitch IBCA

To assess airport revenue bonds credit strength Fitch IBCA makes an evaluation of key factors that include the service area, traffic composition and trends, as well as airline performance and management team track record. Fitch also looks at the legal framework and physical characteristics of the facility.

In the process of making a service area analysis Fitch IBCA makes a careful evaluation of the balance in air traffic. That is, the balance between origination and destination (O&D) traffic in contrast to connecting traffic. According to Fitch IBCA, the "most highly rated airports have a substantial foundation of O&D traffic." In addition, the traffic composition and enplanement trends are analyzed in relationship to local economic conditions and the overall national economy. Airport characteristics such as size and airline competition are also evaluated, as well as the financial strength of the dominant carriers.

When evaluating the use and lease agreements between airports and airlines Fitch IBCA does not prefer one cost recovery methodology to another. The rating agency evaluates the type of agreement in relationship to market demands and the airport credit fundamentals. The credit evaluation includes an airport management analysis and an assessment of the financial performance of the sponsoring entity. The rating agency also looks into the airport's history of capital planning and execution.

The final component of the evaluation menu includes the legal structure of the deal. "Fitch IBCA focuses on the pledge security, flow of funds, various covenants and restrictions, reserve funds, events of default and provisions for subordinate and variable-rate debt."

3.3.2 Moody's Investors Services

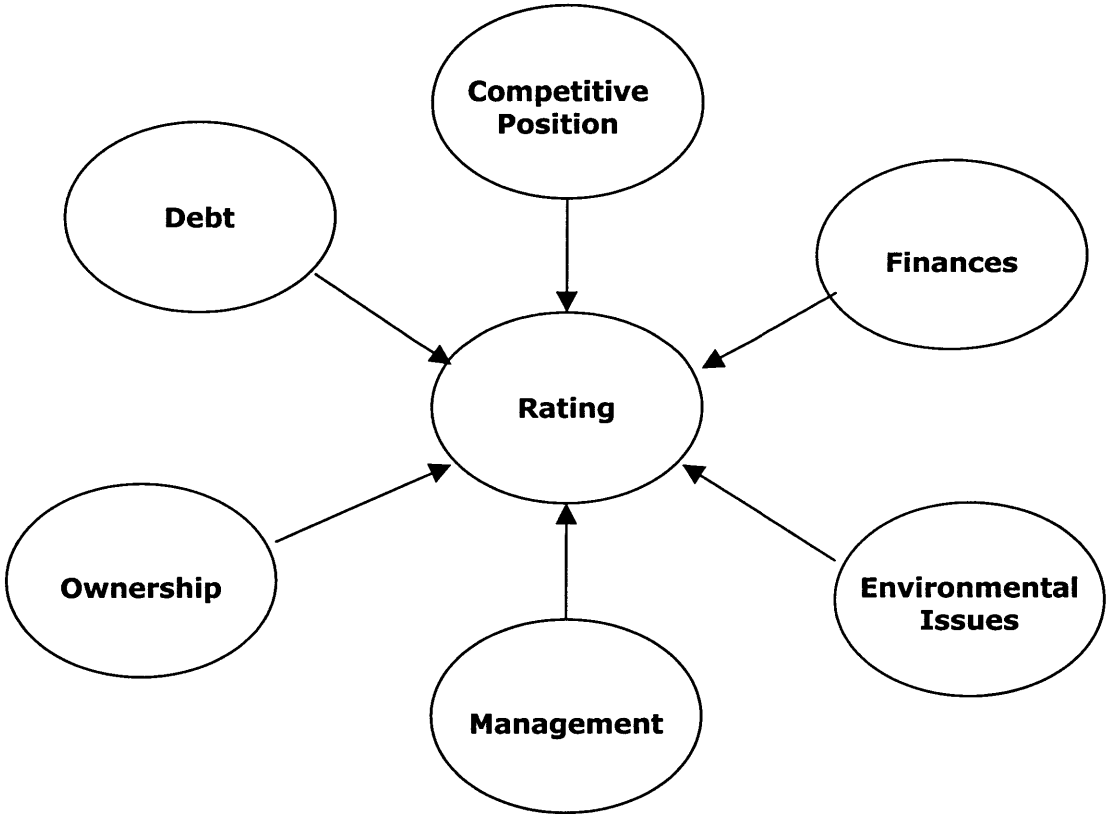
Moody's rating process includes an assessment of the performance of the issuer against the backdrop of major industry trends. The evaluation of an airport's position involves a fundamental analysis of its business, competitive position and operations. According to Moody's the airport's financial and debt positions are essentially derivatives of these structural and operational factors, while the airport's legal framework defines its obligations to the debt holders. Figure 3.5 synthesizes the key factors that determine Moody's airport credit evaluation.

In the evaluation process, Moody's examines the competition from other airports in the area, the airline diversity, as well as the control that the operator has over the facility (i.e., gates, holdrooms, concession and passenger buildings space). Environmental issues such as pollution and noise control are a major concern for Moody's. These issues have the potential to become problematic and costly for the sponsoring agency. For example, communities opposed to an airport expansion project due to noise, pollution and/or traffic concerns can resort to the use of environmental legislation to derail or slow down an expansion program.

Probably the most subjective part of Moody's evaluation is the analysis of the management and ownership structure. For example, relationships among stakeholders – government, airport tenants, debt holders and the like—are not always explicit and easy to quantify. Yet, in many ways, a good or bad relationship can help accelerate or slow down the negotiation process thus affecting the overall outcome and cost of a project.

Airport finances are not totally comparable and usually reflect the cost recovery methodology that is used as well as the corporate structure. There are, however, a number of common themes that are true for most airports irrespective of type. Foremost among these is the diversification of the revenue base away from airlines, something which Moody's feels is a positive credit attribute. Moody's focuses specially on the way the financial arrangement fits the particular cost recovery methodology used by the airport. Moody's also makes an assessment of the type of debt used and sees how this fits the specific needs of the project. This analysis is complemented with an assessment of the legal framework used in the deal.

Figure 3.5 Moody's Airport Rating Factors



Source: Moody's Investors Services 2000

3.3.3 Standard & Poor's

In the rating process Standard & Poor's (S&P) makes an in-depth analysis of the service area characteristics. According to S&P, the strength of the local economy help determine air passenger demand. The rating agency states that "high per capita income is an important indicator of discretionary air travel." S&P further evaluates air traffic demand by examining the airport utilization trends versus those of the nation. Then the types of traffic are carefully weighted against the local economy. If most passengers are those of the O&D variety, the local economy dictates the level of service demands. Conversely, airports used heavily for connecting traffic depend less on service area economics. S&P clearly states that substantial transfer traffic is usually a vulnerability "because the choice of connecting facility is not made by the passengers, but dictated by the airline and thus related to a carrier's viability and route decisions." However, airports that handle mostly connecting traffic have mitigating factors that can effectively offset this concern. The mitigating factors include the importance of the facility to the overall U.S. airport network, a favorable geographical location, manageable debt burden and carrying costs, strong air carriers accounting for the greatest amount of connecting traffic, and legal provisions that allow for maximum flexibility in charging rates.

The use and lease agreements used by the airport determine, not only the allocation of risk, but also the use of surplus money from landside. If landside businesses do not do well, then depending on the type of cost recovery methodology, losses will be the responsibility of either the airport or the airlines. The rate-setting methodology is carefully examined by S&P to determine how the new debt fits into the existing legal and financial framework.

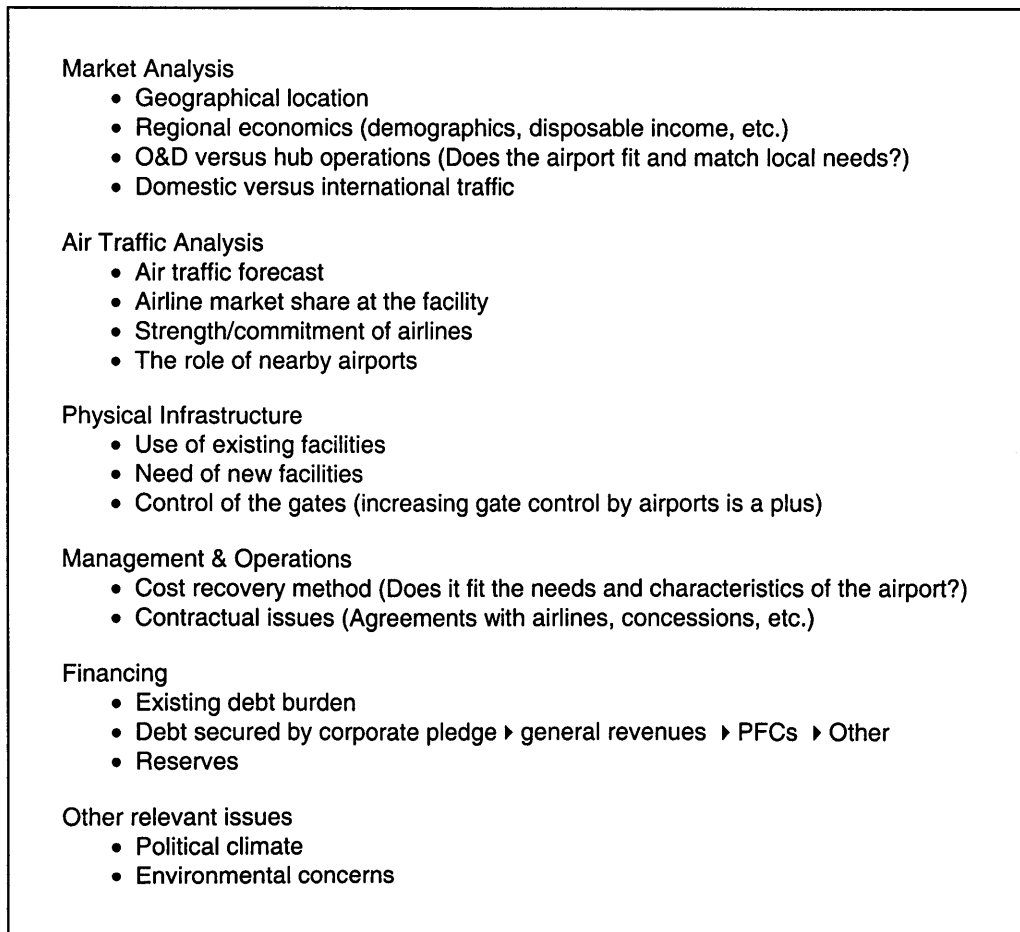
According to S&P, analysis of other financial conditions is similar regardless of cost recovery methodology used. Important financial factors considered by S&P are historical revenue diversity, debt burden, and airline cost per enplanement. Analyzed on a pro forma basis, this last measure is particularly useful because it incorporates future debt service costs and indicates the degree to which concessions can offset airline costs.

In addition, S&P analyzes the size and purpose of the financing program as well as the need of additional debt financing. S&P also evaluates other important factors that have a major impact on

the outcome the project such as the influence of local politics and experience of the management team with large construction projects.

Figure 3.6 is an attempt to summarize the common factors that rating agencies analyze when performing a credit evaluation. The *market analysis* focuses on external factors that have an impact on the competitiveness of the airport. The *air traffic analysis* assess the forecast of air traffic volumes and airline competition environment. Next is the analysis of the existing *physical infrastructure* and an assessment for the need for a capital program. The *management and operations* analysis evaluates how the management and operation of the airport fits the legal and financial framework. The *financing* factor focuses on the existing debt, and an evaluation of a scenario in which additional debt is accrued to the airport. *Other relevant issues* cover the political climate and environmental concerns.

Figure 3.6 Relevant Factors for Rating Airport Revenue Bonds



3.4 Capital Programs after September 11, 2001

As a result of the events of September 11, 2001, in Washington and New York the North American air transportation system was disrupted resulting in a two-day closure of the entire air network in the United States. Since then, major carriers have announced more than 100,000 layoffs in the airline industry, have begun retiring older planes, and have reduced service in approximately 20% (Gilliland, Champeau, Soltz, and Warlick 2001, 2). It is important to point out, though, that prior to September 11, major carriers were already facing a noticeable decrease in revenues due to a slow down in the economy. The terrorist attacks and the consequent disruption to the air transportation system accentuated and magnified the problem resulting in unprecedented declines in air traffic.

The initial impact suffered by the airlines after September 11 was followed by other sectors of the industry including the airport system. The unprecedented nature of the events created a high degree of uncertainty. An initial assessment on the industry by S&P indicated that the effects on the airport industry would generate lower financial margins, higher operating costs, that naturally would produce lower credit ratings (Forsgren, Macdonald and Whitestone 2002 –1).

“Airport industry estimates the combined financial effects on airport budgets for the year through September 2002 to be a \$3.8 billion, all relating to lower operating and passenger facility charge revenues, higher expenses, and insurance. Not included in that total are estimates of \$750 million in capital costs to improve airport access as reported by Airport Council International-North America and what Standard & Poor’s expects to be significant infrastructure cost to accommodate baggage screening and explosive detective systems.” (Forsgren, Macdonald and Whitestone 2002 –1)

In early 2000 the credit rating agencies started to re-evaluate the status of the airport credit ratings. The kind of factors they focused on highlights the issues that are most relevant to the credit rating process under the present circumstances.

Immediately after September 11, Standard & Poor’s began to monitor closely the airport sector. On February 7, 2002 S&P released a report entitled “*Operational and Financial Difficulties*

Confront North American Airport Sector.” The report indicates that S&P concentrated its attention on airports showing the following credit risks:

- Airports with airline concentration issues and a hub status that leave them exposed to a large-scale reduction in scheduled flights greater than industry peers;
- Airport sponsors that, due to their airline rate-making methodology, are more exposed to the implications of significantly reduced non-aeronautical revenues and negatively affected by revised security procedures;
- Passenger facility charges (PFC) backed facilities and other narrowly secured airport special facilities that lack sufficient financial cushions;
- Airports with already high costs and debt levels and particularly those with large non-deferrable capital expenditure programs or anticipated capital requirements;
- Airports with a high share of discretionary or international passengers; and
- Management teams that have not devised a strategy for addressing potential cost increases and revenue declines.

In May 2002, Moody’s released the “Why the Airport Downgrades?” report citing a few cases that warranted a credit rating downgrade. In analyzing the factors that led to downgrade some airport credit ratings Moody’s highlighted a number of key issues that include:

- Aggressive ramp-up growth assumptions that have not stood up severe stresses;
- Projects that lack sufficient liquidity to cushion financing during downturns;
- Insufficient interest contingency to cover delays in construction; and
- Ambiguities in the legal contracts and documents underlying the concessions are being tested and not performing well

There is consensus among credit rating agencies that hub airports (i.e. those facilities with a high level of connecting traffic) are more vulnerable under the present circumstances. This situation is closely linked to the dominant carriers at the facilities. In recent months it has become evident that airports with a large percentage of connecting traffic tend to mirror the standing of their dominant carrier. For example, airport hubs dominated by American Airlines and United Airlines have experienced the largest service reductions based on schedule daily seats in February 2002

versus February 2001. By contrast, markets dominated by Southwest Airlines continued to be spared much of the negative effects associated with traffic declines (Forsgren, Macdonald and Whitestone 2002 –1). In some cases, the rating agencies have taken action against airports dominated by troubled airlines. For instance, the troubled financial status of US Airways led to Fitch to place the ratings for Pittsburgh International Airport and Charlotte/Douglas International Airport, NC, the airline’s largest and third hubs, respectively, on Rating Watch Negative. Fitch also changed the outlook of Philadelphia International Airport, US Airways’ second largest hub, to negative from stable (Stettler and others 2002, 5).

Revenues generated by parking, rental car, duty free, and other concessions, have experienced large decreases and still lag behind previous years. In addition, there is significant uncertainty regarding both the scope and cost associated with increased security measures. This also relates to the possibility of costly design reconfiguration of buildings in some airports due to changes in security procedures.

As expected, many airports halted nonessential operating expenditures and implemented better cash-management techniques by reviewing accounts receivable and shortening maturities on reserves where possible. The monitoring of S&P shows that the approach of most management teams has been to cut expenditures, and assuming lower traffic levels, scale back budgets. However, Fitch expects airports to resume spending in their capital programs as passenger traffic returns to its historical growth pattern.

In the end it is important to emphasize that the rating agencies have a somewhat optimistic outlook for the future of the airport sector. This is strengthened by the fact that as a whole the airport sector has been able to cope relatively well with probably the worst crisis in aviation history. In S&P’s view most airport sponsors have financial flexibility, demonstrated strategy, and sufficient liquidity to address lower traffic levels during the intermediate term. “Barring further exogenous shocks to demand or prolonged economic recession that retards recovery, Standard & Poor’s expects most ratings in the sector to maintain their current credit profiles and eventually return to a stable outlook.”

In Fitch's view, the risk of widespread airport revenue bond defaults remains extremely low. Fitch highlights the fact that most airport operators have been able to adjust both capital and operating budgets to preserve cash and maintain sound levels of debt service coverage. The rating agency further states that "the relative stable performance of the nation's airports during one of the most tumultuous periods of the industry's history demonstrates the inherent credit strengths of their financial structure" (Stettler and others 2002, 5).

Chapter 4

Operating Revenue Structure

4.1 Background

Large commercial airports are increasingly viewed as cash-generating economic engines, less in need of direct and indirect support from local government and congressional appropriation committees (Forsgren, Wilkins, and Greer 1999, 18). In fact, most U.S. airport debt for capital programs sold since the 1950s has been secured solely by revenues generated at the airport facilities. U.S. airports have participated actively in the U.S. tax-exempt market for over 50 years. Historically, this is a market that has demonstrated aversion to risk and has achieved full and timely payment of debt. Indeed, no U.S. airport has defaulted on its debt during the past 50 years (Whiteman and He 2000, 8). The backbone of such a formidable performance is the airports' operating revenue structure.

The operating revenue of large commercial airports is fairly simple and can be divided into two main categories: aeronautical and non-aeronautical revenues. Aeronautical revenues are generated mainly by fees paid by the airlines for the use of runways, terminal space, apron areas, and cargo facilities. Non-aeronautical revenues are generated by activities not directly associated with the actual air transport of passengers, but by supporting activities such as concessions, parking, rental cars, and other activities as diverse as the leasing of properties, gaming, or consulting fees.

Airports receive additional revenues from federal grants and government controlled/monitored programs such as the passenger facilities charge (PFC) program. These revenues are not part of the operating revenue structure. However, they, just as operating revenues, contribute substantially to the viability of the airports' capital programs. Commercial airports in the U.S. that benefit from federal funding programs are required by law to submit at the end of their fiscal year a detailed financial report to the FAA. This information can be used to assess the cost of running an airport facility. Additionally, the data can be used as a benchmarking tool to compare financial performance among airport operators.

4.2 FAA Form 5100-127

In compliance with section 47107 of the Title 49 United States Code and section 111 (b) of the Federal Aviation Administration Authorization Act of 1994 airports that receive federal funding (AIP grants) or have received authorization from the FAA to impose PFCs must file FAA Form 5100-127 at the end of their fiscal year. Congress enacted this reporting requirement to inform the public about how airports collect and disburse their funds and to provide the FAA with a means for evaluating whether airports comply with policy directions on revenue use. Form 5100-127 is a simplified financial statement that displays airport revenues and expenses in a given year.

Form 5100-127 is fairly simple and resembles an income statement. However, the version used by the FAA prior to 2001 poses some problems when used for analysis and comparison purposes. For example, in the old Form 5100-127 under expenses the amount allocated to depreciation was

combined into a single line item with interest, PFCs costs, grant expenses, etc. Depreciation is a very important line item that should be itemized separately since it profoundly affects the overall operating cost structure. The depreciation of airport facilities can represent as much as 30% of operating expenses (Tables 5.4 and 6.4). Another major problem was the listing of bond proceeds as revenues, whereas this is in reality acquisition of debt. These and other similar problems will be corrected in the future since the FAA has updated and improved Form 5100-127 addressing the above mentioned and other relevant issues. Figure 4.2 shows the April 2001 updated version of Form 5100-127. The April 2001 version lists depreciation separately. In addition, it has moved bond proceeds and sale of property to another category that reports the facility's yearly proceeds. Other useful new features are a special category with information about the airport's indebtedness at the end of the fiscal year, as well as a separate listing of restricted financial assets.

Adjustments to Form 5100-127

The financial information for this study was based on Form 5100-127 as reported by the airport operators to the FAA. The data were collected in the original Form 5100-127 format as it stood prior to the 2001 version. This format presented a few difficulties for the evaluation and comparison of airports' financial performance. The objective of this study was to identify the main sources of operating revenues of large commercial airports in the United States and the factors that affect them the most, as well as the creation of a framework that allows a fair comparison between airport facilities. To analyze and compare the financial data a few adjustments were made to the original version of Form 5100-127. The various changes made to this form were not aimed at improving its accuracy or to make it compatible to standard accounting procedures. They were made just to better resemble an income statement (this allows one to single out operating revenues and expenses), to simplify the format and to provide a framework for fair analysis and comparison.

The modifications made to Form 5100-127 resemble the new format put forward by the FAA in April 2001 (Figure 4.2). Figure 4.1 displays the changes made to Form 5100-127. The left column shows the format of Form 5100-127 prior to April 2001. The right column shows the modified format used for this study. The following is a detailed description of the changes made to the original Form 5100-127.

Structural Changes

Originally Form 5100-127 was divided into two main sections: revenues and expenses. The revenues section was further divided into three main subsections: aeronautical operating revenues, non-aeronautical operating revenues and non-operating revenues. The expenses section was divided into operating and non-operating expenses subsections. The modified version separates the operating revenues and expenses from other revenues and expenses. Operating revenues are subdivided into two subsections aeronautical and non-aeronautical revenues. The “Non-Operating Revenues” and “Non-Operating Expenses” sections were combined into a new section named “Non-Operating Revenues (Expenses).” In addition, a new “Government-Sponsored Revenues” section was created (Figure 4.1).

Line Item Changes

Form 5100-127 as it stood prior to April 2001 underwent several modifications that included moving six line items and eliminating another six line items. The original format of Form 5100-127 had 37 line items (see left column of Figure 4.1). The modified version ended up with 31 line items (see right column of Figure 4.1).

New Non-Operating Revenues (Expenses) Section

Revenues and expenses not directly related to the operation of airport facilities were moved and consolidated into a new “Non-Operating Revenue (Expenses)” section.

- Interest income (line item B16) under non-aeronautical revenues was moved to become new line item D1.
- Other non-operating revenue that includes interest income from restricted cash/capital (line item C25) was moved to become new line item D2.
- Other non-operating expenses and fund uses (which combines interest, depreciation, and loss on retirement/disposal of property, plant & equipment) (line item E12) was moved to become new line item D3.

The revenues generated by governmental programs were consolidated under the new “Government-Sponsored Revenues” section.

- Revenue from AIP and other grants (line item C23) was removed from Non-Operating Revenues to become new line item E1.
- Passenger Facility Charges (PFCs) (line item C24) was removed from Non-Operating Revenues to become new line item E2.

Eliminated Line Items

- Bond proceeds (line item C20) are not revenues, instead they represent the acquisition of new debt (this is money that airport operators will eventually have to pay back), therefore this line item was eliminated.
- Property sold--not subject to federal obligations (line item C21), and Property sold--subject to SPA/grant obligations (line item C22) are one-time events that depend on specific circumstances and decisions of the airport operator. The inclusion of sale of properties figures can affect negatively the comparability of fixed and steady operating revenue streams; these figures were therefore eliminated.
- Finally, to help simplify the format three other line items, namely Debt Service (line item E9), Transfer to Reserves (line item E10), and Capital Expenditures (line item E11), were also eliminated.

Figure 4.1 Changes to FAA's Form 5100-127

FAA FORM 5100-127 (as of 2000)	MODIFIED VERSION OF FAA FORM 5100-127
<p>A) Aeronautical Operating Revenue</p> <ul style="list-style-type: none"> 1 Landing fees 2 Terminal 3 Apron charges and tiedowns 4 Fuel flowage fees 5 Utilities 6 FBO revenue: contract or sponsored 7 Cargo and hangar rentals 8 Security reimbursement 9 Miscellaneous 10 Other(s) <p>B) Non-aeronautical Operating Revenue</p> <ul style="list-style-type: none"> 11 Rent 12 Concessions 13 Parking 14 Rental Cars 15 In-flight catering <li style="border: 1px solid black;">16 Interest income Moved to Row D1 17 Royalties 18 Miscellaneous 19 Other(s) <p>C) Non-operating Revenues</p> <ul style="list-style-type: none"> 20 Bond Proceeds Eliminated 21 Property sold (a) Eliminated 22 Property sold (b) Eliminated <li style="border: 1px solid black;">23 AIP and other grants Moved to Row E1 <li style="border: 1px solid black;">24 PFCs Moved to Row E2 <li style="border: 1px solid black;">25 Other(s)--Interest income from restricted Moved to Row D2 <p>D) Operating Expenses</p> <ul style="list-style-type: none"> 1 Personnel Compensation and Benefits 2 Communications and Utilities 3 Supplies, Materials Repairs, Maintenance 4 Services (c) 5 Insurance and Claims 6 Government in lieu (e) 7 Miscellaneous 8 Other(s) <p>E) Non-operating Expenses</p> <ul style="list-style-type: none"> 9 Debt Service Payments (f) Eliminated 10 Transfers to Reserves Eliminated 11 Capital Expenditures Eliminated <li style="border: 1px solid black;">12 Other non-operating expenses and fund Moved to Row D3 	<p>A) Aeronautical Operating Revenue</p> <ul style="list-style-type: none"> 1 Landing fees 2 Terminal 3 Apron charges and tiedowns 4 Fuel flowage fees 5 Utilities 6 FBO revenue: contract or sponsored operated 7 Cargo and hangar rentals 8 Security reimbursement 9 Miscellaneous 10 Other(s) <p>B) Non-aeronautical Operating Revenue</p> <ul style="list-style-type: none"> 11 Rent 12 Concessions 13 Parking 14 Rental Cars 15 In-flight catering 16 Royalties 17 Miscellaneous 18 Other(s) <hr/> <p>C) Operating Expenses</p> <ul style="list-style-type: none"> 1 Personnel Compensation and Benefits 2 Communications and Utilities 3 Supplies, Materials Repairs, Maintenance 4 Services (c) 5 Insurance and Claims 6 Government in lieu, permit, impact fees, etc 7 Miscellaneous 8 Other(s) <hr/> <p>D) Non-Operating Revenues (Expenses)</p> <ul style="list-style-type: none"> 1 Interest income 2 Other(s)--Interest income from restricted cash/capital funds 3 Other non-operating expenses and fund uses (d) <p>E) Government Sponsored Revenues</p> <ul style="list-style-type: none"> 1 AIP and other grants 2 PFCs

- (a) Not subject to federal obligations
- (b) Subject to SPA/grant obligations
- (c) Includes fees for other governmental services not included in other categories
- (d) Includes interest, depreciation, and loss on retirement/disposal of property, plant & equipment
- (e) Includes permits, impact fees, etc.
- (f) Net of Capitalized Interest

Source: FAA's Form 5100-127

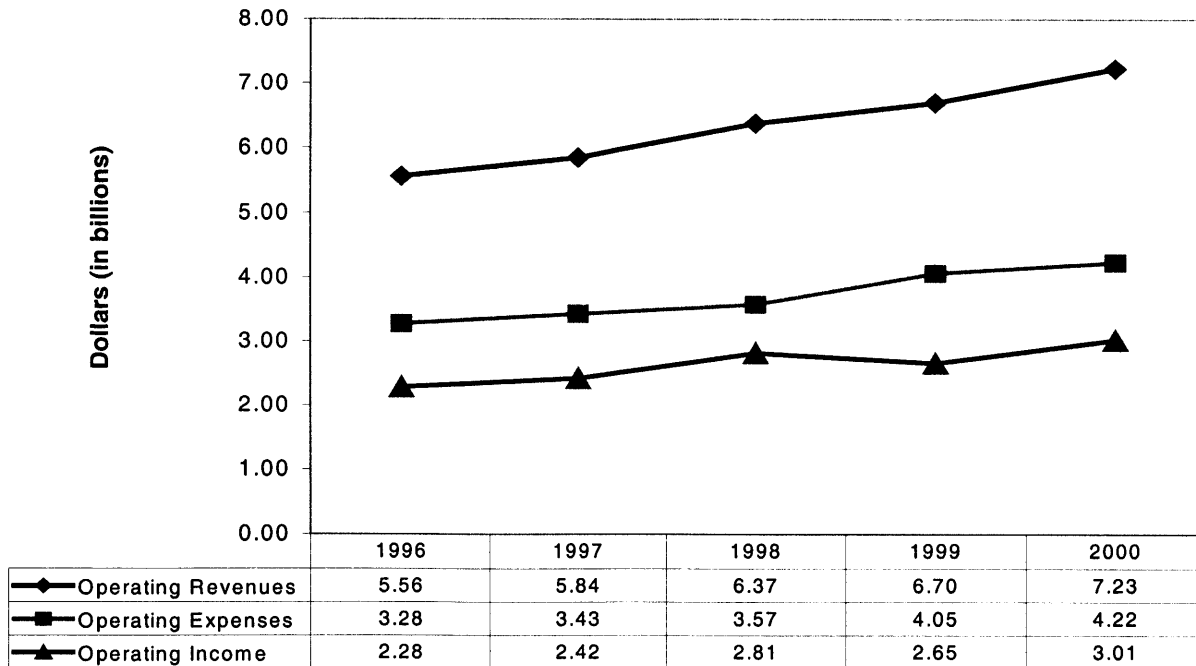
Figure 4.2 FAA Form 5100-127 (April 2001 version)

Operating and Financial Summary		
Summary of Revenues and Expenses		
A. Aeronautical Operating Revenue		
1. Landing fees		
2. Terminal/international arrival area rental or other charge		
3. Apron charges/tiedowns		
4. FBO revenue: contract or sponsor-operated		
5. Cargo and hangar rentals		
6. Aviation fuel tax retained for airport use		
7. Fuel sales net profit/loss or fuel flowage fees		
8. Miscellaneous (not to exceed 5% of Aeronautical)		
9. Other (enter total here and add attachment)		
Total	\$	
B. Nonaeronautical Operating Revenue		
1. Land and non-terminal facilities		
2. Terminal - food and beverage		
3. Terminal - retail stores		
4. Terminal - other		
5. Rental cars		
6. Parking		
7. Misc. (Should not exceed 5% of total non-aeronautical)		
8. Other (Enter total here and add attachment)		
Total	\$	
C. Nonoperating Revenues		
1. Interest income - restricted and non-restricted		
2. Grant receipts		
3. Passenger Facility Charges		
4. Other		
Total	\$	
D. Operating Expenses		
1. Personnel compensation and benefits		
2. Communications and utilities		
3. Supplies and materials.		
4. Repairs and maintenance		
5. Contractual services		
6. Insurance, claims and settlements		
7. Misc (should not exceed 5% of total op expenses)		
8. Other		
Total	\$	
E. Non-Operating Expenses		
1. Interest expense		
2. Other		
Total	\$	
F. Depreciation		
Net (Total A+B+C Less D, E and F)	\$	
Other Financial Information		
G. Reporting Year Proceeds		
1. Bond proceeds		
2. Proceeds from sale of property		
3. Grants and other contributed capital		
4. Other		
Total	\$	
H. Reporting Year Expenditures for Projects		
1. Airfield		
2. Terminal		
3. Parking		
4. Roadways, rail and transit		
5. Other		
Total	\$	
I. Reporting Year Debt Payments Incl. Interest		
J. Indebtedness at End of Year		
1. Bonds		
2. Loans		
3. Other		
Total	\$	
K. Net Assets		
L. Restricted Financial Assets		
1. Restricted debt service reserve		
2. Restrictions for renewals and replacements		
3. Other restricted financial assets		
Total		
M. Unrestricted Financial Assets including cash		

4.3 Operating Revenues and Expenses

The financial data from Form 5100-127 provided by the FAA were used to look into the airports' operating revenue and cost structure. Figure 4.3 displays the consolidated operating financial information for large commercial airports in the United States. Between 1996 and 2000 operating revenues increased from \$5.56 billion to \$7.23 billion. Operating expenses did not increase at the same pace. As a result, operating income (differential between operating revenues and expenses) increased from \$2.28 billion in 1996 to \$3.10 billion in 2000. The consolidated operating margin of all large hubs in the U.S. was 41% in 1996 and 1997, 44% in 1998, and 40% in 1999 and 2000. These operating margins provide the means to pay for the airports' expensive capital programs.

Figure 4.3 Consolidated Operating Revenues and Expenses for U.S. Large Hubs,* Fiscal Years 1996-2000



* According to the FAA classification system large hubs are airport facilities that serve at least 1% of revenue enplanements in the U.S. in a given year. After 1999 the FAA incorporated Fort Lauderdale Airport (FLL) to the list of large hubs.

Source: FAA's Form 5100-127

4.3.1 Operating Revenues

The FAA financial data have been used to create Table 4.1, which consolidated operating revenues for all large commercial airports in the United States for the period 1996-2000. Table 4.1 divides operating revenues into two categories: aeronautical revenues, and non-aeronautical revenues. In 2000 the operating revenue of large hubs was \$7.22 billion. The same year aeronautical revenues accounted for 54% of operating revenues, while non-aeronautical operating revenues contributed 46%. A few large line items stood out under each category. For example, under aeronautical revenues landing fees and terminal building revenues accounted for 44% of operating revenues. Also, four non-aeronautical line items including concessions, parking, rental cars, and rent contributed 42% of operating revenues. In summary, six line items generated approximately 86% of operating revenues.

Aeronautical Operating Revenues

Table 4.1 shows that the aeronautical operating revenues have increased steadily from \$3.1 billion in 1996 to \$3.8 billion in 2000. As a proportion of the overall operating revenue structure these revenues have declined slightly over the 5-year span from 56% in 1996 to 54% in 2000.

Terminal Revenues

Terminal rental revenues are generated from the use of terminal facilities and ground space used for moving passengers and their baggage. It includes charges for the use of office space, check-in and ticket counters, hold rooms, passenger baggage claim and staging areas, and the use of other operational and maintenance facilities directly related to the air transport of passengers. Table 4.1 shows that, at 24%, the revenues from the fees paid by the airlines for the use of the terminal space was in 2000 the most important operating revenue source of large commercial airports in the U.S.

Table 4.1 Consolidated Operating Revenues for 31 Large Hub Airports, Fiscal Years 1996-2000
(in Current Dollars)

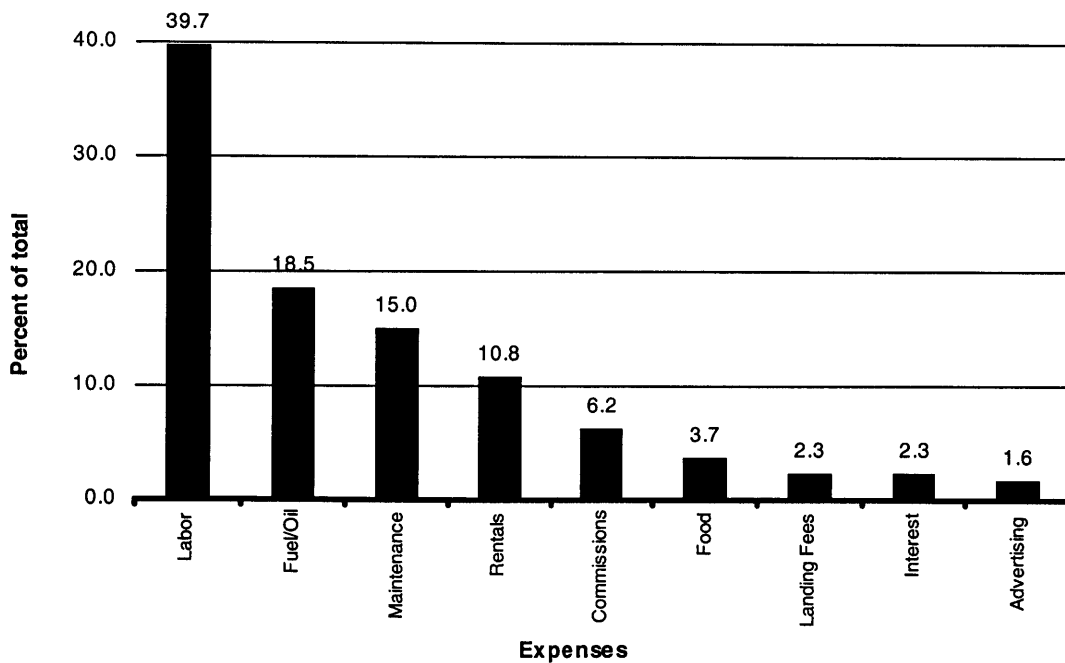
	1996	%	1997	%	1998	%	1999	%	2000	%
Aeronautical Operating Revenue										
Terminal	1,362,804,101	25	1,370,378,831	23	1,437,709,193	23	1,506,983,069	23	1,756,864,782	24
Landing fees	1,252,133,599	23	1,246,875,894	21	1,279,028,572	20	1,374,639,822	21	1,474,620,729	20
Cargo/hangar rentals	210,392,138	4	200,643,048	3	198,190,270	3	217,638,145	3	223,385,174	3
Utilities	119,710,625	2	129,926,184	2	143,867,236	2	134,704,467	2	160,856,832	2
Others	178,088,872	3	192,775,549	3	320,251,544	5	309,949,814	5	256,860,374	4
Subtotal	3,123,129,335	56	3,140,599,506	54	3,379,046,815	53	3,543,915,317	53	3,872,587,891	54
Non-aeronautical Operating Revenue										
Parking	810,818,319	15	883,270,064	15	1,000,554,666	16	1,108,377,315	17	1,209,236,545	17
Concessions	739,216,300	13	779,968,741	13	796,209,531	12	837,100,670	13	913,722,543	13
Rental Cars	396,433,543	7	438,636,809	8	490,135,352	8	528,260,268	8	586,982,222	8
Rent	234,577,324	4	267,886,334	5	330,322,321	5	290,752,842	4	271,831,199	4
Others	255,168,076	5	331,026,901	6	377,016,756	6	387,489,575	6	373,891,972	5
Subtotal	2,436,213,562	44	2,700,788,849	46	2,994,238,626	47	3,151,980,670	47	3,355,664,481	46
Total Operating Expenses	5,559,342,897	100	5,841,388,355	100	6,373,285,441	100	6,695,895,987	100	7,228,252,372	100

Source: FAA's Form 5100-127

Landing Fees

Landing fees are paid by the air carriers for the use of runways, taxiways, landing strips, runway protection zones and clearways. Form 5100-127 does not account for charges for aircraft parking under this category. Landing fees are a vital component of the operational revenue structure of large commercial airports. In 2000 landing fees accounted for 20% of all operating revenues (Table 4.1). By contrast, the fees that the airlines pay for utilizing airport facilities are a relatively minor portion of the airlines' cost of operations, typically 3 to 6% (Fitch IBCA 2000, 1). As Figure 4.4 shows, in 2000 landing fees constituted only 2.3% of the cost of operations for U.S. major carriers.²⁰ By contrasting the importance of landing fees to airport revenues with their cost to the airlines it is easier to understand where these two parties start off when negotiating airport use and lease agreements.

Figure 4.4 U.S. Major Carriers Expense Indicators,* Fiscal Year 2000



*Fuel/Oil expenses include taxes

*Maintenance labor included under maintenance

Source: Eclat Consulting

Cargo and Hangar Rentals

This line item includes revenues received from cargo operations and for the “hangaring” of aircraft. Between 1996 and 2000 this line item accounted for about 3-4% of operating revenues. Some airports known for their passenger traffic volumes have also developed quite profitable cargo operations. For example, JFK generated over \$100 million from cargo operations in 2000. Other airports with considerable revenues from cargo operations are EWR with \$23 million, SFO with \$20 million, and BOS with \$13 million.

Other Revenues

Other revenues on the aeronautical side account for about 6-7% of the total. They include income from utilities, fuel flowage fees, apron charges, Fixed-Base Operators (FBOs),²¹ security reimbursements, etc. Under fuel flowage fees airports record all revenues (or losses if applicable) derived from the business of selling aviation fuel. This should include all fees charged to aircraft owners, operators and fuel providers (e.g., fuel flowage fees charged to FOBs for fueling aircraft on airport property). Other revenues are derived from the parking of aircraft on airport property and the fees paid by FBOs for the use of land and airport facilities. In addition, there is a variety of smaller sources of operating revenues that include revenues derived from security charges, tax retained for airport use, and revenues from tax collections from the sale of aviation fuel.

²⁰ Under the FAA classification system airlines with annual revenues over \$1 billion are considered major carriers.

²¹ “Fixed-Base Operators (FBOs) are privately owned businesses that provide flight and aircraft support services to aeronautical users of the airports, such as the sale of aircraft fuel, aircraft maintenance, and hangar facilities. FBOs may need to lease airport facilities and land or enter into operating agreements with the airports sponsor in order to provide such services.” (US Department of Transportation 2001, A1-1)

Non-Aeronautical Operating Revenues

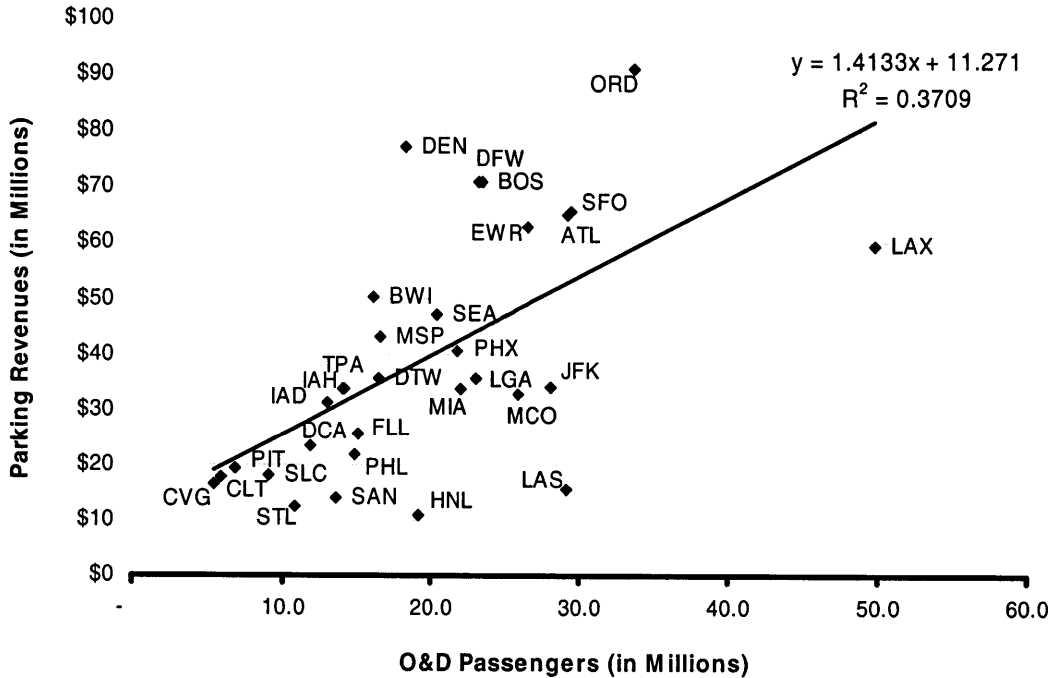
As indicated previously, non-aeronautical operating activities are not essential to air transportation. However, they play a key supporting role, adding convenience to the traveler, and are becoming an increasingly vital component to the overall revenue structure of large commercial airports. The main non-aeronautical operating revenues are generated from concessions, parking and rental car companies. Table 4.1 lists the consolidated non-aeronautical operating revenues for the large commercial airports in the US during the period 1996-2000. The table shows that non-aeronautical operating revenues have increased steadily from \$2.4 billion in 1996 to \$3.3 billion in 2000. As a percent of the overall operating revenue structure, non-aeronautical operating had a minor increase from 44% in 1996 to 46% in 2000.

Parking and Car Rentals

Given the great dependence on the use of the automobile in the United States it is not surprising that, at 17% in 2000, parking revenues represent the most important non-aeronautical source of operating revenue, and the third major contributor to the overall operating revenue structure. Parking facilities are very profitable since the cost of operating them is very low compared to the revenue they generate. Airports with large O&D traffic volumes show higher reliance on revenues related to automobile usage. Indeed, Table 4.1 shows that in 2000 large commercial airports in the U.S. derived about 25% of their operating revenues from automobile-related businesses (i.e., parking 17% and car rentals 8%).

Figure 4.5 shows a fairly good correlation between the revenues from parking and O&D traffic volumes. The graph shows that as O&D traffic increases, the revenue from parking increases as well. In 2000 ORD was the leading parking revenue collector with over \$90 million. Other airports with large O&D traffic such as DEN, DFW, SFO, EWR, ATL and BOS, had parking revenues ranging between \$60 and \$80 million.

Figure 4.5 Correlation Between O&D Traffic and Parking Revenues at Large Hub Airports, Fiscal Year 2000



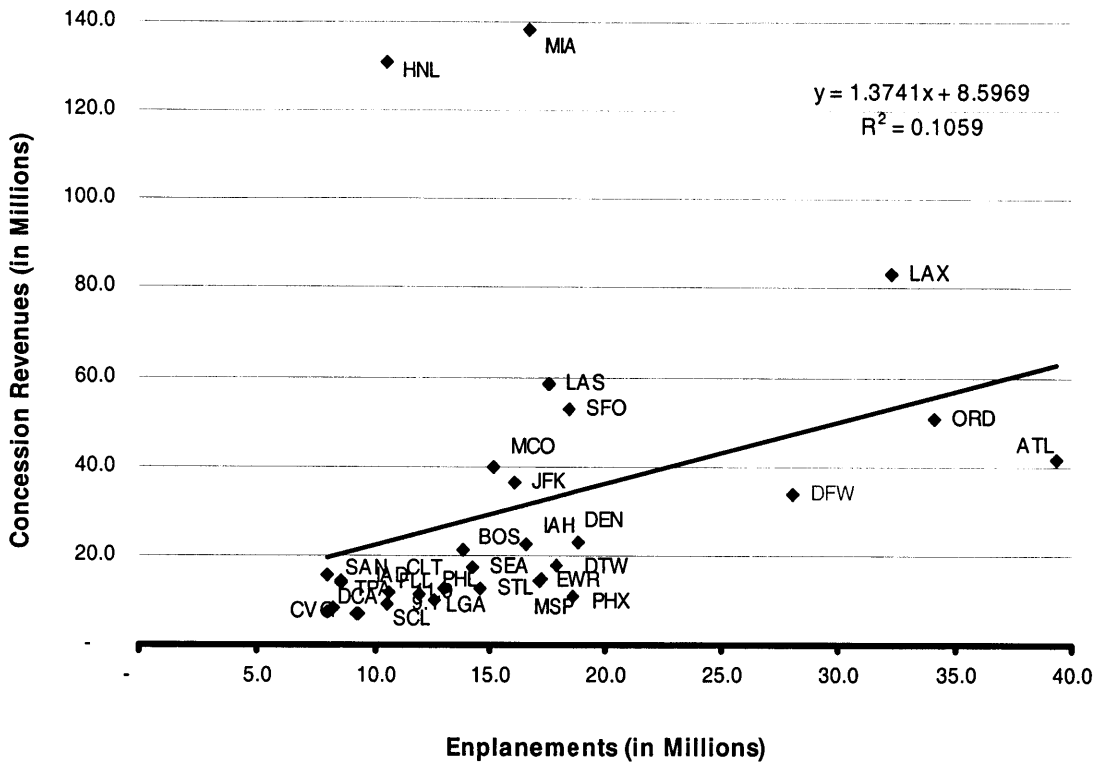
Concessions

Airports are increasingly taking advantage of business opportunities in passenger buildings by offering specially designed space for concessions. The concessions category includes a) revenues from food and beverages, and b) revenues from retail activities (news stands, bookstores, gift shops, clothing stores, banks, currency exchanges, postal facilities, hotel reservation desks, business centers, barbershops, shoeshine stands, computer games, gambling machines, pay telephones, advertising space, specialty stores, duty-free and tax-free shops, and other retail operations).

Between 1996 and 2000 concession revenues for all large commercial airports have increased by 23% from \$739 million to \$913 million (Table 4.1). Concessions generated about 13% of operating revenues in 2000. Revenues from concessions are also tied to traffic volumes. As new terminal facilities are built, newer airport designs focus on the latest retail techniques aimed at

improving the revenues from concessions. Figure 4.6 shows that as traffic volume increases, concession revenues increase as well. HNL and MIA stand out with concession revenues much higher than other airports with larger traffic volumes. Figure 4.7 compares average concession revenues per enplaned passenger. Again HNL and MIA stand out.

Figure 4.6 Correlation Between Concession Revenues and Traffic Volumes, Fiscal Year 2000



Note: DFW concession revenue is an approximation

Source: FAA

Other non-aeronautical operating revenues

A variety of other non-aeronautical activities produce between 7% and 8% of total revenues. Activities at airport sites and surrounding areas can vary greatly depending on the economic character of the area where the facilities are located. The FAA notes that airport owners and

operators sometimes set up other revenue-producing activities that include manufacturing, warehousing, and farming. In addition, there are charges to companies that operate on the airport premises such as catering firms that provide services for the airlines. As well, there are other revenue-generating activities such as leases, or contracts with hotels, car valet services, etc.

4.3.2 Operating Expenses

Table 4.2 lists the consolidated operating expenses for large commercial airports in the U.S. during the period 1996-2000. The table shows that operating expenses grew steadily from \$3.2 billion in 1996 to \$4.2 billion in 2000. Labor costs stand out as the most significant operating expense. In 2000 this line item accounted for 37% of operating expenses. Another 22% was destined to outsourcing of services, while supplies, repairs and maintenance accounted for approximately 18%. Communications and utilities expenditures were approximately 10%. The combination of all the remaining expenses accounted for about 14%.

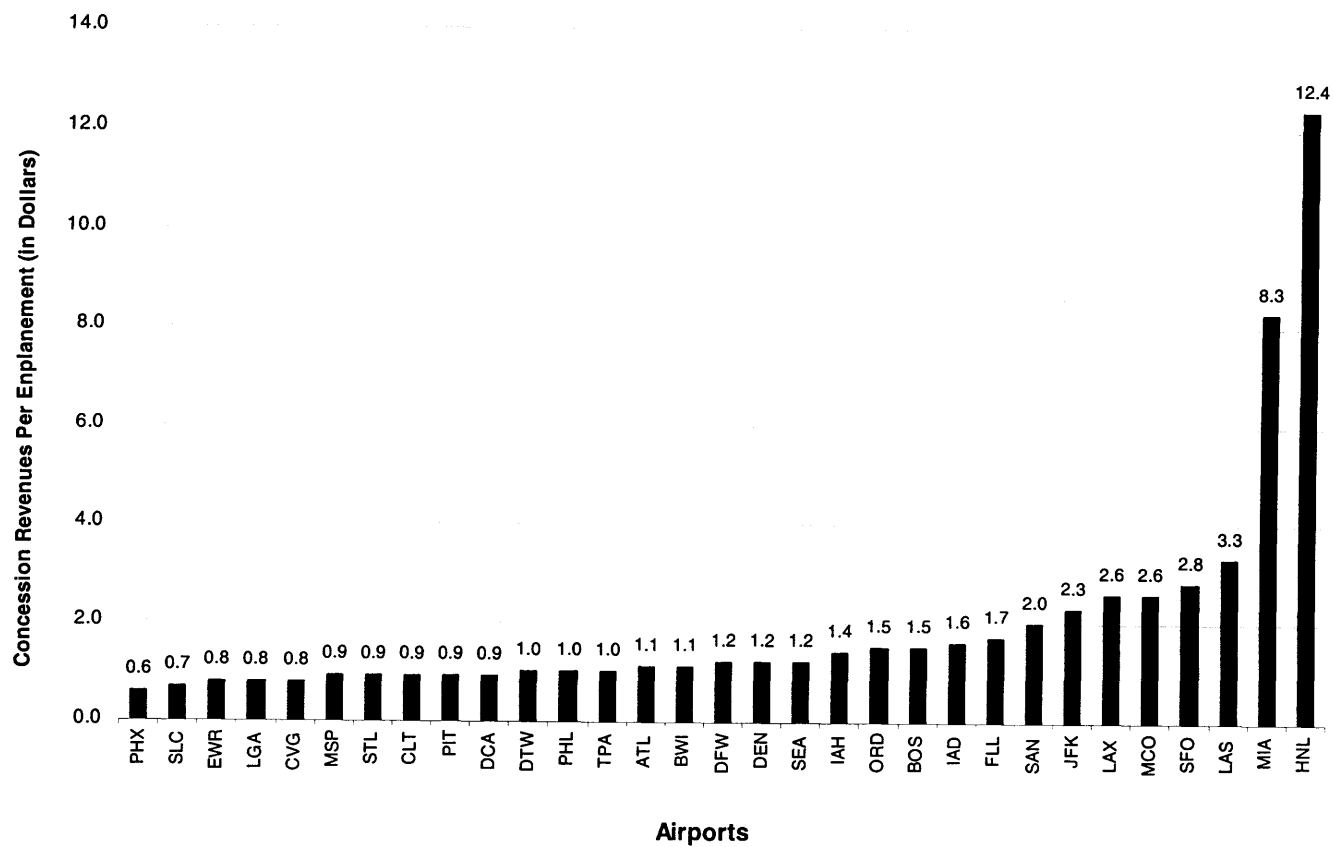
Personnel Compensation and Benefits

Salaries and other compensation and benefits accounted for 37% of operating expenses in 2000. However, it is important to point out that operators of large commercial airports in the United States often employ between 10 to 20% of the total number of workers on the airport. Typically, private companies handle most of the everyday activities needed to keep American airports running (de Neufville 1999, 9). For example, the Port of Seattle employs about 800 people to run the local airport (SEA). But the total number of employees working at the airport including airlines, food & beverage services, rental car operations, etc., is estimated to be close to 22,000²² (Parker 2002). A similar case is that of the Minneapolis Airports Commission (MSP): the airport operator has about 500 employees on its payroll, but 30,000 people are estimated to work at the facility as whole.²³

²² This number is based on the number of security badges issued by the Port of Seattle.

²³ Information provided in a telephone interview by Patrick Hogan, MSP Public Affairs official (April 16, 2002).

Figure 4.7 Concessions Revenues Per Enplanement, Fiscal Year 2000

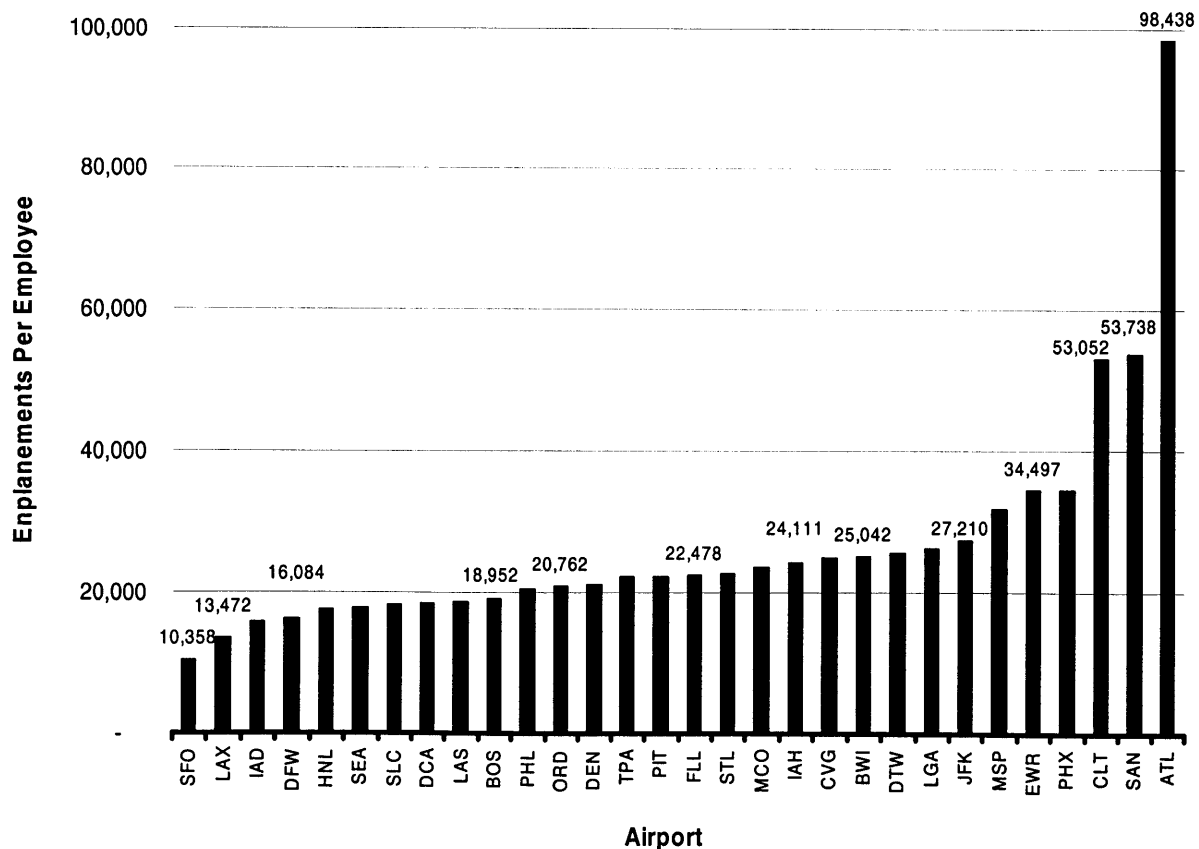


Source: FAA

Table 4.3 lists employment figures for large commercial airport operators in the United States. The employment figures at those facilities range from 148 employees at SAN to 2,400 at LAX. Figure 4.8 shows the number of enplanements per airport operator employee. Most airports show 15,000 to 25,000 enplanements per employee. With over 98,000 enplanements per employee ATL stands out as a facility with a ratio 5 times higher than the average US airport!

Facilities that show large numbers of enplanements per employee, such as ATL, SAN, CLT, PHX, EWR and MSP are airports with high concentration ratios and are hubs of major airlines. The low number of airport employees per enplanement may be explainable by the possibility that the dominant airline provides or outsources most services to handle traffic operations.

Figure 4.8 Enplanements Per Employee at Large Hub Airports, Fiscal Year 2000



Sources: ACI-NA, FAA & author

Table 4.2 Consolidated Operating Expenses for 31 Large Hubs, Fiscal Years 1996-2000
(in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Operating Expenses										
Personnel Compensation and Benefits	1,200,316,710	37	1,233,517,356	36	1,337,706,170	37	1,458,492,466	36	1,549,396,497	37
Services (a)	554,863,363	17	606,628,456	18	594,418,298	17	780,819,597	19	908,127,673	22
Supplies, Materials Repairs, Maintenance	522,212,710	16	516,048,370	15	623,388,966	17	746,350,367	18	744,834,202	18
Communications and Utilities	342,107,521	10	348,985,244	10	352,192,537	10	357,105,962	9	419,072,558	10
Others	655,600,315	20	720,648,738	21	659,533,956	18	706,750,710	17	598,106,618	14
Total Operating Expenses	3,275,100,619	100	3,425,828,164	100	3,567,239,927	100	4,049,519,102	100	4,219,537,548	100

(a) This line item is for outsourcing services such as legal advise, engineering, maintenance and janitorial services, etc.

Source: FAA's Form 5100-127

Services

The FAA states that under this category the airport management should record the outsourcing of services from commercial enterprises and governmental agencies. Such costs include, but are not limited, to consulting, legal, accounting, auditing, security, fire-fighting, advertising, engineering, training, lobbying, maintenance, and janitorial services, architectural fees, and financial services. The cost of outsourcing services has increased by 64% from \$554 million in 1996 to \$908 million in 2000.

Supply, materials, repairs and maintenance

The costs of supplies, materials, repairs and maintenance have increased from \$522 million in 1996 to \$744 million in 2000. This represents an increase of 42% in five years. However in the overall operating cost structure this line item has only grown from 16% in 1996 to 18% in 2000

Communications and utilities

Expenditures on communications and utilities have increased from \$342 million in 1996 to \$419 million in 2000 remaining at 10% in the overall operating expenses framework. This is a line item that includes, but is not limited to, the cost of telephone usage, electricity and water services.

Others

The combination of the remaining operating expenses accounted for approximately 14% of all expenses in 2000. These include insurance, claims and settlements, and special contractual agreements with governmental agencies.

Table 4.3 Employment at Large Hub Airports, Fiscal Year 2000

Ranking	Airport	Employees	Enplanements	Enplanements per employee	Labor expenses	Labor expenditure per employee
1	ATL	400	39,375,330	98,438	33,950,000	84,875
2	ORD	1,645	34,153,190	20,762	156,247,993	94,984
3	LAX	2,400	32,332,452	13,472	106,131,571	44,221
4	DFW	1,745	28,066,194	16,084	89,556,704	51,322
5	SFO	1,786	18,498,749	10,358	111,910,110	62,660
6	DEN	900	18,883,765	20,982	72,378,486	80,421
7	PHX	540	18,652,345	34,541	34,552,399	63,986
8	LAS	941	17,530,409	18,630	48,709,000	51,763
9	DTW	700	17,873,801	25,534	49,214,547	70,306
10	EWR	497	17,144,940	34,497	63,439,000	127,644
11	MSP	543	17,203,373	31,682	39,814,000	73,322
12	MIA	1,626	16,716,291	10,281	143,627,000	88,331
13	IAH	687	16,564,385	24,111	30,789,000	44,817
14	JFK	591	16,080,974	27,210	77,955,000	131,904
15	STL	644	14,552,733	22,597	30,590,979	47,502
16	MCO	645	15,136,268	23,467	31,963,000	49,555
17	SEA	800	14,225,451	17,782	57,940,651	72,426
18	BOS	729	13,816,195	18,952	60,581,834	83,103
19	LGA	480	12,567,451	26,182	44,376,000	92,450
20	PHL	641	13,022,732	20,316	31,584,183	49,273
21	CLT	225	11,936,722	53,052	9,471,008	42,093
22	CVG	370	9,185,962	24,827	19,503,111	52,711
23	HNL	600	10,511,446	17,519	25,622,180	42,704
24	PIT	475	10,520,627	22,149	19,039,642	40,083
25	BWI	424	10,617,714	25,042	20,569,358	48,513
26	IAD	545	8,501,994	15,600	45,516,045	83,516
27	SLC	512	9,297,702	18,160	23,783,305	46,452
28	TPA	371	8,200,264	22,103	18,667,687	50,317
29	SAN	148	7,953,273	53,738	3,272,211	22,110
30	FLL	380	8,541,532	22,478	15,186,000	39,963
31	DCA	436	7,959,838	18,257	33,454,493	76,730
Totals		23,426	495,624,102	21,157	1,549,396,497	66,140

Sources: ACI-NA, FAA & author

4.4 Government-Sponsored Revenues

Since the mid 1940s the federal government has played a vital role in the process of planning and developing airport facilities. The role has not been one of direct involvement with local processes, but of providing financial support through grant programs, especially the Airport Improvement Program (AIP). The funding has supported and continues to support programs that follow the general guidelines that allow the US airport system to expand while meeting high standards of safety and security while promoting competition at airport facilities (DOT/FAA 1999, 47). In the administration of the AIP, the FAA gives highest priority to projects that enhance the safety and security of the airport system (FAA 1999, 2). The Office of the Associate Administrator for Airports of the FAA administers both the AIP and PFC programs.

As explained in Chapter 3, most large commercial airports are operated by independent divisions within city government or by stand-alone public entities (e.g., airport authorities or port authorities). Both types of ownership are subject to federal regulations (with the exception of a few grandfathered entities) that restrict airports from diverting revenues to non-airport funds or activities (Champeau, Soltz, and Fry 2000, 6).

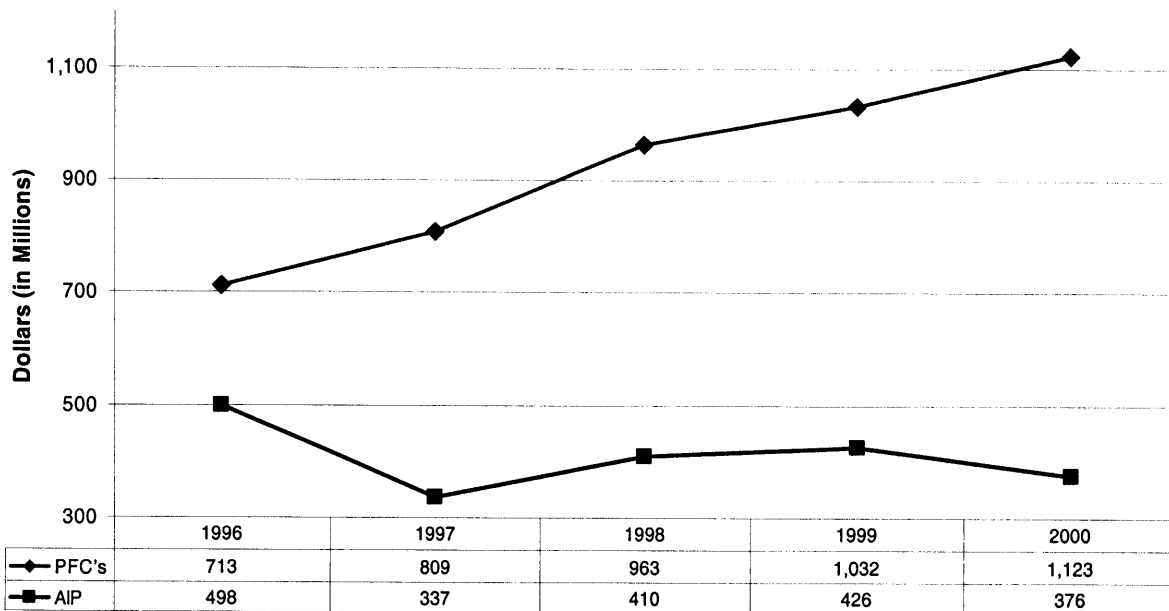
The fact that most large commercial airports receive AIP funding and/or have a PFC program in place makes them subject to federal monitoring and regulation. Table 4.4 shows the government-sponsored revenues received by large commercial airports in fiscal year 2000 as reported by the airport operators in Form 5100-127. These revenues are likely to increase in the next few years as airports continue to embrace more PFC-backed capital programs. Figure 4.9 depicts the consolidated revenues of government-sponsored programs for large commercial airports in the U.S. for the five-year period ended in 2000. These airports have had an increase in government-sponsored revenues from \$1.2 billion in 1996 to \$1.4 billion in 2000.

Airport Improvement Program (AIP)

As explained in Chapter 3, in recent years the AIP program has evolved, focusing primarily on funding medium and smaller airports. In 1996 federal grants for large commercial airports provided about \$498 million. By 2000 the number had been reduced to \$376 million. This

corroborates the fact that large commercial airports are reducing their dependence on AIP funding.

Figure 4.9 Consolidated Government-Sponsored Revenues for Large Hub Airports, Fiscal Years 1996-2000



Source: FAA's Form 5100-127

Passenger Facilities Charges (PFCs)

Since PFCs and federal grant assistance are complementary, the AIP is likely to continue to decline in importance for large commercial airports, as these airports increase their reliance on PFC revenues. This is a choice that appeals to airports with large traffic volumes. As seen in Chapter 3, the FAA set a cap to the apportionment formula for AIP money at \$22 million per airport. By using PFC funding airports with large traffic volumes give up a portion of their AIP funding, but obtain a much larger PFC revenue in return. Figure 4.9 clearly shows that while AIP funding has remained under \$500 million between 1996 and 2000, PFC funding has increased from \$713 in 1996 to \$1.1 billion in 2000. The gap between these two funding sources is expected to widen at a higher rate after 2000 as airports authorized to charge PFCs above \$3

will give up 75% (instead of the original 50%) of their AIP funding. However, this might be an area of concern for air carriers, since the PFC money is charged directly to the air fare. PFCs of \$1, \$2, or \$3 do not seem to add substantially to the overall cost of a ticket. However, as the PFCs are increased to \$4 and \$4.50, they become a larger percentage of the total cost of the ticket and could become a potential problem for low-fare carriers.

Table 4.4 Government-Sponsored Funding of Large Commercial Airports, Fiscal Year 2000

Ranking	Airport		AIP and other grants	PFC
1	Atlanta	ATL	13,794,834	105,108,240
2	Chicago O'Hare	ORD	15,062,579	90,394,695
3	Los Angeles	LAX	9,121,875	76,054,287
4	Dallas-Ft. Worth	DFW	19,696,484	73,300,686
5	San Francisco	SFO	10,072,353	0
6	Denver	DEN	4,218,143	51,482,169
7	Phoenix	PHX	43,826,777	47,514,946
8	Las Vegas	LAS	10,004,000	45,159,000
9	Detroit	DTW	1,206,925	45,996,580
10	Newark	EWR	2,218,000	45,117,000
11	Minneapolis/St. Paul	MSP	35,177,000	43,567,000
12	Miami	MIA	16,439,000	43,090,000
13	Houston	IAH	0	0
14	New York	JFK	8,758,000	39,960,000
15	St Louis	STL	22,894,846	43,819,193
16	Orlando	MCO	17,550,000	44,200,000
17	Seattle	SEA	14,043,015	37,438,916
18	Boston	BOS	8,883,000	41,296,309
19	La Guardia	LGA	20,524,000	35,326,000
20	Philadelphia	PHL	2,831,167	33,602,771
21	Charlotte	CLT	0	0
22	Cincinnati	CVG	10,608,852	18,117,705
23	Honolulu	HNL	2,747,866	0
24	Pittsburgh	PIT	12,805,514	0
25	Baltimore/Washington	BWI	12,027,089	25,611,879
26	Washington Dulles	IAD	6,395,406	26,562,989
27	Salt Lake City	SLC	11,768,875	25,661,204
28	Tampa/St. Petersburg	TPA	4,864,003	20,966,416
29	San Diego	SAN	8,243,341	21,061,420
30	Fort Lauderdale	FLL	22,309,000	20,399,000
31	Washington D.C. (National)	DCA	7,956,049	21,798,105
Totals			376,047,993	1,122,606,510

Source: FAA's Form 5100-127

4.5 Cost Recovery Methodology Comparison

4.5.1 Background

As seen in Chapter 2, the cost recovery methodologies used by airport operators have a major impact on their revenue flows and consequently on the funding of capital programs. To determine whether specific patterns exist within the revenue framework of airports with different cost recovery methodologies a comparative analysis was performed. Keeping in mind that cost recovery methodologies may vary widely from case to case, this section will focus on certain general principles that apply to most cases.

A departure from a residual arrangement can be seen as a bold and aggressive business decision. Airport operators that consider themselves in a stronger bargaining position with regards to the airlines might feel motivated to move away from a residual rate-setting methodology into a hybrid or compensatory arrangement. Airports switching from residual into compensatory agreements are willing to take the risk associated with the operation of their facilities since they can no longer rely on the airlines to cover for losses from non-aeronautical cost centers. The motivation to increase their risk is to maximize profits and maintain control of the decision-making process in the implementation of capital programs. The nature of the compensatory arrangements enables airport operators to charge the airlines for the full cost of using the airports' aeronautical installations while keeping surplus money from non-aeronautical cost centers. The magnitude of the aeronautical charges increase can be very dramatic. For example, in 1993 when LAX decided to switch from a residual to a compensatory methodology landing fees were increased by 300%! (Section 2.4.4)

Residual arrangements are perceived as a more conservative approach to airport management. However, this does not mean that operators with a residual arrangement are not motivated to maximize profits. The difference is that the motivation might not be as strong as for airport operators with compensatory arrangements, since the advantage of increased revenues benefits mainly the signatory airlines. The motivation for airports with residual arrangements can be the ability to lower the cost of aeronautical fees to maintain competitive prices and to keep the

signatory airlines satisfied. Hybrid arrangements use components of both cost recovery methodologies. Therefore it is expected that they should perform somewhere between residual and compensatory arrangements.

In addition to increasing the revenue potential, airports can resort to minimizing expenses. Labor cost represents the most significant operating expense for large commercial airports in the United States (Table 4.2). Operators looking for ways to minimize costs may consider outsourcing as an alternative to reduce labor costs. Advocates of outsourcing see it as an opportunity to reduce administrative burdens, stabilize financial swings, and improve service by placing key tasks in the hands of professionals that will provide services only when needed. Considering the willingness of some airport operators to increase their risk level by using compensatory arrangements, one can expect that these same operators are also the most likely to use outsourcing as an alternative to high labor costs.

The previous general concepts regarding the alternative cost recovery methodologies established the parameters for the formulation of three hypothesis. The common denominator for all of them is the principle that airport operators opting for a compensatory rate-setting methodology are more motivated to maximize revenues and minimize expenses, which should result in larger operating margins.

Hypothesis 1

The percentage of total operating revenue generated from aeronautical sources should be highest for compensatory airports, second highest for hybrids and lowest for residual arrangements. The converse applies to non-aeronautical revenues.

Hypothesis 2

Services expenses should be highest for compensatory, second highest for hybrid and lowest for residual. Conversely, labor costs should be the highest for residual, second highest for hybrid and lowest for compensatory.

Hypothesis 3

Operating margin should be highest for compensatory airports, second highest for hybrid and lowest for residual arrangements.

4.5.2 Findings

For the analysis, all large commercial airports were separated into three groups by type of cost recovery methodology (i.e., residual, compensatory or hybrid) --for a listing of airports in each category see Table 2.4. The evaluation for each group was based on the modified version of Form 5100-127 (right column of Figure 4.1). It is important to point out that between 1996 and 1998 there were 30 airports in the FAA list of large hubs. After 1999 the list increased to 31 as the FAA added FLL to the list of large hubs. Table 4.5 has the consolidated operating revenues for 11 airports listed as having residual arrangements. Table 4.6 presents the consolidated operating revenues for the 7 airports with compensatory rate-setting methodology, while Table 4.7 shows operating revenues of the 13 airports with hybrid arrangements. It is important to emphasize that of primary interest in these tables is the percentage value of each line item, not the absolute dollar figures.

The following issues are important to keep in mind when interpreting the results:

- This analysis represents only a “short-term picture” of operating revenues and expenses over a 5-year span. A long-term analysis would be needed to see how certain patterns hold over longer periods of time.
- This type of analysis is not valid for evaluation of incidents that have a major impact at specific points in time such as the drastic downturn in airport revenues after Sept. 11, 2001. The reason is that not all airports end their fiscal year at the same time. For example, financial reports of airports that ended their fiscal year at the end of September or December of 2001 will partially reflect the impact of Sept. 11, unlike those facilities that closed their books at the end of June, 2001.

- Airports were classified according to cost recovery methodology on the basis of data obtained from the 2001 General Information Survey conducted by Airports Council International. There is no information regarding the length of time for which these airports have been using their current cost recovery methodology. Facilities that just “switched” to a new cost recovery methodology might be adjusting to recent changes and might not have fully developed their revenue strategy.

Table 4.5 Consolidated Operating Revenues for Large Hub Airports with Residual Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Aeronautical Operating Revenue										
Terminal	480,304,171	23	472,939,685	21	528,306,965	23	494,173,684	21	616,267,539	23
Landing fees	401,545,599	19	402,652,472	18	419,688,544	18	451,634,862	19	499,773,001	19
Cargo/hangar rentals	38,660,356	2	42,526,836	2	41,189,574	2	48,802,884	2	50,361,218	2
Utilities	35,857,404	2	36,651,644	2	39,232,884	2	30,107,620	1	35,806,810	1
Other(s)	57,160,213	3	68,485,719	3	77,359,503	3	87,366,103	4	102,389,516	4
Subtotal	1,013,527,743	48	1,023,256,356	46	1,105,777,470	48	1,112,085,153	47	1,304,598,084	49
Nonaeronautical Operating Revenue										
Parking	303,852,721	14	328,339,939	15	355,225,676	15	389,872,812	16	435,779,735	16
Concessions	434,318,026	21	444,899,341	20	450,291,834	20	441,546,453	19	472,935,990	18
Rent	130,661,949	6	136,952,985	6	143,966,253	6	154,732,423	7	136,106,338	5
Rental Cars	146,113,414	7	166,971,266	8	181,385,497	8	205,922,402	9	233,293,563	9
Other(s)	86,896,561	4	100,255,329	5	67,330,129	3	70,922,905	3	84,312,713	3
Subtotal	1,101,842,671	52	1,177,418,860	54	1,198,199,389	52	1,262,996,995	53	1,362,428,339	51
Total Operating Revenues	2,115,370,414	100	2,200,675,216	100	2,303,976,859	100	2,375,082,148	100	2,667,026,423	100

Source: FAA 5100-127

Table 4.6 Consolidated Operating Revenues, Large Hub Airports with Compensatory Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Aeronautical Operating Revenue										
Terminal	207,484,448	17	217,822,018	17	231,468,007	17	255,752,023	18	288,562,030	19
Landing fees	294,836,694	24	299,604,754	23	279,812,569	20	289,030,983	20	284,664,712	19
Cargo/hangar rentals	39,835,716	3	28,002,927	2	27,146,386	2	27,184,032	2	26,469,649	2
Utilities	17,728,072	1	17,743,824	1	17,155,996	1	21,023,224	1	21,844,772	1
Other(s)	33,605,555	3	35,107,660	3	34,149,054	2	37,964,297	3	34,272,938	2
Subtotal	593,490,485	48	598,281,183	46	589,732,012	42	630,954,559	44	655,814,101	44
Nonaeronautical Operating Revenue										
Parking	254,203,038	21	274,416,779	21	296,110,718	21	325,928,914	23	338,818,528	23
Concessions	152,222,925	12	164,611,963	13	182,735,157	13	206,362,759	14	205,031,950	14
Rent	72,470,107	6	89,621,679	7	140,271,264	10	83,301,569	6	94,449,861	6
Rental Cars	130,461,601	11	137,610,653	11	150,930,160	11	158,214,621	11	173,003,131	11
Other(s)	34,563,220	3	35,327,602	3	40,046,058	3	38,523,754	3	37,554,725	2
Subtotal	643,920,891	52	701,588,676	54	810,093,357	58	812,331,617	56	848,858,195	56
Total Operating Revenues	1,237,411,376	100	1,299,869,859	100	1,399,825,369	100	1,443,286,176	100	1,504,672,296	100

Source: FAA 5100-127

Table 4.7 Consolidated Operating Revenues, Large Hub Airports with Hybrid Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Aeronautical Operating Revenue										
Terminal	675,015,482	31	679,617,128	29	677,934,221	25	757,057,362	26	852,035,213	28
Landing fees	555,751,306	25	544,618,668	23	579,527,459	22	633,973,977	22	690,183,016	23
Cargo/hangar rentals	131,896,066	6	130,113,285	6	129,854,310	5	141,651,229	5	146,554,307	5
Utilities	66,125,149	3	75,530,716	3	87,478,356	3	83,573,623	3	103,205,250	3
Other(s)	87,323,104	4	89,182,170	4	208,742,987	8	184,619,414	6	120,197,920	4
Subtotal	1,516,111,107	69	1,519,061,967	65	1,683,537,333	63	1,800,875,605	63	1,912,175,706	63
Nonaeronautical Operating Revenue										
Parking	252,762,560	11	280,513,346	12	349,218,272	13	392,575,589	14	434,638,282	14
Concessions	152,675,349	7	170,457,437	7	163,182,540	6	189,191,458	7	235,754,603	8
Rent	31,445,268	1	41,311,670	2	46,084,804	2	52,718,850	2	41,275,000	1
Rental Cars	119,858,528	5	134,054,890	6	157,819,695	6	164,123,245	6	180,685,528	6
Other(s)	133,708,295	6	195,443,970	8	269,640,569	10	278,042,916	10	252,024,534	8
Subtotal	690,450,000	31	821,781,313	35	985,945,880	37	1,076,652,058	37	1,144,377,947	37
Total Operating Revenues	2,206,561,107	100	2,340,843,280	100	2,669,483,213	100	2,877,527,663	100	3,056,553,653	100

Source: FAA 5100-127

Hypothesis 1

Figure 4.10 summarizes the data on aeronautical revenues contained in Tables 4.5, 4.6 and 4.7. Airports with compensatory and residual arrangements obtain slightly less than half of their operating revenues from aeronautical sources. Contrary to what was expected, airports with compensatory arrangements depend the least on aeronautical revenues. Prior to 1997 residual and compensatory airports had almost the same percentage of revenues derived from aeronautical sources. After 1997 residual airports increased their dependence on this source. Compensatory airports, by contrast, decreased their dependence on aeronautical sources. Hybrid airports, on the other hand, depend heavily on aeronautical revenues. In 1996 airports with hybrid arrangements received about 69% of their operating revenues from aeronautical sources. By 2000 this figure had decreased to 63%.

Figure 4.10 Percent of Aeronautical Operating Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

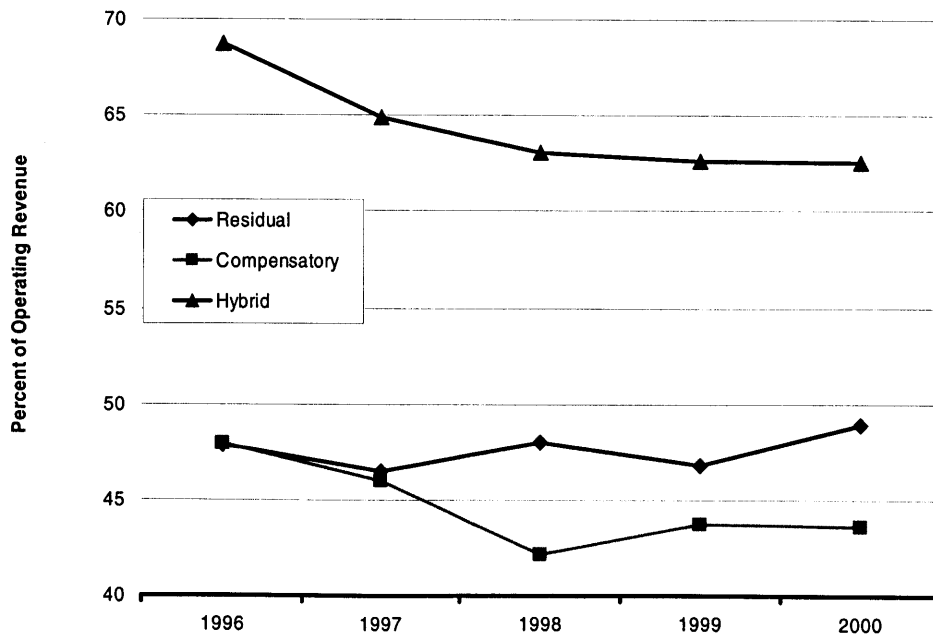


Figure 4.11 illustrates graphically part of the data contained in Tables 4.5, 4.6 and 4.7. The graph shows the importance of landing fees to airports with different rate-setting methodologies. Airports with hybrid arrangements are the most dependent on landing fees. Interestingly landing fees revenues for airports with compensatory arrangements have declined steadily since 1996 to become almost as low as those of airports with residual agreements, which are the least dependent on landing fees.

Figure 4.12 shows that airports with hybrid arrangements rely more than the other two types on the rents collected from the airlines for the use of terminal buildings. Airports using residual agreements are less dependent on terminal revenues than hybrid airports. Airports using compensatory are the least likely to depend on terminal rental revenues.

A potential explanation for the patterns observed might be based on the following argument. An airport using a compensatory methodology can charge fees only to cover the cost of operating the facilities being used by the airline (i.e. runways or passenger buildings). For example, an airport that under a residual agreement was able to reduce the landing fees with surplus money from non-aeronautical cost centers could eliminate those subsidies under a new compensatory agreement. If the aeronautical fee reductions were substantial, a new compensatory arrangement will introduce a major increase in aeronautical fees. However, after the landing fees have been adjusted then they cannot increase at a high rate because the airport will be obligated to charge only for the cost of using the facility (the airport cannot make a profit on these charges). The only way to increase landing fee revenues substantially will be through major increases in traffic volumes. Therefore, the major motivation for airports to switch from residual to compensatory agreements does not have to be increased aeronautical revenues, but rather the benefits accruing from increased non-aeronautical revenues.

Figure 4.13 shows that airports with compensatory and residual agreements derive over 50% of their revenues from non-aeronautical sources. Airports with hybrid arrangements receive substantially less from non-aeronautical revenues. Figure 4.14 displays the parking revenues. Airports with compensatory agreements have a higher reliance on parking revenues. Next are airports with residual agreements, while airports using hybrid arrangements depend the least on

parking revenues. This graph also highlights a clear trend with an increasing reliance on parking revenues by all airport facilities.

Figure 4.11 Percent of Landing Fees Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

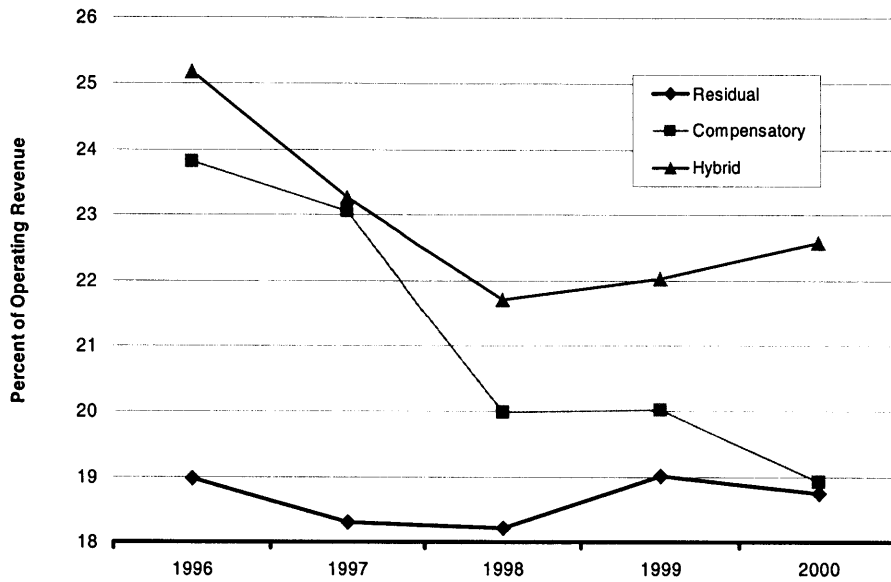


Figure 4.12 Percent of Terminal Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

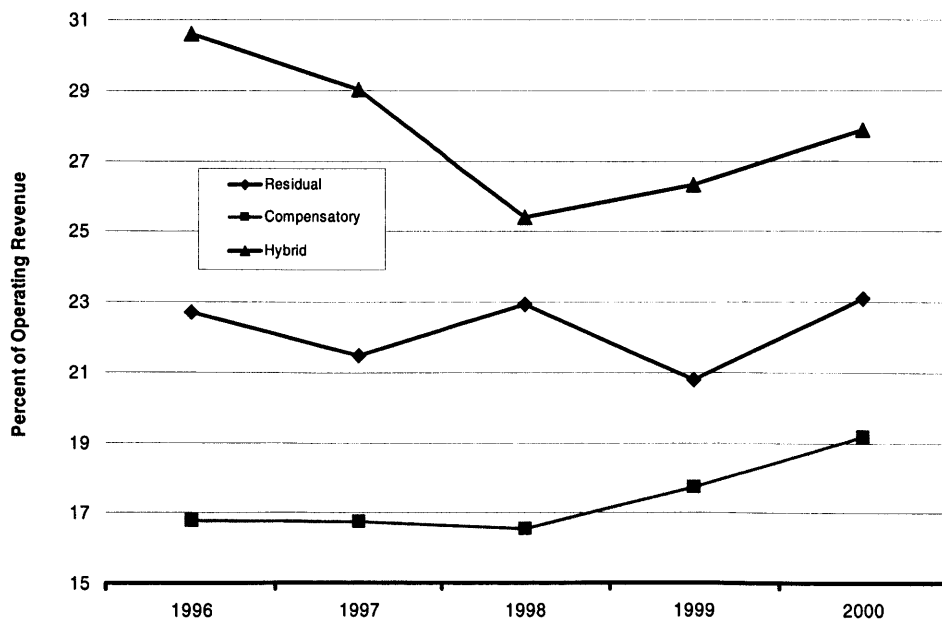


Figure 4.13 Percent of Non-Aeronautical Operating Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

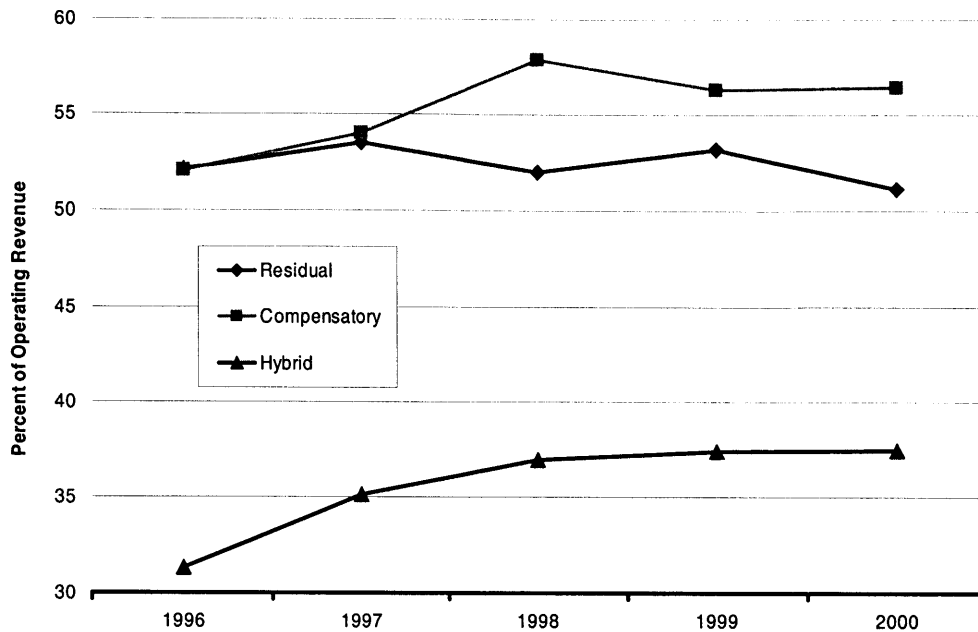


Figure 4.15 shows that airports with residual agreements rely the most on concession revenues. However their dependence on this line item is decreasing steadily as a percent of total operating income. Facilities with compensatory arrangements are less dependent on concession than airports with residual agreements. Airports with hybrid arrangements are the least dependent on concession revenues.

In summary, airports with compensatory arrangements seem to be reducing their dependence on aeronautical revenues and are clearly trying to increase their non-aeronautical revenues (i.e., parking and concessions). Airports with residual arrangements have a slightly higher dependence on non-aeronautical revenues. However they do not show a clear trend toward either increasing or decreasing their dependence on this revenue source. Airports with hybrid arrangements show a much higher dependence on aeronautical revenues than airports using other cost recovery methodologies (63% in 2000).

Figure 4.14 Percent of Parking Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

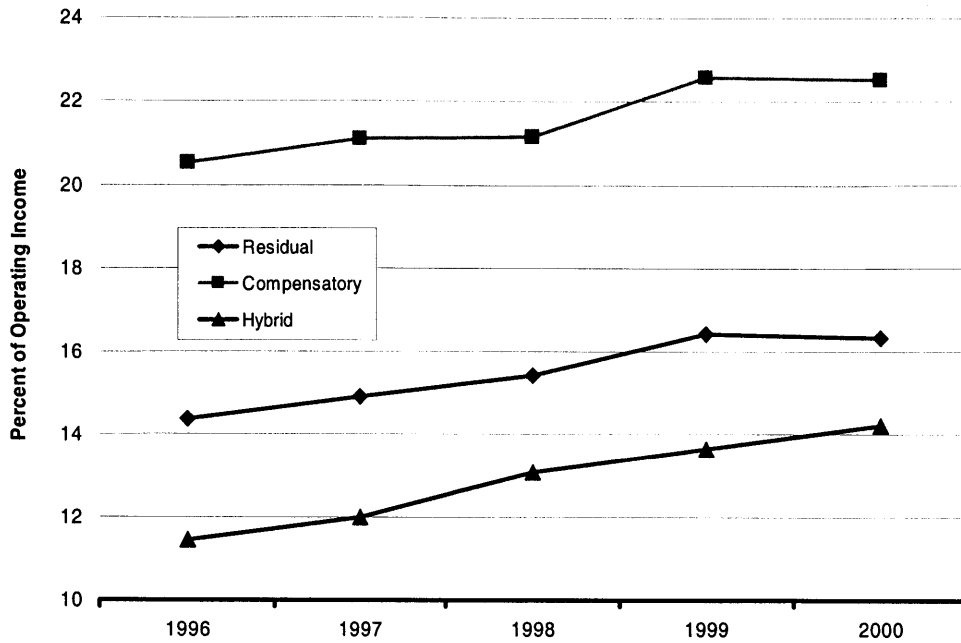
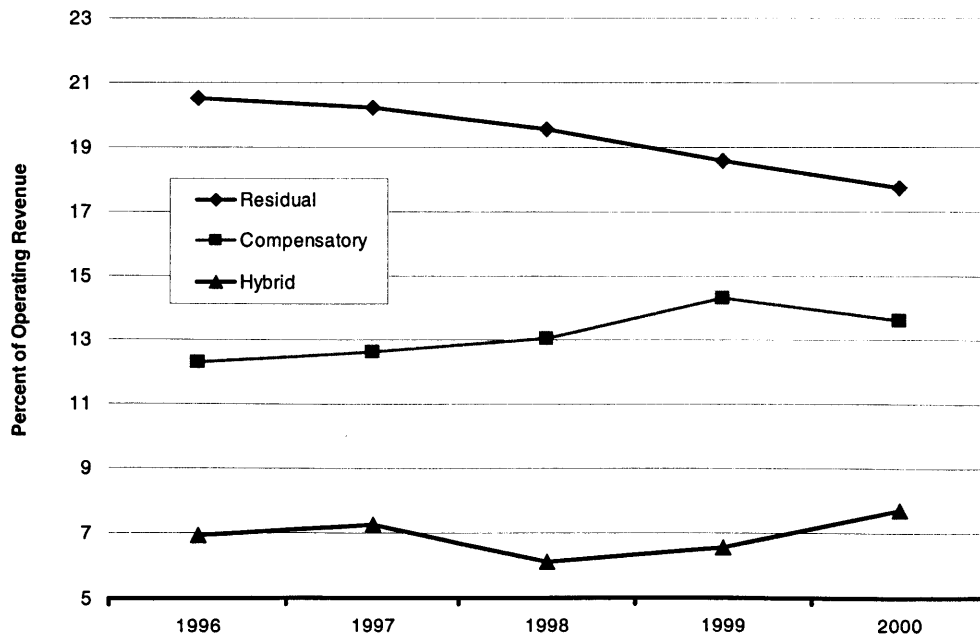


Figure 4.15 Percent of Concession Revenues By Type of Cost Recovery Methodology, Fiscal Years 1996-2000



Hypothesis 2

Tables 4.8, 4.9 and 4.10 summarize the operating expenses for each cost recovery category. In the quest for improving profit margins airport operators can resort to outsourcing services. Figure 4.16 shows the expenditures for outsourcing of services, which includes legal advice, engineering, maintenance and janitorial services, etc. As expected, the figures indicate that airports with compensatory arrangements outsource substantially more services than other airports. In fact, in 1996 airports with compensatory arrangements spent twice as much on outsourcing services than their counterparts with hybrid and residual arrangements. In recent years, airports with residual and hybrid arrangements have also steadily increased their expenditures on outsourced services.

As figure 4.17 shows, airports with residual agreements spend more of their budget on labor. In 2000 about 42% of operating expenditures were devoted to labor. Despite having large service expenditures, airports with compensatory arrangements also have high labor expenditures. Airports with hybrid arrangements have relatively low expenditures on labor. It is important to exercise caution when interpreting these data. The reason is that operational differences can affect the labor requirements of airports that, in theory, might seem very similar. For example, two airports serving roughly the same number of passengers and having similar O&D markets can have very different labor needs. One airport could be served by an airline with 70-80% market share which provides most of the labor force needed to operate the facility. The other airport could have a less concentrated environment with a large number of airlines using the facility. This could result in the need of additional manpower to better coordinate the operation of the facility.

Table 4.8 Consolidated Operating Expenses, Large Hub Airports with Residual Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Operating Expenses										
Personnel Compensation/Benefits	553,606,415	39	575,393,518	40	606,691,361	43	650,596,186	42	702,180,574	42
Services (a)	181,781,417	13	200,679,648	14	213,588,326	15	294,114,992	19	366,848,415	22
Supplies, Repairs, Maintenance	214,804,131	15	215,136,960	15	261,103,582	19	297,278,122	19	296,678,968	18
Communications and Utilities	145,165,187	10	146,678,864	10	146,568,435	11	144,709,906	9	166,336,633	10
Insurance and Claims	19,109,532	1	18,411,779	1	20,696,782	1	22,472,132	1	23,021,377	1
Government expenditures	19,604,027	1	13,396,234	1	6,447,310	0	7,782,629	1	10,441,186	1
Miscellaneous	51,306,981	4	39,066,288	3	29,142,985	2	24,924,628	2	29,861,542	2
Other(s)	227,078,270	16	240,186,403	17	110,986,066	8	94,613,454	6	82,292,108	5
Total Operating Expenses	1,412,455,960	100	1,448,949,694	100	1,395,224,847	100	1,536,492,049	100	1,677,660,803	100

Table 4.9 Consolidated Operating Expenses, Large Hub Airports with Compensatory Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Operating Expenses										
Personnel Compensation/Benefits	262,581,232	39	274,230,005	40	288,565,803	41	326,620,146	39	333,887,038	40
Services (a)	203,634,891	30	209,900,785	30	214,055,857	30	235,607,000	28	248,238,368	30
Supplies, Repairs, Maintenance	68,740,648	10	69,666,623	10	74,386,318	10	97,874,886	12	102,004,787	12
Communications and Utilities	63,531,808	9	65,338,690	9	67,377,824	9	68,639,848	8	75,799,013	9
Insurance and Claims	11,929,584	2	12,640,929	2	10,417,063	1	10,314,259	1	11,291,874	1
Government expenditures	8,244,665	1	8,817,611	1	10,398,159	1	10,543,883	1	9,715,420	1
Miscellaneous	11,931,806	2	13,305,175	2	16,862,431	2	19,636,807	2	29,401,931	4
Other(s)	39,636,532	6	39,421,823	6	29,717,798	4	62,886,496	8	24,375,894	3
Total Operating Expenses	670,231,166	100	693,321,641	100	711,781,253	100	832,123,325	100	834,714,325	100

Table 4.10 Consolidated Operating Expenses, Large Hub Airports with Hybrid Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	%	1997	%	1998	%	1999	%	2000	%
Operating Expenses										
Personnel Compensation/Benefits	384,129,063	32	383,893,833	30	442,449,006	30	481,276,134	29	513,328,885	30
Services (a)	169,447,055	14	196,048,023	15	166,774,115	11	251,097,605	15	293,040,890	17
Supplies, Repairs, Maintenance	238,667,931	20	231,244,787	18	287,899,066	20	351,197,359	21	346,150,447	20
Communications and Utilities	133,410,526	11	136,967,690	11	138,246,278	9	143,756,208	9	176,936,912	10
Insurance and Claims	21,778,714	2	20,971,198	2	20,964,059	1	24,580,251	1	22,303,729	1
Government expenditures	2,864,000	0	5,179,000	0	0	0	2,000	0	4,058,360	0
Miscellaneous	22,677,359	2	32,787,201	3	31,441,895	2	31,826,595	2	36,564,701	2
Other(s)	219,438,845	18	276,465,097	22	372,459,408	26	397,167,576	24	314,778,496	18
Total Operating Expenses	1,192,413,493	100	1,283,556,829	100	1,460,233,827	100	1,680,903,728	100	1,707,162,420	100

Figure 4.16 Percent of Services Expenses By Type of Cost Recovery Methodology, Fiscal Years 1996-2000

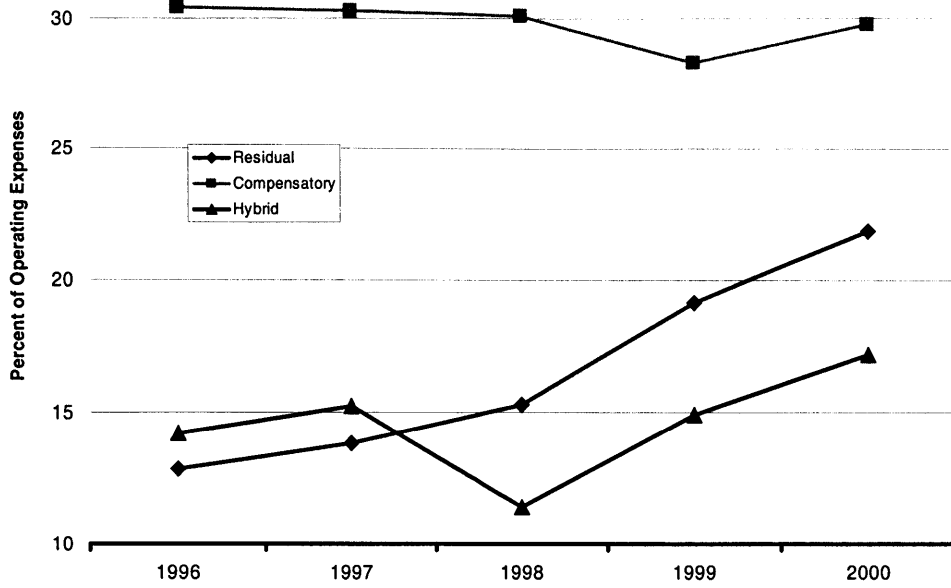


Figure 4.17 Percent of Labor Expenses By Type of Cost Recovery Methodology, Fiscal Year 1996-2000

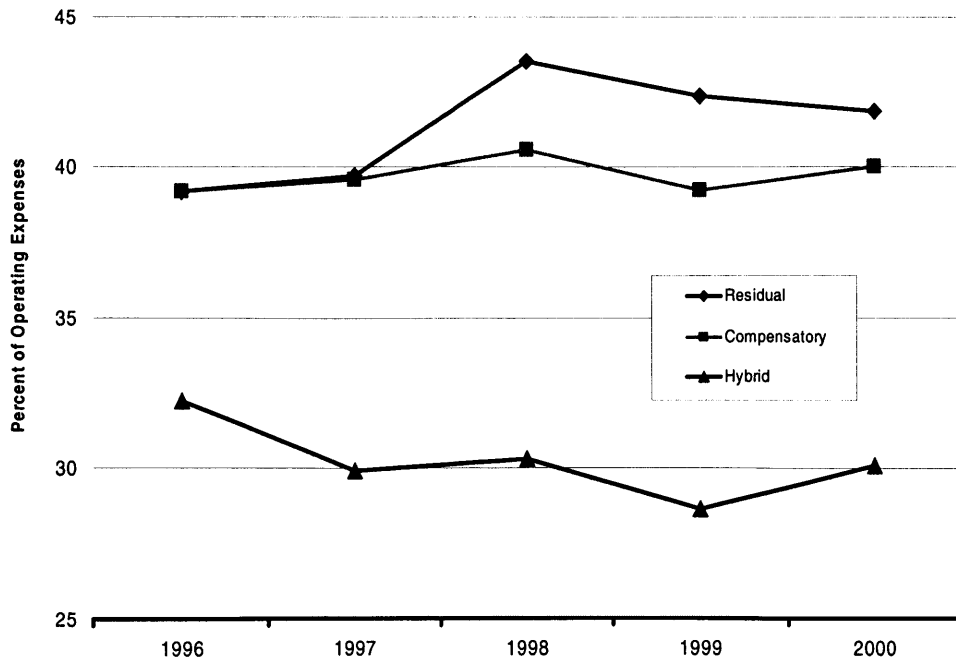


Table 4.11 Consolidated Operating Margins, Large Hub Airports with Residual Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	1997	1998	1999	2000
Revenue	2,115,370,414	2,200,675,216	2,303,976,859	2,375,082,148	2,667,026,423
Expenditure	1,412,455,960	1,448,949,694	1,395,224,847	1,536,492,049	1,677,660,803
Operating Income	702,914,454	751,725,522	908,752,012	838,590,099	989,365,620
Operating Margin	33.2	34.2	39.4	35.3	37.1

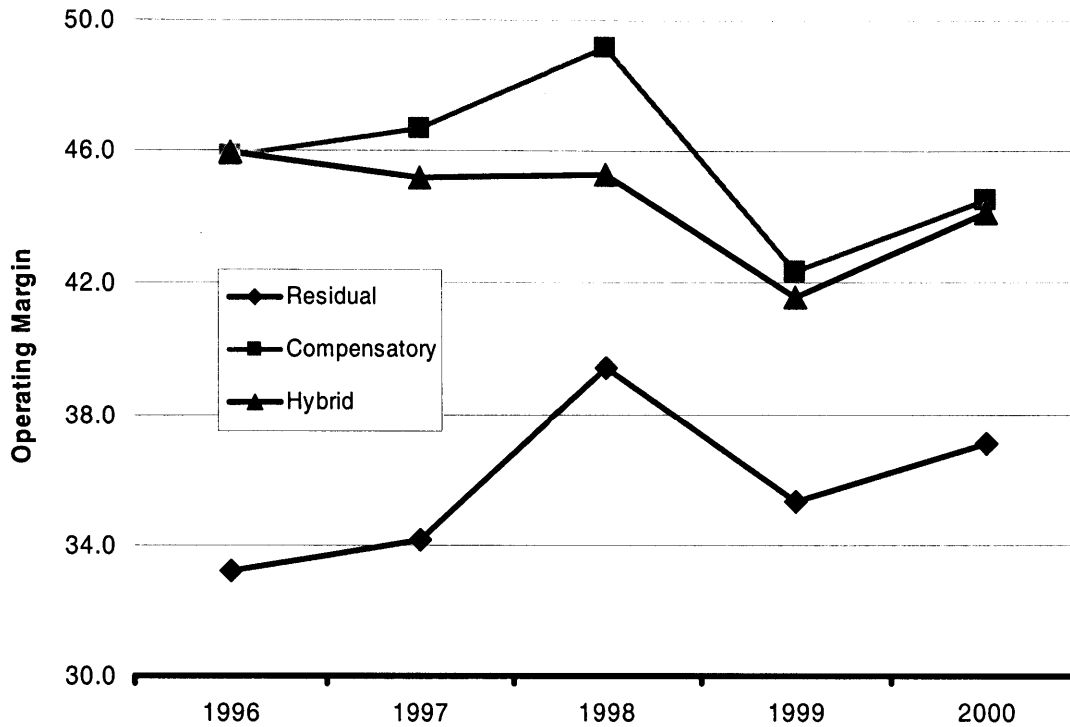
Table 4.12 Consolidated Operating Margins, Large Hub Airports with Compensatory Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	1997	1998	1999	2000
Revenue	1,237,411,376	1,299,869,859	1,399,825,369	1,443,286,176	1,504,672,296
Expenditure	670,231,166	693,321,641	711,781,253	832,123,325	834,714,325
Operating Income	567,180,210	606,548,218	688,044,116	611,162,851	669,957,971
Operating Margin	45.8	46.7	49.2	42.3	44.5

Table 4.13 Consolidated Operating Margins, Large Hub Airports with Hybrid Arrangements, Fiscal Years 1996-2000 (in Current Dollars)

	1996	1997	1998	1999	2000
Revenue	2,206,561,107	2,340,843,280	2,669,483,213	2,877,527,663	3,056,553,653
Expenditure	1,192,413,493	1,283,556,829	1,460,233,827	1,680,903,728	1,707,162,420
Operating Income	1,014,147,614	1,057,286,451	1,209,249,386	1,196,623,935	1,349,391,233
Operating Margin	46	45.2	45.3	41.6	44.1

Figure 4.18 Operating Margins (%) By Type of Cost Recovery Methodology



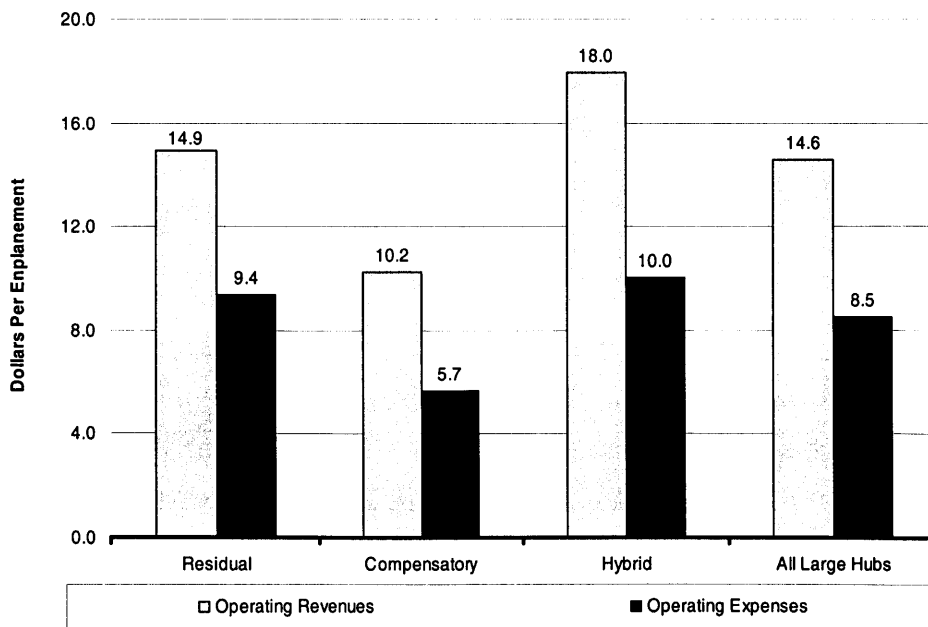
Hypothesis 3

Tables 4.11, 4.12, and 4.13 summarize operating margins by type of cost recovery methodology for the period 1996-2000. Figure 4.18 illustrates graphically the operating margins of all three cost recovery methodologies. The results support Hypothesis 3. Airports with compensatory arrangements achieved the highest operating margins. Hybrid facilities had the second highest operating margins. Facilities with residual arrangements achieved the lowest operating margins. This is consistent with the very nature of residual agreements, which limits the risk of the airports by shifting it to the airlines, but at the same time limits the potential of the airport for increased operating margins.

Despite the fact that compensatory arrangements achieve the highest operating margin, it is airports with hybrid rate-setting methodologies that, in absolute terms, achieve the highest operating surplus on a per-passenger basis. Figure 4.19 shows the operating revenue and cost per enplaned passenger for airports with different cost recovery methodologies. Airports with hybrid arrangements generate the largest operating revenues²⁴ per enplanement (\$18.00), followed by facilities with residual (\$14.90) and compensatory (\$ 10.20) arrangements. The operating expenses follow the same order as airports with hybrid arrangements have higher expenses (\$10.00), followed by facilities with residual (\$9.40) and compensatory (\$5.70) arrangements.

Airports with compensatory arrangements generate the least revenue per passenger, but their operating expenses are also very low. This results in a high operating margin. Nevertheless, it is facilities with hybrid arrangements that realize the highest operating surplus per passenger on an absolute basis. This is the result of flexible arrangements that allow the airport operator to divert risk while leaving plenty of room to increase (and the option to retain) non-aeronautical revenues when the opportunity arises.

Figure 4.19 Operating Income By Type of Cost Recovery Methodology, Fiscal Year 2000



²⁴ Operating revenues excludes Government-Sponsored programs such as AIP or PFCs.

4.6 Main Drivers of Operating Revenues

According to Table 4.1 large commercial airports receive almost half of their operating revenues from airlines in the form of landing fees and of rental fees for the space leased in the terminal buildings. But the distribution and size of the revenue sources can vary, according to a number of factors, that include airport size and configuration, traffic volumes, traffic mix, the state of the local economy, etc. For example, the largest commercial airports typically have a more diversified base of revenues than do smaller ones, and terminal concessions can be expected to generate a greater percentage of the airport's total operating revenues as boarding numbers increase (GAO 1998, 2).

What influences greatly the aeronautical operating revenues is the existing use and lease agreements²⁵ that airports establish with the airlines. The *relationship* between the airport and the airlines is therefore important in shaping most of the aeronautical operating revenue structure. The relationship between the airport and the airlines is influenced by factors such as existing long-term contractual obligations, ownership and management structure of the facility, O&D demand, competitive airline environment within the facility and in the region (i.e., in regions with more than one large airport, airlines have to compete with airlines within the same airport and also with airlines serving nearby airports), as well as the financial stability of main air carriers using the airport.

Non-aeronautical operating activities are not vital to the transportation of passengers. However, they play a key supporting role by providing convenience to the traveler. In recent years airports have started to implement aggressive business plans to expand their cash inflows from non-aeronautical operating revenues. The remodeling of existing facilities and the construction of new airport terminals utilize new concepts and designs aimed at maximizing business revenues. This can be achieved by incorporating the latest retail techniques and adapting them to fit airport activities. Therefore, the main driver of non-aeronautical operating revenues is the *business* practices of the airport management. The business environment is influenced by a number of

²⁵ As explained in Section 2.3 some airports might choose not to have a contractual agreement with the airlines and set their fees by ordinance.

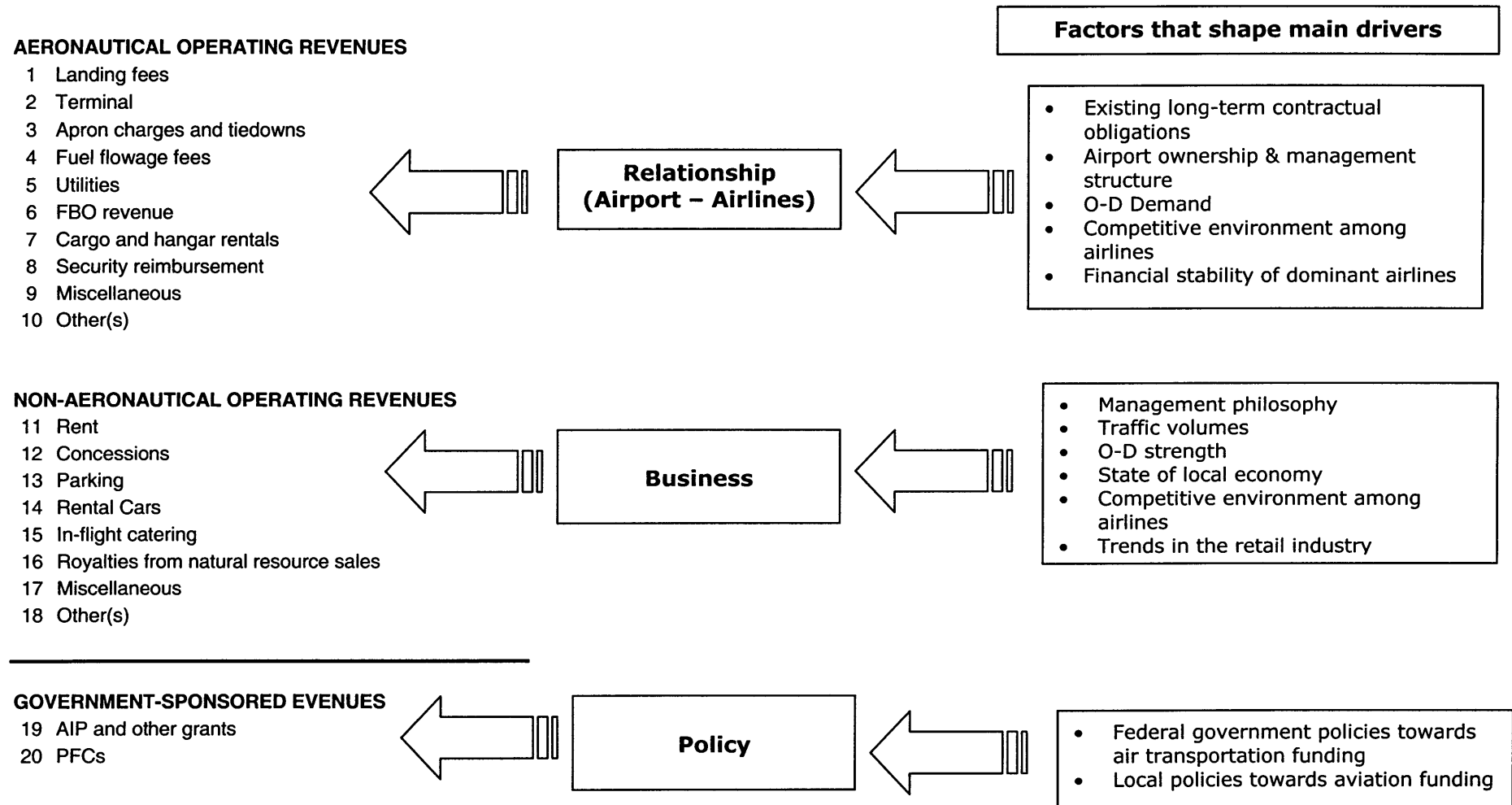
factors that include management philosophy, traffic volumes, O&D demand, state of the national and local economy, as well as trends in the retail industry.

Government-sponsored revenues contributed a significant \$1.4 billion in 2000. The main components of this segment are grants received from the federal, state and local governments and passenger facility charges (PFCs), which are fees collected from the passengers for the use of airport facilities. The funds from the AIP and PFC programs are dedicated to specific capital programs. Therefore these cannot be considered operating revenues. This revenue stream is controlled externally by the FAA, which grants permission and holds the right to discontinue the programs at any time if airports do not comply with established federal regulations. Grant money and PFC revenues are directly related to government policies towards the funding of air transportation. Therefore, this revenue stream is mostly shaped by policy considerations.

Figure 4.20 highlights the main drivers of airport revenues. The 20 line items on the left column generate the revenue streams that flow into the airports' coffers. The revenues are divided into three main categories: aeronautical operating revenues, non-aeronautical operating revenues, and government-sponsored revenues. Each category is influenced by one main driver (center column). For instance, the existing relationship between the airports and the airlines is the main driver that shapes the aeronautical operating revenue structure. Airport-airline relationships are influenced by various internal and external factors (right column) such as existing long-term contractual agreements,²⁶ O&D demand, competitive airline environment and financial strength of the airlines. The business environment is the main driver that shapes the non-aeronautical revenue structure. At the same time, the business environment is influenced by factors such as management philosophy of the airport operator, traffic volumes, O&D demand, state of the economy, and trends in the retail industry. Finally, federal policy is the main factor that shapes the government-sponsored revenues.

²⁶ As explained in Section 2.3 some airports might choose not to have a contractual agreement with the airlines and set their fees arbitrarily by ordinance.

Figure 4.20 Drivers and Main Factors that Affect the Operating Revenue Structure of Large Commercial Airports in the U.S.



PART II

CASE STUDIES AND CONCLUSION

Chapter 5

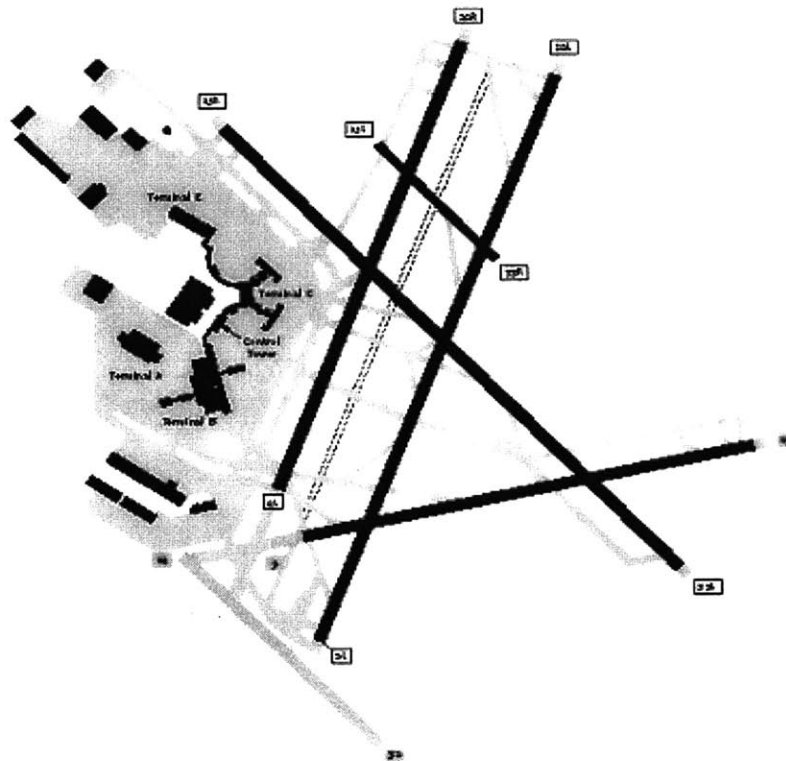
Logan International Airport

This chapter presents Logan International Airport (BOS) as an example of an airport that uses a compensatory approach to set its aeronautical fees. As indicated in Section 4.5, airports using a compensatory methodology have higher reliance on non-aeronautical revenues and high operating margins. This chapter will assess whether these patterns hold in the case of BOS. Another aspect the chapter will focus on is debt service coverage, which should be higher for BOS due to a higher dependence on non-aeronautical revenues. According to S&P, U.S. airports with compensatory elements in their business profile tend to achieve average higher debt service coverage (1.75-2.50 or higher) to compensate for the highly elastic association between passenger traffic and concession revenues as compared to residual airports (Forsgren, Wilkins and Greer 1999, 21). It is important to point out that all financial information on this chapter pre-dates Sep. 11, 2001.

5.1 Background

Located in Boston, Massachusetts, Logan International Airport (BOS) serves a population of approximately 3.5 million. In 2000 over 27 million passengers flew to and from BOS making it the 18th most active airport in the United States. About 85% of BOS traffic is domestic. Only 4 million passengers or 15% of total traffic is international. Close to 86% of passengers originate or end their trips at Logan, making it one of the strongest O&D markets in the country. According to Standard & Poor's the fact that Logan is an O&D facility rather than a carrier hub lends stability to enplanement growth, making forecasts dependent on local economic trends rather than air carrier routing decisions.

Figure 5.1 Logan International Airport Layout



Source: FAA

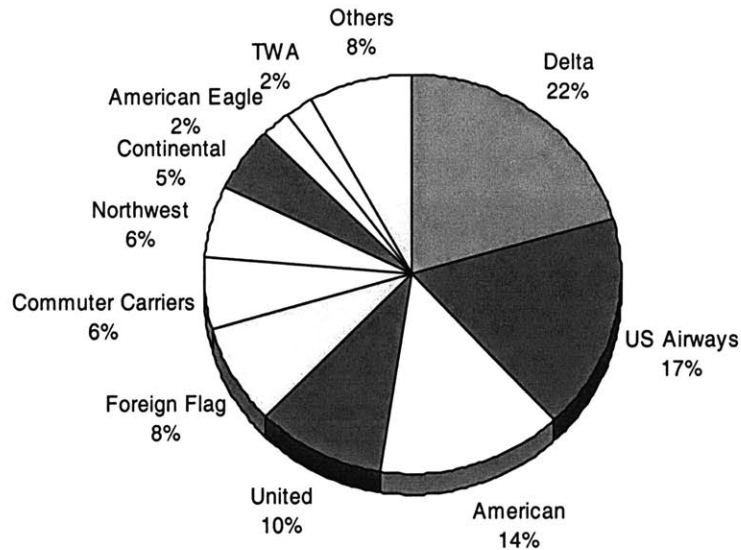
As of June 30, 2001, airline service at Logan, both scheduled and non-scheduled, was provided by 60 air carriers, including 8 U.S. major carrier airlines, 16 no-U.S. flag carriers, and 8 regional and commuter airlines. Logan has the lowest market concentration of all large commercial airports in the U.S. (Figure 2.10). No airline has over 25% market share at Logan. In 2000 Delta had approximately 22% market share, followed by US Airways' 17% and American's close to 14% (Figure 5.2). In Standard & Poor's opinion, Logan's diversity of air carriers is a considerable strength and indicative of the strong demand by carriers to provide service to the Boston area (Loop and Hecht 2000, 3).

BOS is one of the most coveted airport facilities. However, during the last few years traffic growth has slowed down considerably. Average annual growth during the 70s was 4.5%, followed by a 4.2% average annual growth in the 1980s. During the 90s growth declined considerably to about 1.8% per annum. The noticeable decrease in growth can be explained (at least in part) by recent increased activity at neighboring airports (i.e., Worcester Regional in Central Massachusetts, T.F. Green/Providence Airport and Manchester Airport), which now serve the periphery of the Boston Metropolitan area.

BOS has five passenger terminals (Figure 5.1) each with its own ticketing, baggage claim, and ground transportation facilities. As of December 2000, the airport had 84 gate positions available for both scheduled and non-scheduled service. The airfield is comprised of five runways, fourteen miles of taxiway, and 237 acres of concrete and asphalt apron. During 2000 BOS had over 478,000 aircraft operations (an average of 1,300 aircraft movements a day). Due to its high traffic volume and limited capacity BOS was ranked fifth in the country in number of flights significantly delayed (more than 15 minutes). The current airside capacity benchmark at BOS is 118-126 flights per hour in good weather, while declining to 78-88 flights (or fewer) per hour in adverse weather conditions (that include poor visibility, unfavorable winds, or heavy precipitation). A new runway planned for completion in 2005 will help mitigate delays normally encountered during northwest wind conditions when the airport is reduced to a dual or a single runway configuration. According to the FAA demand is expected to grow by 6% over the next decade but delays are not expected to increase primarily due to the construction of the new runway. In addition, terminal construction should reduce gate delays, and new taxiways and high

speed turnoffs will improve runway utilization, thereby minimally improving airside capacity (FAA 2001).

Figure 5.2 Airline Share of Total Passenger Traffic at BOS, Fiscal Year 2000



Note: Delta includes Delta Shuttle and Delta Express

Source: 2002 Aviation and Aerospace Almanac

5.2 Ownership, Governance and Management

Logan International Airport is owned and operated by the Massachusetts Port Authority (Massport). This self-supporting, independent public authority was created by Chapter 465 of the Massachusetts Act of 1956 to operate and manage the airport and Boston's port facilities. Today, Massport operates three major airports, the region's largest seaport facilities and important

surface arteries. Massport facilities include Boston-Logan International Airport, Laurence G. Hanscom Field, the Worcester Regional Airport,²⁷ Tobin Memorial Bridge, and various port properties, located in Charlestown, South Boston, and East Boston.

Massport is governed by a seven member Board appointed by the Governor of the Commonwealth. The chairman and members are appointed to staggered seven-year terms, with the term of one of the members expiring on June 30 of each year. All members serve without compensation. The management of Massport and its operations are carried out by a staff headed by the Executive Director, who is appointed by and reports directly to the members of the Board. Massport has the power to acquire property by purchase or through the exercise of the right of eminent domain. The authority does not have taxing powers and no stockholders or equity holders. Massport receives no state taxpayer funds for its operations or capital programs. It is a revenue bond authority and all of its monies are generated by these bonds and through user fees charged at the facilities it operates.

5.3 Operating Revenue Structure

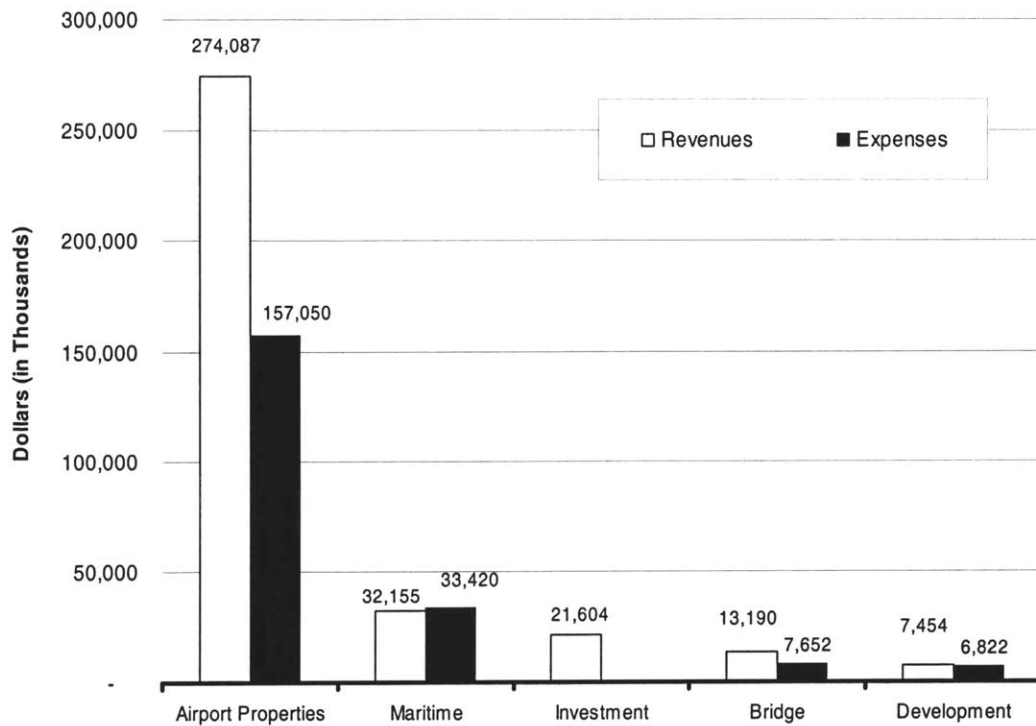
Logan Airport is the principal source of revenue, net revenues, and net income, and is the dominant factor in the determination of Massport's financial condition. In fiscal 2000, Logan accounted for 77.4% of Massport's revenues and 83.3% of net revenues (as defined in Trust Agreement) (Massport 2000, 2). Figure 5.3 highlights the importance of the airport properties²⁸ to Massport's operating revenue (and expense) structure. In the past Logan airport subsidized the other properties/facilities to a considerable degree, but the authority appears to be shifting to a stance of fuller cost recovery from each property rather than in aggregate. These changes seem to go in the direction of the compensatory arrangement used for fee-setting at Logan Airport (see Appendix 2), where each cost center must generate revenues to cover its expenses. An example of this new trend can be found in the decision to raise tolls on the Tobin Bridge (from 50¢ to \$1

²⁷ Under an operating agreement between Massport and the City of Worcester, Massport assumed the operating responsibility of the Worcester airport on January 15, 2000.

²⁸ These include Logan International Airport, Hanscom Field and Worcester Regional Airport.

in 1997) and to tie rentals at some of the port properties to the quantity of cargo handled (Loop and Hecht 1999, 1).

Figure 5.3 Massport’s Operating Revenues and Expenses by Business Units, Fiscal Year 2001

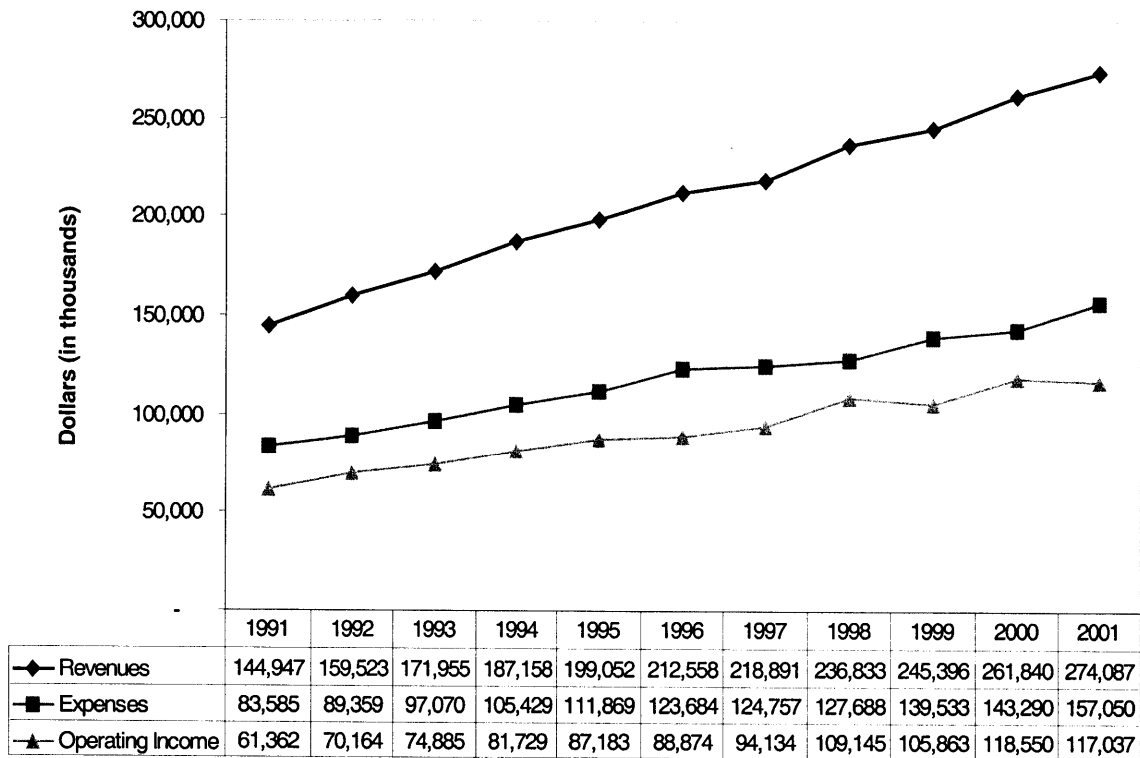


Source: Massachusetts Port Authority Comprehensive Annual Financial Report (Fiscal Year 2001)

During the last few years Massport Airport System²⁹ has strengthened its financial standing considerably. Figure 5.4 shows that between 1991 and 2001³⁰ operating revenues increased 90% from \$144 million to \$274 million. Expenses increased 89% from \$83 million in 1991 to \$157 million in 2001. Operating income grew almost every year except in 1999 and 2001. From 1991 to 2001 operating income almost doubled from \$61 million to \$117 million.

²⁹ Massport Airport System includes Logan International Airport, L.G. Hanscom Field and Worcester Regional Airport.

Figure 5.4 Massport Airport System Operating Revenues and Expenses, Fiscal Years 1991-2001



Source: Massachusetts Port Authority Comprehensive Annual Financial Report (Fiscal Year 2001)

5.3.1 Operating Revenues

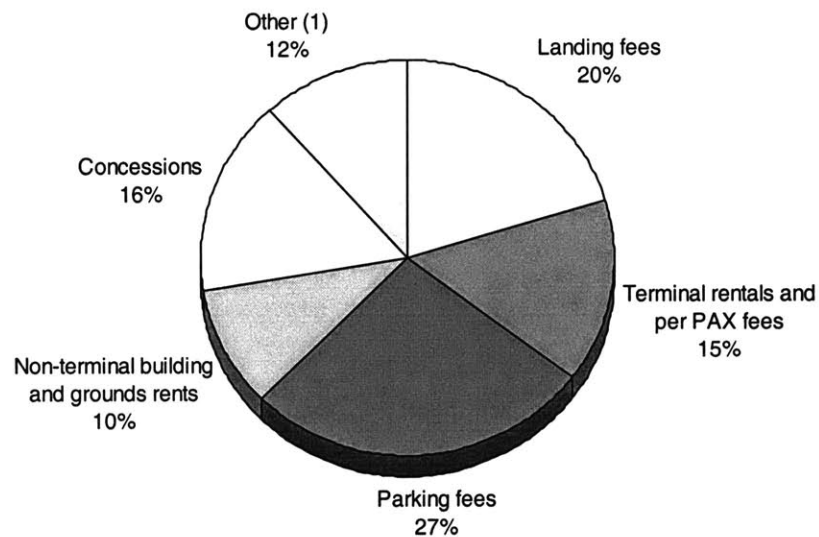
In 2000 the Massport Airport System³¹ generated \$261 million in operating revenue. Figure 5.5 and Table 5.1 show the composition of the operating revenue. Parking fees generated \$71 million or 27% of total operating revenue. Landing fees contributed \$53 million or 20% and concession revenues \$41 million which accounted for 15.9% of operating revenues. Terminal rentals and

³⁰ The impact of Sept. 11, 2001, was not recorded because Massport's fiscal year 2001 ended June 30, 2001.

³¹ Massport Airport System includes Logan International Airport, L.G. Hanscom Field and Worcester Regional Airport.

fees per passenger contributed with another \$39 million or 15.1% of operating revenues. The remaining line items contributed 22% of operating revenues.

Figure 5.5 Massport Airports' Operating Revenue Structure, Fiscal Year 2000



(1) Includes airport utility revenues and fees from operations at Hanscom Field.

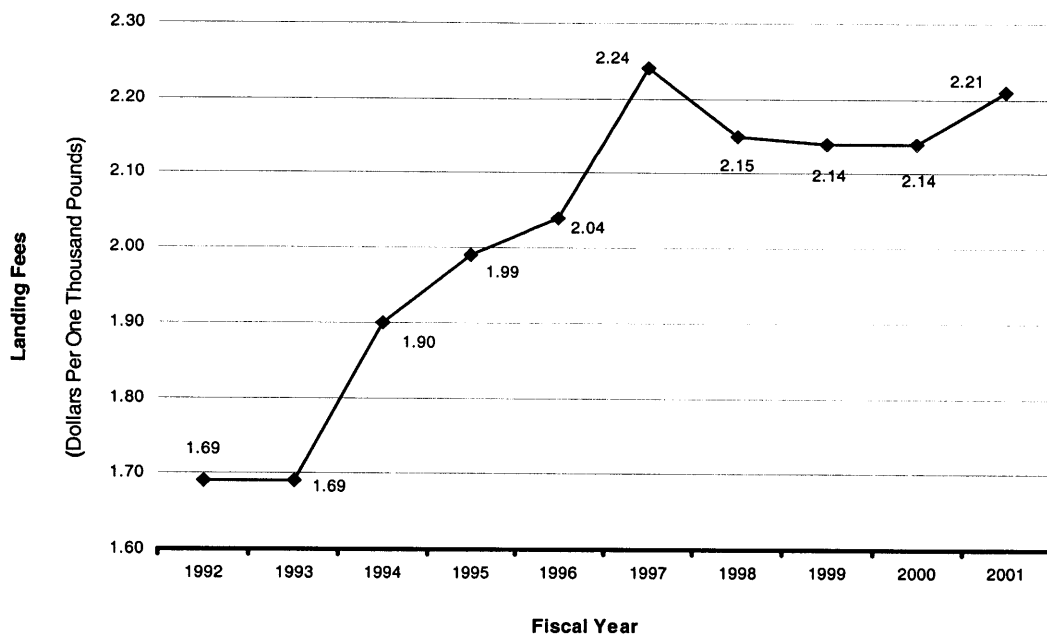
Source: Massachusetts Port Authority Comprehensive Annual Financial Report (Fiscal Year 2000)

Table 5.1 further shows how the individual revenue line items contributed to the overall operating revenue structure of Massport Airports between 1991 and 2000. Since 1991 parking revenue has consistently been Massport Airport System's main source of operating revenue. Parking revenues increased from \$36 million in fiscal year 1991 to \$71 million in fiscal year 2000, achieving a 94% increase in a ten-year span!

Since Massport does not have long-term written agreements with the airline tenants, landing fees are set on a compensatory basis to recover direct and allocated capital, administration,

maintenance and operations costs, as well as amortization and interest. Landing fees at Logan increased 55% from \$34 million in 1991 to almost \$53 million in 2000. Modest increases in traffic volumes and small increases in landing fees (Figure 5.6) have kept this line item from growing at the same pace as the consolidated operating revenues. In 2000, landing fees accounted for approximately 20% of all operating revenues. Appendix 2 describes the methodology used by Massport to set landing fees and terminal rentals.

Figure 5.6 Landing Fees at Logan Airport, Fiscal Years 1992-2001



Source: Massachusetts Port Authority

At 15.9% in 2000, concession revenues were the third most important operating revenue source. Concession revenues include payments made by rental car companies and commissions from businesses such as food and beverages, news and gifts, duty free shops, specialty shops, and other concessions. These revenues increased from \$19 million in 1991 to \$41 million in 2000. The growth of concession revenues by 115% between 1991 and 2000 indicates their tremendous potential. It is important to mention that during the five year period from fiscal 1995 to fiscal year 1999, approximately 48% of concession revenues were derived from payments made by

rental car companies (Revenue Bond Series 199-C and 199-D 1999, 47). Aware of the retail business potential Massport continues to plan in order to capitalize on this opportunity:

“In recent years, the Authority [Massport] has adopted a concession strategy aimed at identifying new revenue opportunities in passenger terminal concessions and increasing passenger satisfaction and passenger spending through the utilization of branded concepts and a variety of new retail offerings. The Authority [Massport] has instituted a competitive bidding process which include flexible financial models (premises rentals, annual guarantees, commissions, profit-sharing, facilities investment and non-exclusivity) and expanded marketing efforts for retail opportunities to include not only traditional airport retail concessionaires, but also local and regional retail operators and joint ventures. Sales (excluding rental car concessions) per enplaned passenger increased in fiscal year 1999 by 11.9% over the prior fiscal year.” (Revenue Bond Series 199-C and 199-D 1999, 47)

Since Massport does not have long-term written agreements with the airline tenants, rental rates are set on a compensatory basis to recover direct and allocated capital, administration, maintenance and operations costs. Charges for the use of the terminal buildings cover the costs of operation and maintenance only (including amortization and interest). This line item does not show the strength of other revenue sources and increased by only 47% from \$26 million in 1991 to \$39 million in 2000.

Table 5.1 Massport Airports⁽¹⁾ Operating Revenues, Fiscal Years 1991-2000
(in Thousands of Dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	% (2000)
Landing fees	34,020	38,080	37,917	42,022	44,989	45,358	49,058	50,812	51,994	52,972	20.2
Terminal rentals and per PAX fees	26,788	28,782	31,016	33,132	33,038	33,648	33,912	38,037	36,735	39,346	15.1
Parking fees	36,513	39,608	42,388	44,989	50,746	55,892	54,325	58,214	63,931	71,108	27.2
Non-terminal building and grounds rents	10,290	12,860	15,132	19,081	20,238	20,826	21,332	21,095	22,444	26,264	10
Concessions	19,975	21,391	24,248	25,136	27,228	30,924	33,881	39,000	42,449	41,567	15.9
Other (2)	17,361	18,802	21,254	22,798	22,813	25,910	26,383	29,675	27,843	30,493	11.6
Totals	144,947	159,523	171,955	187,158	199,052	212,558	218,891	236,833	245,396	261,750	100

(1) Includes Boston-Logan International Airport and L.G. Hanscom Field

(2) Includes airport utility revenues and fees from operations at Hanscom Field.

Source: Massachusetts Port Authority Comprehensive Annual Financial Report (year ended June 30, 2000)

Table 5.2 Massport Airports⁽¹⁾ Operating Income and Operating Margin, Fiscal Years 1991-2001
(in Thousands of Dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Revenues	144,947	159,523	171,955	187,158	199,052	212,558	218,891	236,833	245,396	261,750	274,087
Expenses	83,585	89,359	97,070	105,429	111,869	123,684	124,757	127,688	139,533	143,290	157,050
Operating Income	61,362	70,164	74,885	81,729	87,183	88,874	94,134	109,145	105,863	118,550	117,037
Operating Margins (2)	42	44	44	44	44	42	43	46	43	45	43

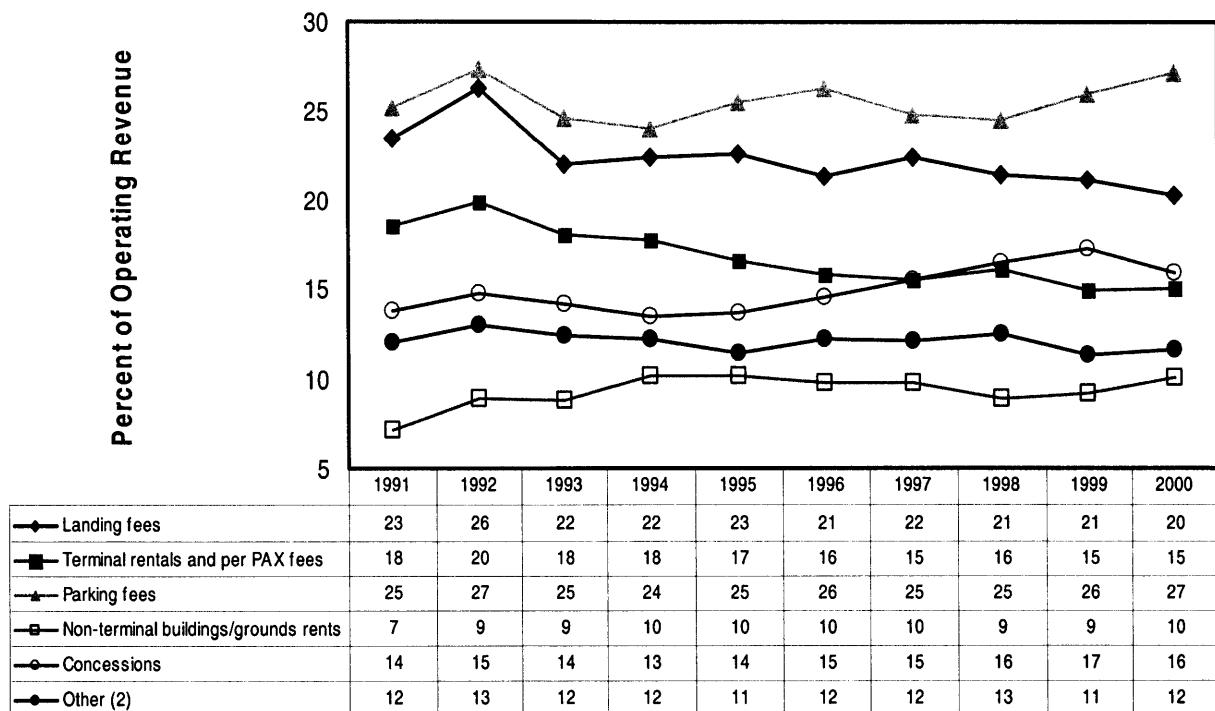
(1) Includes Boston-Logan and L.G. Hanscom Field.

(2) Excluding depreciation.

Source: Massachusetts Port Authority Comprehensive Annual Financial Report (year ended June 30, 2000)

To compare the relative strength of individual revenue line items on the overall revenue structure and against each other, Figure 5.7 was created assigning each line item its percent value of operating revenue for each year between 1991 and 2000. In this scale, parking revenues have been and continue to be the most important source of operating revenue. Furthermore, since 1998 parking revenue shows a clear upward trend widening the gap against all other revenue sources.

Figure 5.7 Massport Airports Operating Revenue Share, Fiscal Years 1991-2000



(2) Includes airport utility revenues and fees from operations at Hascom Field.

Source: Massachusetts Port Authority Comprehensive Annual Financial Report (Fiscal Year 2000)

Landing fees started as the second most important line item and maintained their position at the end of the 10-year period (Figure 5.7). Notice that despite the fact that between 1992 and 1997 landing fee rates increased continuously (Figure 5.6), landing fee revenues did not become more important as a fraction of total revenues. Conversely, after 1997 when landing fees declined from

\$2.24 to \$2.14 in 1999 and 2000 (Figure 5.6) landing fee revenues declined as a percent of the overall revenues (Figure 5.7).

In 1991 the rentals paid by the airlines for the use of the airport facilities and per passenger fees were, at 18%, the third most important operating revenue source. In 1992 the terminal rental fees contributed 20% of operating revenues. After that they declined to 15% of operating revenues in 2000. In 1997 concession revenues surpassed terminal rentals revenues. In 2000 concession revenues lost some of the previous gains, but still maintained a slight edge over terminal rental revenues (Figure 5.7). The remaining line items contribute about 20% of operating revenues, a percentage that has not changed much between 1991 and 2000.

5.3.2 Operating Expenses

Massport's operating expenses for airports have increased steadily from \$83 million in 1992 to \$157 million in 2001. Massport divides operating expenses into three main line items: operations and maintenance, administrative and insurance expenses (Table 5.4). About \$110 million or 71% of operating expenses was allocated to operations and maintenance costs. Approximately \$44 million or 28% was dedicated to administrative costs, while about \$2 million or 1.3% was used to cover insurance expenses.

5.4 Net Income

Table 5.4 highlights Massport airports net income for fiscal year 2001. Net income takes into account other revenues (and expenses) such as investments, the sale of property and equipment, as well as funds received from grants and special programs such as the Airport Improvement Program (AIP) and Passenger Facility Charges (PFCs). Items subtracted from operating income include interest expenses, and more importantly depreciation and amortization. The cost of depreciation and amortization was \$51 million in 2001. After all adjustments were made, the operating income was reduced from \$117 million to a net income of \$74 million.

Table 5.3 Massport's Airport Properties Net Income, Fiscal Year 2001

	Amount	(%)
Revenues, net:		
Total pledged revenues (5)	274,087	
Operating Expenses:		
Operations and Maintenance	110,343	70.3
Administration (6)	44,690	28.5
Insurance	2,017	1.3
<i>Total</i>	157,050	100.0
Excess (deficit) of revenues over operating expenses as prescribed by the trust agreement	117,037	
Add:		
Other Revenue (3)	1,516	3.0
Self Insurance Cost (1)	10	0.0
Passenger Facility Charge (3)	36,324	71.4
Gain on the sale of equipment (2) (4)	148	0.3
Capital grant revenue (3)	12,851	25.3
	50,849	100.0
Less:		
PILOT (4)	(10,759)	11.6
Interest Expense (4)	(29,120)	31.3
Depreciation and Amortization (4)	(51,930)	55.9
Other Expenses (4)	(1,096)	1.2
	(92,905)	100.0
Net Income (loss)	74,981	

(1) Expense under Trust Agreement, not an expense under GAAP.

(2) Equipment is depreciated under GAAP, but not under Trust Agreement.

(3) Not revenue under Trust Agreement, revenue under GAAP.

(4) Not operating income/(expense) under Trust Agreement, income/(expense under GAAP).

(5) For trust accounting purposes, the provision for uncollectible accounts is netted within the accounts listed under the Pledged Revenues caption.

(6) Massport allocates total administrative expenses based upon the proportionate amount of revenues and direct expenses by facility.

Source: Massachusetts Port Authority Comprehensive Annual Financial Report (Fiscal Year 2001)

5.5 Capital Program

In July 2000, Massport approved a capital program for the period 2000-2005 for \$3.4 billion. Of this amount, 87% will be dedicated to improve the Logan airport facilities. The Tobin bridge was allocated about 2%, while the maritime port, and other projects will receive the rest (Loop and Hecht 1999, 3).

5.5.1 Projects

Logan Modernization consists of two programs, the Logan Landside program, which involves major physical improvements to the airport and the Logan Airside program, which involves various alternatives for reducing current and projected levels of aircraft delay and enhancing operational safety. An important feature of the capital program is that each project has been designed as a separate module and has been or is being carried out and financed independently of other projects. Logan Airport improvements include:

- Replacement of Terminal A;
- Upgrade and expansion of Terminals B, C, and E;
- Renovation and expansion of the Central Garage and Terminal B Garage;
- Tow-level terminal roadway construction;
- Moving walkways from garages to terminals;
- Construction of unidirectional Runway 14/32;
- Construction of midfield taxiway between Runways 4L/22R and 4R/22L;
- Reconfiguration of taxiways in the southwest area;
- Other smaller projects.

5.5.2 Funding Sources

To pay for the capital program, Massport uses a sophisticated combination of financing mechanisms that rely mainly on borrowing. The preferred financing instrument used by Massport is revenue bonds. The federal government provides additional funding in the form

of grants (AIP) and approval of user-fee schemes (PFC) for key projects. In addition, there are smaller projects financed with special facility revenue bonds.

Massport relies heavily on government-sponsored programs such the Airport Improvement Program (AIP) (federal grants) and the Passenger Facility Charge (PFC) program, which was instituted at BOS in 1993. The federal government-sponsored funds provide funding for specific projects to meet the following objectives: preserve or enhance safety, capacity, or security; reduce airport noise; or serve as a catalyst to further competition among the airlines (DOT/FAA 1999, 48). As Figure 5.8 shows, since 1991 the revenue from government sponsored programs has increased substantially reaching its peak in 1996. It leveled off after that, declining slightly in the last six years. PFC funding has become the main source of federal government-sponsored funding, while AIP funding has decreased in recent years. Sections 3.1.2 and 3.1.3 explain how the FAA intended to use the PFC program as a quasi-substitute for the Airport Improvement Program (AIP). This is exactly what happened at Logan as AIP funding has decreased by almost two thirds from a high \$23.1 million in 1993 to a low \$8.5 million in 2001 (Figure 5.7).

In August 1993 the FAA approved the request from Massport to collect a \$3 PFC at Logan. The FAA authorized Massport to collect net PFCs up to \$598 million from November 1, 1993 though a projected expiration date of October 1, 2011. In January 1997, the FAA authorized Massport to increase its PFC collections to \$631 million and extended the expiration date to September 1, 2012. In addition the FAA approved the use of \$493 million of PFC collections for preliminary design projects as well as the final design, construction and financing costs associated with portions of residential soundproofing, the Terminal E Modernization project, circulating roadways and an elevated pedestrian walkway. In February 1998 the FAA authorized Massport to increase its PFC collections up to \$927 million extending the expiration date to October 1, 2017. Massport received authorization to spend \$434 million for the final design, construction and financing costs associated with the International Gateway Project. The steady revenue stream of PFC money made it possible to issue bonds backed by PFCs. On May 6, 1999, Massport entered into the PFC Trust Agreement with the Bank of New York, simultaneously removing PFC revenues from the pledge of the Trust Agreement. All PFCs collected by Massport after this

date are pledged under the PFC Trust Agreement. On June 16, 1999, Massport issued \$249.3 million PFC Revenue Bonds, Series 1999A and 1999B pursuant to the PFC Trust Agreement.

5.5.3 Debt Service

Revenue Bonds

As of June 30, 2001, Massport had outstanding obligations issued pursuant to the 1970 Trust Agreement and the PFC Trust Agreement of approximately \$1.2 billion.³² In fiscal year 2001, the total deposited in the debt service funds to pay senior lien obligations issued pursuant the 1978 Trust Agreement was \$74.2 million, while debt service to pay PFC bonds was \$21.5 million. Massport had 14 series of revenue bonds outstanding pursuant to the 1978 Trust Agreement in a total principal amount of \$936.2 million, and two series of PFC Bonds pursuant to the PFC Trust Agreement, with \$249.3 million outstanding.³³

Special Facility Bonds

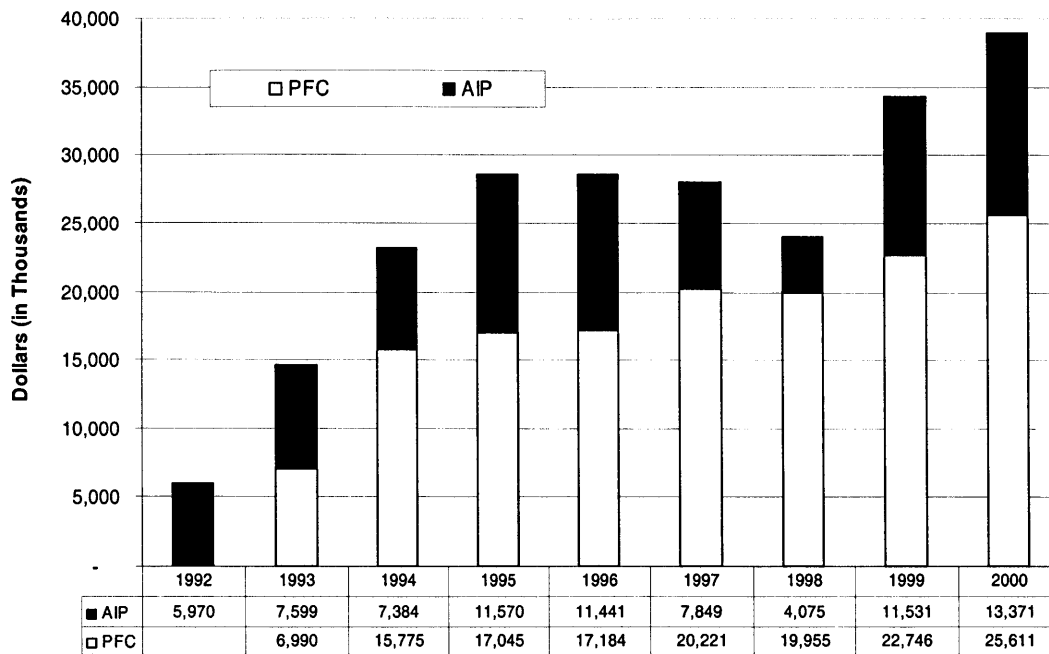
Massport also sponsors special projects through the issuance of special facility revenue bonds. As of June 30, 2001, Massport had approximately \$315.6 million of special facility revenue bonds outstanding in six separate series of bonds that include special bonds to finance the Harborside Hyatt Conference Center and Hotel Project. On August 16, 2001 Massport issued approximately \$497.6 million in aggregate principal amount of its Special Facility Revenue Bonds for the Delta Air Lines, Inc. Project. After the issuance of the Delta Bonds, the aggregate principal amount of Massport's special facility revenue bonds outstanding was approximately \$813.2 million. The principal and interest on the special facilities revenue bonds issued by Massport are payable solely from the revenues generated by each facility deal. For example, the Delta bonds will be paid with the revenues generated by the Delta facility to be built. It is important to mention that the special facilities revenue bonds are "stand-alone" financing mechanisms that will not be tied to Massport operating revenue or turn into a general obligation

³² This number excludes special facility revenue bonds issued on behalf of and payable by certain borrowers.

³³ In addition, Massport had smaller obligations regarding commercial paper and letters of credit.

of Massport, the Commonwealth or any political subdivision of it (Massachusetts Port Authority Comprehensive Annual Financial Report 2001, 12).

Figure 5.8 Massport's Government-Sponsored Revenues, Fiscal Years 1992-2000
(in Thousands of Dollars)



Source: Massachusetts Port Authority Annual Financial Reports (Fiscal Years 2000 and 2001)

Table 5.4 Massport's PFC Project Activity (as of June 30, 2001)

Projects	Charge Effective Date	Approval of Use Date	Cumulative Expenditures To Date	Approval of Use Amount
Residential Sound Insulation	1-Nov-93	27-Jan-97	15,325	26,990
Logan Modernization Program (LMP) Planning, Preliminary Design, and Environmental Analysis	1-Nov-93	24-Aug-93	9,510	10,346
Terminal E Modernization	1-Nov-93	27-Jan-97	20,892	24,568
Roadway System (Circulation)	1-Nov-93	27-Jan-97	78,334	268,306
International Gateway	1-Nov-93	5-Feb-98	5,959	434,106
Elevated Walkways	1-Jan-01	27-Jan-97	90,210	163,037
Total			220,230	927,353

Source: Massachusetts Port Authority Comprehensive Annual Financial Report, page 57

5.5.4 Recent Developments

The strong financial standing of Massport can be appreciated when comparing Massport's annual debt service,³⁴ which in 2001 reached \$64 million, to its increasing net income, which in 2001 reached \$143 million. This resulted in a bond debt service coverage of 2.21 (Table 5.5). The strong debt service coverage contributes to the high rating of Massport's bonds. By yearend 2000, Massport's Revenue Bonds were rated Aa3 by Moody's Investors Services, AA- by Standard & Poor's³⁵ and AA by Fitch IBCA. However, as a result of the financial impacts to Massport arising from the events of September 11, 2001, each of the major credit rating agencies placed Massport's Revenue Bonds on credit watch with negative implications. Massport's PFC Bonds are insured by Financial Security Assurance Inc. and were rated AAA, Aaa, and AAA, as insured, by each of Fitch IBCA, Moody's and S&P, respectively. Also, as consequence of the events of September 11, 2001, each credit rating agency placed the bonds on credit watch with

³⁴ Proceeds of the passenger facility charges ("PFCs") have been excluded from Revenues because such proceeds have been excluded from Revenues under the Trust Agreement. As used in the table, "Annual Debt Service" is equal to the "Principal and Interest Requirements" on Bonds (other than) PFC Revenues Bonds, Commercial Paper and Special Facility Revenue Bonds) outstanding for the applicable year.

negative implications (Massachusetts Port Authority Comprehensive Annual Financial Report 2001, 11-12).

Massport's prior planning and its comprehensive financial plans have contributed to responding to the changes in the aviation industry that have arisen since September 11, 2001. Now projects relating to safety and security have become Massport's priority. The change in priorities have aided staff in selecting which projects to accelerate and which projects to postpone. BOS should be able to withstand a decline in net income by adjusting its capital expenditures to current conditions (e.g. defer non-essential projects). On the other hand It is important to point out that airport operators can actually benefit during an economic slow down: Christopher Gordon, head of capital programs at BOS emphasized, "...the best time to build at an airport site is during a recession. Why? During a downturn in the economy, the construction industry suffers. This allows airports to hire the best construction companies at more competitive prices."

5.6 Conclusion

Logan International Airport stands out as one of the most profitable airports in the nation. In terms of traffic volume it ranks 18th among U.S. large hubs, yet it has operating revenues that comparable airports with much higher passenger volumes (e.g. ATL, DFW). As seen in Section 4.3.1, a strong O&D base contributes to higher parking and concession revenues. BOS, an airport with a very strong O&D base, has been able to capitalize with substantial parking and concession revenue increases. Massport's dependence on airline-driven revenues (i.e., landing fees, terminal rentals) has diminished during the last 11 years. This is consistent with the findings of Section 4.5 regarding facilities with compensatory rate-setting methodology: during the period 1996-2000 airports³⁶ with compensatory arrangements showed declines in aeronautical revenues (i.e., landing fees and terminal building rentals) and increases in non-aeronautical revenues (mainly parking and concession revenues). Operating expenses have been stable and well under control (Figure 5.4) and should not pose a threat to Massport's operating revenue structure. Evidence of

³⁵ On March 2002, d & Poor's lowered Massport Revenue Bonds rating from AA- to A+.

³⁶ This is applicable only to large airport hubs as defined by the FAA (Section 2.1).

Massport's sound financial standing is the increase of debt service coverage that since 1997 has fluctuated between 2.06 and 2.21 (2001) (Table 5.5).

Table 5.5 Massport Revenue/Bond Debt Service Coverages
Fiscal Years 1991-2001 (in thousands)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total Revenues	193,081	203,798	216,419	233,906	248,417	259,315	261,456	290,887	310,782	333,675	348,490
Total Operating Expenses	115,782	121,605	132,406	142,402	152,659	165,819	164,336	169,673	188,016	191,726	204,944
Net Revenues	77,299	82,193	84,013	91,504	95,758	93,496	97,120	121,214	122,766	141,949	143,546
Annual Debt Service	42,882	42,563	45,656	48,018	48,024	47,054	47,061	46,560	56,956	57,444	64,965
Annual Debt Service Coverage	1.8	1.93	1.84	1.91	1.99	1.99	2.06	2.6	2.16	2.47	2.21

Proceeds of the passenger facility charges ("PFCs") have been excluded from Revenues because such proceeds have been excluded from Revenues under the Trust Agreement. As used in the table, "Annual Debt Service" is equal to the "Principal and Interest Requirements" on Bonds (other than) PFC Revenues Bonds, Commercial Paper and Special Facility Revenue Bonds) outstanding for the applicable year.

Source: Massachusetts Port Authority Comprehensive Annual Financial Report (year ended June 30, 2000 and 2001)

Chapter 6

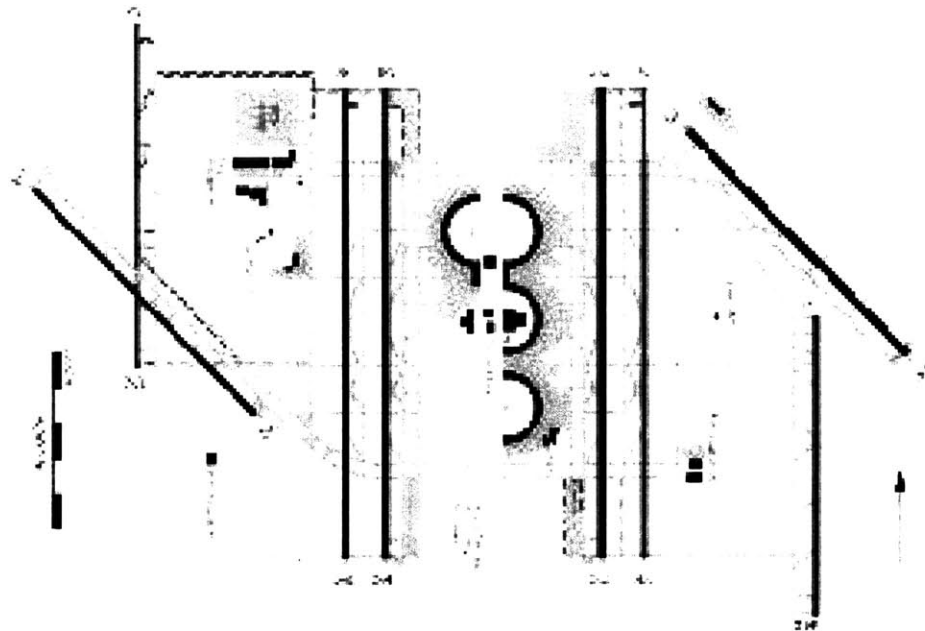
Dallas/Fort Worth International Airport

This chapter presents Dallas/Fort Worth (DFW) as an example of an airport that uses a residual fee-setting methodology. As seen in Section 4.5, airports using a residual approach to rate-setting are least dependent on landing fees. They also have a lower dependence on aeronautical fees and higher dependence on concessions. In the end, according to the findings in Section 4.5, airports with residual agreements achieve the lowest operating margins. In addition, according to S&P, airports with residual agreements should achieve average lower debt service coverage (1.75 or lower) than those with compensatory agreements (Forsgren, Wilkins and Greer 1999, 21). This chapter will be set to evaluate whether these patterns hold for DFW. It is important to point out that all financial information on this chapter pre-dates Sep. 11, 2001.

6.1 BACKGROUND

The Dallas/Fort Worth International Airport (DFW) was built in the early 1970s and opened for commercial service in 1974. After 25 years of operation, DFW ranks among the top five airports in the world in terms of aircraft operations and passenger traffic. The airport is located about 17 miles equidistant from the central business districts of Dallas and Fort Worth, serving an area with a population of approximately 4.8 million. The property contains about 18,000 acres with seven active runways, four terminals and 127 gates. By having 12 landing approaches, DFW ranks highly in on-time performance which is essential in maintaining reliable hubbing activity (Lehman, Mock and Fallon 2000, 5).

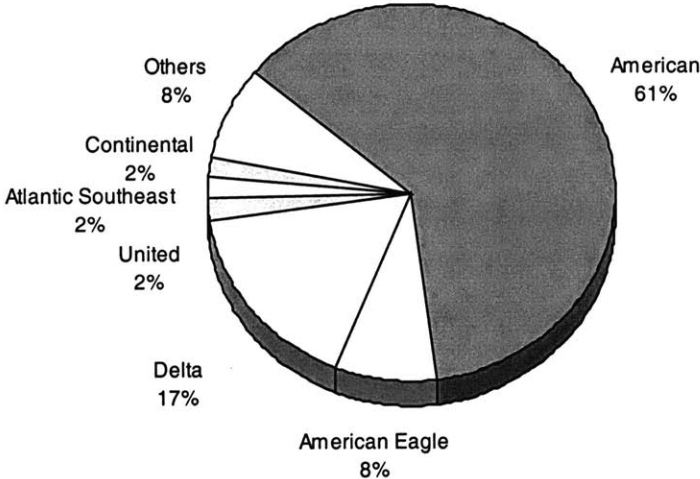
Figure 6.1 Dallas/Fort Worth International Airport Layout



Source: FAA

At the end of FY 2000 DFW had the following characteristics: it served over 60 million passengers, ranking fourth among the largest hubs in the U.S. The main tenants at DFW, American Airlines and partner American Eagle, had almost 70% market share, followed by Delta Airlines at 17% (Figure 6.2). Since DFW is one of the major hubs for American Airlines about 60% percent of the airport's passenger traffic is connecting. However, it is important to point out that the 40% O&D traffic at DFW represents about 23 million passengers, a number higher than total passenger numbers at one third of the largest commercial airports in the United States. DFW serves primarily U.S. destinations, consequently only 8% of the passenger traffic is international. In recent years DFW has maintained a 3.5% annual average passenger volume increase. This is well above the U.S. average, which in 2000 was about 2.4%.

Figure 6.2 Airline Share at DFW, Fiscal Year 2000



Source: 2002 Aviation and Aerospace Almanac

6.2 Ownership, Governance and Management

DFW was created on April 15, 1968 through a contract and agreement between the cities of Dallas and Fort Worth, Texas. The creation of this joint entity was for development and operation of the airport as a joint venture of both cities. The Board of DFW consists of seven members from the City of Dallas and four members from the City of Fort Worth, each appointed by the respective City Councils of Dallas and Fort Worth. The Board, has the power to operate the facilities and establish capital programs on behalf of the cities. “However, the Board cannot dispose of any airport property or issue revenue bonds without consent from the Cities” (Dallas/Fort Worth 2000 Comprehensive Annual Report, 17). Total operating expenses to be incurred in any fiscal year are budgeted and submitted to the cities for approval. Although the annual budget must be approved by each city, operations are totally financed by user charges and the cities have no responsibility for debt service of the airport (Dallas/Fort Worth 2000 Comprehensive Annual Report, 10).

6.3 Operating Revenue Structure

Between 1991 and 2001, operating revenues and expenses at DFW have had a parallel growth. As Figure 6.3 shows, the gap between revenues and expenses has remained relatively constant. Consequently, the operating income of DFW has remained almost flat. In 2000 expenses increased slightly more than in previous years while revenues did not show a major improvement. This resulted in a noticeable decline in operating income.

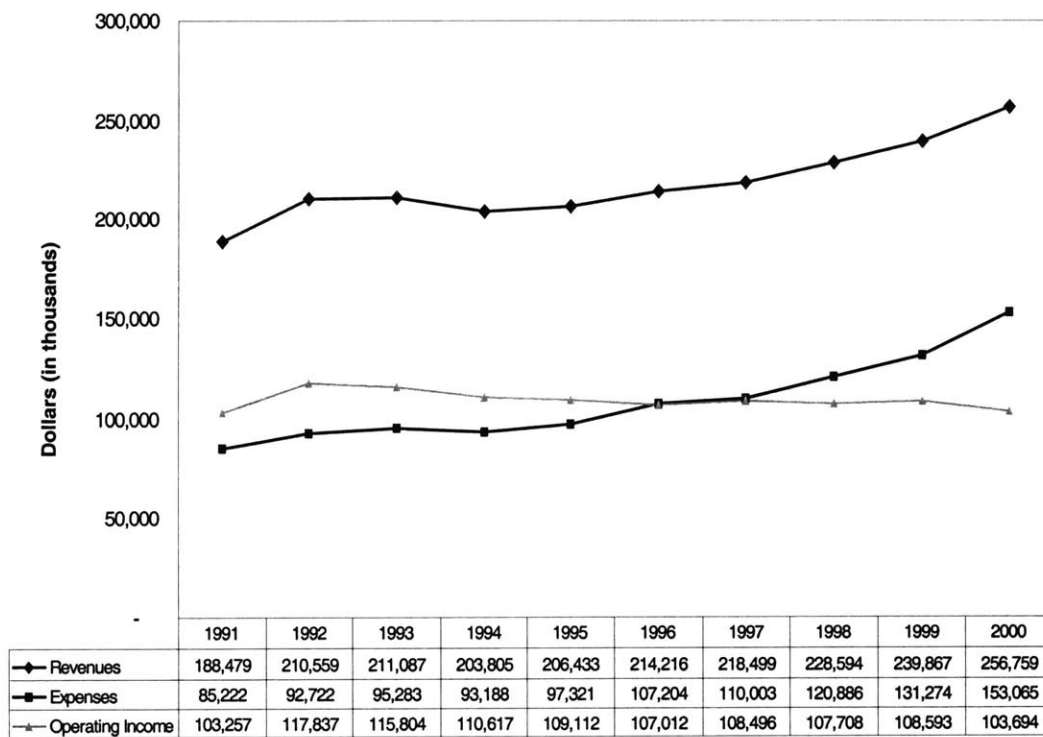
6.3.1 Operating Revenue

DFW operating revenues reached \$256 million in 2000 (Table 6.1). Over half of this amount was derived from parking and landing fees (Figure 6.4). Parking fees contributed over \$70 million or 27%. About \$69 million or 27% was derived from landing fees. Almost \$40 million or 15% was collected from terminal rents, user fees and concessions. Another \$34 million or 13% derived

from ground rentals and outside concessions. The remaining 16% was received from a variety of sources that include utility services, hotel facilities, fueling systems, transit system, etc.

From \$40.4 million in 1991, parking revenue increased by 75% to \$70.9 million, becoming the single most important operating revenue line item at the end of fiscal year 2000. At the end of this 10-year span parking had become the most important line item accounting for 29% of total operating revenues (Figure 6.4).

Figure 6.3 Operating Revenues and Expenses at DFW, Fiscal Years 1996-2000



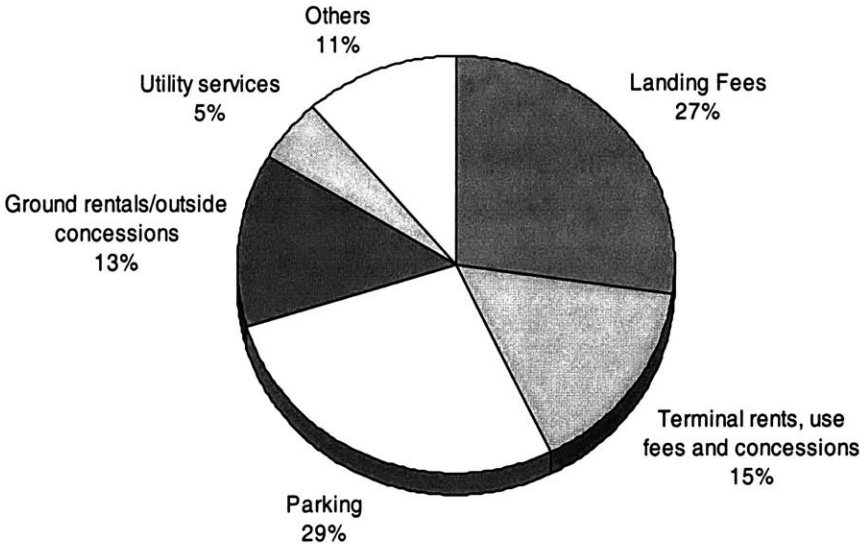
Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

Table 6.1 differentiates signatory airlines³⁷ from non-signatory airlines. Landing fee contributions from signatory airlines reached about \$66 million (25% of operating revenues) in 2000, while non-signatory airlines accounted for just \$3.3 million (slightly over 1.3% of

³⁷ The Dallas/Fort Worth Airport Use Agreement defines as a “Signatory Airline” a Certified Air Carrier, which has executed with the Board a Letter of Agreement or an agreement substantially similar to the DFW Airport Use Agreement.

operating revenues). As Table 6.1 highlights, between 1991 and 2000 the revenues from signatory airlines have actually decreased (value in current dollars). Landing fees from signatory airlines first increased from \$69 million in 1991 to an all-time high of \$83 million in 1993. Then, they declined gradually to reach \$54 million in 1999. In 2000, as other sources of revenue declined, landing fees had a sudden trend reversal with a 22% increase over the previous year reaching \$66 million. This was achieved by increasing the landing fees 15% from \$1.28 (per 1,000 pounds maximum approved landed weight) during fiscal year 1999 to \$1.48 in 2000 (Figure 6.5).

Figure 6.4 DFW Operating Revenues, Fiscal Year 2000



Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

According to the residual fee-setting methodology used by DFW, the airport costs are guaranteed to be covered by signatory airlines to reach a break-even point. Therefore, according to the use

and lease agreements³⁸, whenever there is a reduction of revenues in any of the cost centers, the signatory airlines will step up to cover any deficit. The *Airport Use Agreement*³⁹ imposes on each signatory airline the obligation to pay landing fees, rentals fees and charges for the use and occupancy of the airport. These payments, together with rental fees, and charges paid by other airport users, “will produce total annual gross revenues sufficient to pay for the operation and maintenance of the airport, plus 1.25 times the payment of principal and interest on the joint revenue bonds, plus the payment of any other obligations required to be paid from the revenues of the airport” (Dallas/Fort Worth International Airport 2002, 1). This is in fact the definition of a residual type of agreement.

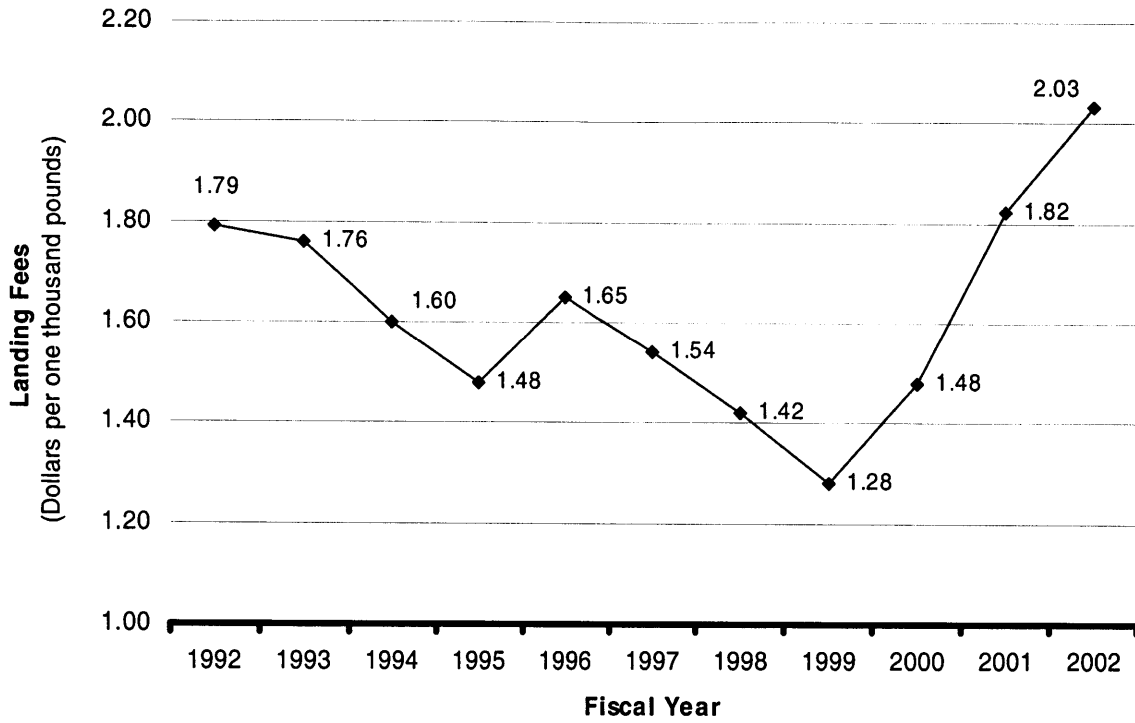
Concession revenue accounts for charges to the airlines, and concessionaires for the use of the space at the passenger buildings. Concession activity within the terminals has expanded measurably in the last five years with service from more than 75 retail establishments (Lehman, Mock and Fallon 2000, 5). In terms of current dollars, this line item has ranged from an all-time high of \$37 million in 1992 to \$32 million in 1999. In 2000, as in the case of the landing fees, this line item had a 21% increase to \$39 million. Again, the terminal rents and concession space is ruled by a residual agreement that obligates the tenants subject to the *Use and Lease Agreement* to cover existing deficits in other cost centers.

Ground Rentals/Outside Concessions revenues accounted for 13.2% of all operating revenues in 2000. What is remarkable about this line item is the fact that between 1991 and 2000 it has increased by 140% from \$14.1 million to \$33.9 million. Consistent with the increasing emphasis in expanding business opportunities at DFW a consolidated Rent-A-Car facility was completed in March 2000. The new Rent-A-Car facility, which provides a common rental center for 12 rental car agencies, generated \$19 million during its first year of operations! (Dallas/Fort Worth 2000 Comprehensive Annual Report, iii).

³⁸ “The airport leases substantially all of its fixed assets (i.e., terminals, runways, and related assets) to signatory airlines and other tenants under long-term operating leases. A majority of the lease payments are determined each year under the Restated and Amended Use Agreement based upon actual costs of the airport” (Dallas/Fort Worth 2000 Comprehensive Annual Report, 24).

³⁹ DFW current Use Agreement will end on December 31, 2009. As of February 2000, there were 18 signatory airlines and eight signatory all-freight carriers. The original use agreements were signed in 1968 and were last amended in 1985.

Figure 6.5 Landing Fees at DFW (1992-2002)



Source: Dallas/Fort Worth International Airport Finance Department

Table 6.1 DFW Operating Revenues, Fiscal Years 1991-2000
(in Thousand of Dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	(2000) %
Landing fees (a)	69,168	82,445	83,368	73,547	68,664	73,082	68,157	61,913	54,997	66,607	25.9
Landing fees (b)	2,128	2,352	2,527	3,209	4,301	3,344	2,918	3,431	4,215	3,315	1.3
Terminal rents, use fees and concessions	34,276	37,255	32,662	27,230	28,738	27,557	29,345	30,891	32,539	39,675	15.5
Parking	40,424	42,324	44,371	47,884	52,572	54,603	57,101	63,460	68,373	70,922	27.6
Ground transportation regulation						1,370	3,872	3,981	5,160	7,149	2.8
Ground rentals/outside concessions	14,111	15,884	17,804	20,440	21,568	23,642	25,203	28,621	28,473	33,969	13.2
Transit system	5,022	6,088	6,549	6,618	6,663	6,812	7,996	8,332	7,917	7,654	3
Utility services	10,694	11,777	11,383	11,042	11,392	11,165	10,824	12,053	12,614	13,286	5.2
Hotel and recreation	4,233	4,278	4,300	4,479	4,700	5,037	5,590	7,944	8,190	3,526	1.4
Fueling system rentals	3,060	3,120	3,060	3,144	3,125	2,014	1,879	1,913	3,880	3,967	1.5
Reimbursable services	834	249	191	58							0
East cargo area rentals	1,468	1,495	1,482	1,729	1,711	1,741	1,715	1,718	1,787	1,813	0.7
Anti-air piracy charges	2,337	2,450	2,326	2,286	2,148	2,197	2,349	2,770	2,956	3,172	1.2
Miscellaneous	724	842	1,064	2,139	851	1,652	1,550	1,567	8,766	1,704	0.7
Total	188,479	210,559	211,087	203,805	206,433	214,216	218,499	228,594	239,867	256,759	100

- (a) Signatory airlines
(b) Non-signatory airlines

Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

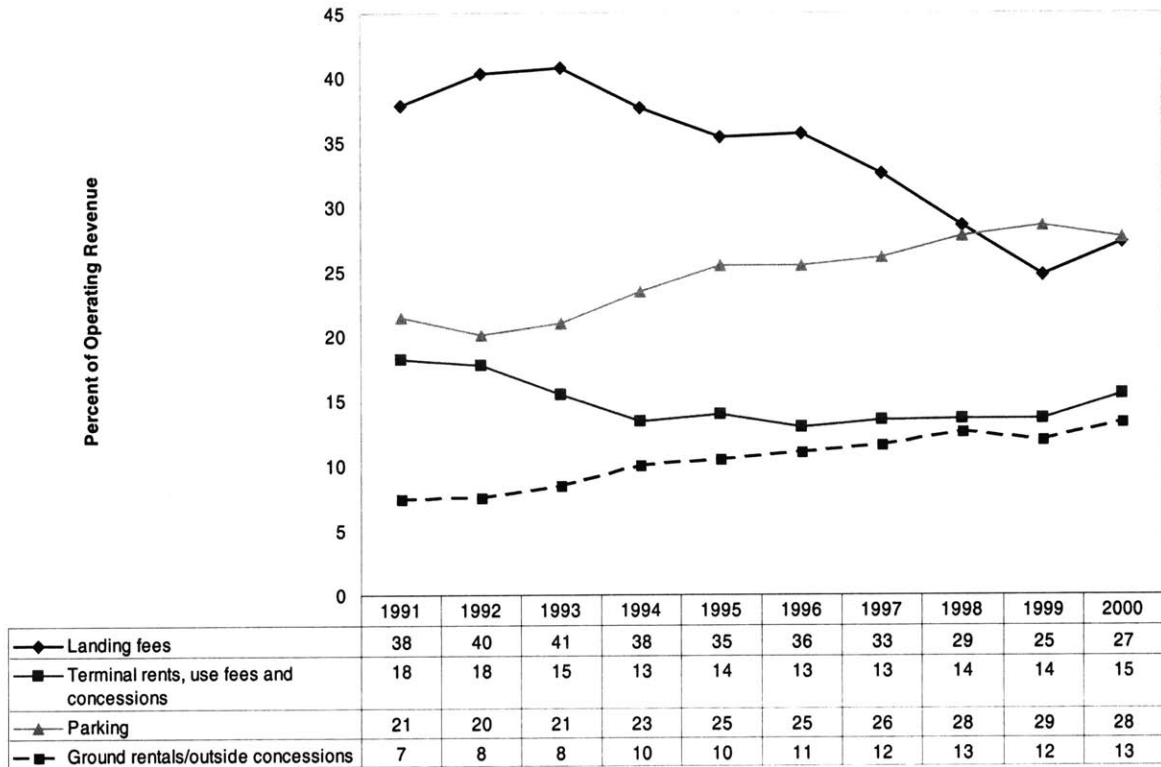
Table 6.2 DFW Operating Expenses, Fiscal Years 1991-2000
(in Thousand of Dollars)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	(2000) %
Landing area	37,553	40,341	43,002	1,451	1,885	1,622	1,853	2,327	3,039	6,921	4.5
General aviation complex	255	298	335	103	170	187	196	230		370	0.2
Terminal area	9,724	10,250	8,727	6,271	6,634	7,186	8,212	10,031	11,386	12,574	8.2
Parking	10,494	11,185	13,174	8,429	9,440	9,756	10,228	12,119	13,919	17,498	11.4
Ground transportation						1,206	1,668	2,486	2,696	3,312	2.2
Ground rentals/outside concessions	3,628	4,600	5,445					521	231	1,792	1.2
Transit system	8,827	9,233	7,514	7,355	7,758	7,967	7,861	7,418	7,813	8,210	5.4
Utility services	7,827	9,193	9,312	8,948	9,596	9,324	8,984	9,211	9,407	9,824	6.4
Hotel and recreation	3,046	3,265	3,355			1	2	2	2		0
Fueling system rentals	1,768	1,573	1,848	1,500	1,375					196	0.1
Reimbursable services											0
East cargo area	684	804	846	617	619	630	628	29	24	682	0.4
Anti-air piracy	2,337	2,450	1,639	2,286	2,148	2,197	2,349	2,770	2,996	3,216	2.1
Airport services***				56,227	57,696	67,128	67,521	72,978	77,649	88,214	57.6
Other operating expenses (revenues)	-921	-470	86	1			501	764	2112	256	0.2
Total	85,222	92,722	95,283	93,188	97,321	107,204	110,003	120,886	131,274	153,065	100
Depreciation	29,085	31,215	32,949	35,827	38,355	42,105	44,848	146,801	56,783	62,956	
Total after depreciation	114,307	123,937	128,232	129,015	135,676	149,309	154,851	267,687	188,057	216,021	

*** Prior to 1994 Airport Services Cost was included in other areas

Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

Figure 6.6 DFW Operating Revenue Structure (selected line items), Fiscal Years 1991-2000



Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

To assess the relative strength of individual revenue line items in the overall revenue structure, Figure 6.6 was created assigning each line item its percent value for each year. Over the 10-year span major changes occurred to the operating revenue structure at DFW. These changes highlight the effect of the existing residual agreement between DFW and the signatory airlines. Generally, under a residual agreement all cost centers are supposed to collectively cover the cost of running the facility. If one of the revenue generating cost centers (or revenue line items) diminishes its contribution, the gap will have to be covered by the remaining cost centers (Section 2.3.1). It is evident in Figure 6.5 that as parking and ground rentals/outside concessions increased their share, the other sources of revenue (i.e., landing fees and terminal rents, use fees and concessions) decreased their contribution. Between 1999 and 2000 parking revenue growth came to a halt and actually lost some ground as compared to previous years. In response, all other centers increased

their contribution. This is the classic example of a residual agreement, where all cost centers are collectively obligated to contribute to ensure that the airport breaks even.

6.3.2 Operating Expenses

DFW operating expenses (excluding depreciation and amortization) reached \$153 million in 2000. Salaries accounted for almost \$90 million or 58% of operating expenses (Table 6.3).

Labor costs at DFW were higher than the U.S. large hub average, which in 2000 was 37% of operating expenses (Table 4.2). General Information Survey conducted by Airports Council International-North America (ACI-NA) indicates that DFW employs over 1,700 people (Table 4.3). DFW averages expenditures of \$51,000 per employee, which is below the \$66,000 average for large hubs in the United States (Table 4.3). Contract services including the outsourcing of work accounted for \$31 million or 20%. Utilities accounted for 7%, and maintenance and supplies for 6%. The other line items that include other administrative charges and insurance accounted for 6.4% of operating expenses.

Table 6.3 DFW Operating Expenses, Fiscal Year 2000
(in Thousands of Dollars)

Operating Expenses	Amount	(%)
Salaries, wages, and benefits	89,831	58.7
Contract services	31,861	20.8
Maintenance and other supplies	10,474	6.8
Insurance	2,851	1.9
Utilities	11,193	7.3
General, administrative and other charges	6,855	4.5
Operating Expenses *	153,065	100

* Excludes depreciation and amortization

Source: Dallas/Fort Worth International Airport 2000 Annual Report

6.4 Net Income

To obtain the airport's net income, revenues and expenses related to financing, and investment, as well as grants and funding from federal-sponsored programs such as AIP and PFC are added and subtracted to the operating income. Notice that interest income is as large as DFW's operating income. The interest cost regarding the revenue bonds was about \$60 million. Also, as a result of DFW's large traffic volumes, PFCs generated over \$67 million. In 2000 DFW operating income reached \$40 million.⁴⁰ After adding and deducting all other revenues and expenses the net income turned out to be a healthy \$93 million (Table 6.4).

6.5 Capital Program

In 2000 DFW launched the largest construction project to date. The program is aimed at increasing air and landside capacity adding convenience to the passenger for the use of DFW. The 5-year Capital Development Program will cost over \$2.5 billion. During the peak construction phase the airport expects to employ 350 contractors and subcontractors, 100 consultants and sub-consultants and more than 4,800 construction workers. The capital program at DFW includes the following main features:

6.5.1 Projects

Terminal D

A new international terminal is slated for completion in 2005. It will be built at a cost of approximately \$1 billion. The construction project will include an 8,100 car parking facility. The new 1.9 million square foot international terminal will add 23 gates for both, international and domestic flights, a centralized federal inspection facility sized to serve 2,800 passengers an hour and plenty of space for concessions and retailers.

⁴⁰ This amount includes depreciation and amortization.

Table 6.4 DFW Net Income, Fiscal Year 2000
(in thousand dollars)

	Amount	%
Operating revenues:		
Landing fees (a)	66,607	25.9
Landing fees (b)	3,315	1.3
Terminal rents, use fees and concessions	39,675	15.5
Parking	70,922	27.6
Ground transportation regulation	7,149	2.8
Ground rentals/outside concessions	33,969	13.2
Transit system	7,654	3
Utility services	13,286	5.2
Hotel and recreation	3,526	1.4
Fueling system rentals	3,967	1.5
Reimbursable services	0	0
East cargo area rentals	1,813	0.7
Anti-air piracy charges	3,172	1.2
Miscellaneous	1,704	0.7
Total operating revenues	256,759	100
Operating expenses:		
Salaries, wages, and benefits	89,831	41.6
Contract services	31,861	14.7
Maintenance and other supplies	10,474	4.8
Insurance	2,851	1.3
Utilities	11,193	5.2
General, administrative and other charges	6,855	3.2
Depreciation	62,956	29.1
Total operating expenses	216,021	100
Operating Income	40,738	
Non-operating revenues (expenses):		
Interest income	40,142	
Interest expense on revenue bonds	-60,737	
Increase (decrease) in direct financing leases receivable. net	-17,635	
Interest and other income (expense) on direct financing leases. Net	13,388	
Federal and State Grants	12	
Passenger Facility Charges	67,933	
Other. Net	9,816	
Total non-operating revenues (expenses)	52,919	
Net Income (Loss)	93,657	

- (a) Signatory airlines
(b) Non-signatory airlines

Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

Airfield Projects

The \$184 million plan is aimed at reducing delays and increasing overall aircraft operations capacity. The plan includes the extension of three runways at a cost of \$87 million, and the construction of a new runway. Among the advantages of this program, the extended runways will contribute to reducing congestion on the taxiways by increasing taxi queuing capacity.

Automated People Mover and Other Projects

The construction of a \$742 million bi-directional automated people mover commenced in 2000 and is expected to be completed during fiscal year 2005. The system is designed to move as many as 8,500 passengers per hour in each direction. The capital program includes other supporting infrastructure projects such as an \$18 million signage replacement program, a new customer center, an aircraft rescue fire station, as well as additional parking spaces.

Various airlines and tenants have obtained independent financing for the acquisition, construction and improvement of certain airport facilities. These entities are governed by boards that are not under the control of the DFW Board. Although the airport reviews and approves the projects for which the monies are spent, the airport has no authority over these entities. Furthermore, certain airlines and other tenants have funded construction and improvements from their own working capital and/or other sources (Dallas/Fort Worth 2000 Comprehensive Annual Report, 24).

6.5.2 Funding Sources

It is impossible for airports to pay for major capital programs without a financing mechanism. To raise large amounts of money airports like DFW leverage their yearly revenues issuing revenue bonds. DFW's capital program will be heavily debt-financed. DFW was planning to issue \$500 million of General Airport Revenue Bonds (GARBs) in the spring of 2002, then \$400 million in the early winter of 2002, and \$300 million in the spring of 2003. Already in the fourth quarter of 2001 DFW issued \$650 million of new money and refunding bonds.

In addition to the revenue bond money, DFW benefits from federally sponsored funding programs. These federal programs include the AIP grant program and the PFC program. DFW has received federal grants over the years for specific projects that are subject to review and audit by the grantor agency. The AIP grants awarded are project-specific and are not given to the airport authorities to be used at their discretion (see Section 3.1). Between 1991 and 2000 DFW received \$337 million in grant money from the federal government. About 68% of the grant money has been used for construction, 29% for land acquisition and only 1.7% for planning (Table 6.5).

Table 6.5 DFW Grant Awards History (unaudited), Fiscal Years 1991-2000
(in Thousands of Dollars)

Fiscal Year	Purpose of Grant*			Total
	Land	Planning	Construction	
1991	-	500	20,482	20,982
1992	-	299	30,727	31,026
1993	10,991	375	29,859	41,225
1994	19,609	-	37,420	57,029
1995	6,500	90	38,500	45,090
1996	35,617	-	9,822	45,439
1997	24,679	1,918	1,646	28,243
1998	2,500	73	19,724	22,297
1999	-	2,269	18,432	20,701
2000	-	450	25,064	25,514
Total	99,896	5,974	231,676	337,546

* Represents grant amounts awarded each year from Federal Aviation Administration Grants or actual grant amounts as closed. For financial reporting purposes, grants are recorded as earned, not awarded.

Source: Dallas/Fort Worth International Airport Finance Department

In recent years funding from the Passenger Facility Charge (PFC) program has become a key component in the funding of DFW's capital program. In 2000 PFC revenues generated more money than landing fees from signatory airlines, the second most important operating revenue source (Table 6.4). Up until the end of 2000 five applications for the PFC Program have been submitted by DFW. The first application provided for funding of the sponsor's share of federal

grant eligible costs for the construction of Runway 17L/35R (formerly Runway 16/34 East), including land acquisition and mitigation and issuance costs and interest related to the bonds sold in conjunction with the runway project. This application provided for the collection of a \$3 per passenger fee resulting in total revenue of \$132 million. The collection period began on May 1, 1994 and ended May 31, 1996 (Dallas/Fort Worth 2000 Comprehensive Annual Report, 16).

A second application provided funding totaling \$96.8 million for six projects, including two that required further approval (such as environmental assessments) prior to implementation. The collection period for this application began on February 1, 1997 and extended through April 30, 1998. Three amendments extended the collection period through September 1, 2001, and resulted in a decrease of total collection to \$90.1 million. On September 26, 2000, a third amendment provided additional authority to collect money for the extension and associated development of Runways 17C, 18L, and 18R (Dallas/Fort Worth 2000 Comprehensive Annual Report, 16).

The third PFC application approved on December 18, 1997 requested about \$249 million for four projects. Among these projects were the expansion of terminal B and the development and construction of Runway 16/34, West. Four amendments to this application increased the authorized collection to \$261 million (Dallas/Fort Worth 2000 Comprehensive Annual Report, 17).

A fourth application was approved May 17, 1999 and requested authorization to use \$24.8 million previously imposed in Application 2 for extension and associated development of Runways 17C, 18R, and 18L. An additional use authority of \$42.8 million for the previous runway projects was approved on September 16, 2000. The four applications resulted in a total collection authority for DFW's PFC Program of \$483.2 million (Dallas/Fort Worth 2000 Comprehensive Annual Report, 17).

The fifth PFC application was presented in December 2000. This should provide funding for a bi-directional people-mover system and eleven other projects. This application is for a collection of \$3 charge with authorized total collections anticipated to be over \$2 billion. The collection period started in June 2001 and goes through September 30, 2011 (Dallas/Fort Worth 2000

Comprehensive Annual Report, 33). The application for authorization of \$3.75 billion in PFC over the next 35 years is seen by the credit rating agency Standard & Poor's as a major factor to reducing pressure on airline rates.

6.5.3 Debt Service

The airport has three forms of indebtedness: Joint Revenue Bonds, Special Facility Revenue Bonds, and Facility Improvement Corporation (FIC) Revenue Bonds (how do these bond forms relate to DFW being a residual airport?). Joint Revenue Bonds are issued for the development of airport property and are serviced and secured from the operations of the airport. Special Facility Revenue Bonds and FIC Revenue Bonds are issued for construction of various special facilities and are payable from rentals and other fees pursuant to various lease agreements between the Airport's various lessees (Dallas/Fort Worth 2000 Comprehensive Annual Report, viii). The gross principal amounts outstanding as of September 30, 2000 were as follows:

Table 6.6 DFW Gross Principal Amounts Outstanding
(as of September 30, 2000)

	Amount (in millions)	%
Joint Revenue Bonds	1,229	48.7
Special Facility Revenue Bonds	67	2.7
FIC(1) Revenue Bonds	1,228	48.7
Total	2,525	100.0

(1) Facility Improvement Corporation

Source: Dallas/Fort Worth International Airport 2000 Comprehensive Annual Report

Between 1991 and 2000 DFW has embarked on a diversification of its operating revenue and a strengthening of its Joint Revenue Bond Coverage. Standard & Poor's values highly DFW trends over the past decade which show a substantial growth in parking and ground rental/concession revenues that have allowed landing fees to drop from \$85 million in 1993 to \$69 million in 2000. This has contributed to a diversification of DFW operating revenues. According to S&P, airport

operating revenues at DFW are already well diversified (Table 6.1 and Figure 6.4) with no line item accounting for more than 28% of operating revenue (Lehman, Mock and Fallon 2000, 5).

The *Use and Lease Agreement* stipulates that debt service coverage should be set at or near 1.25 times the costs needed to run the facility plus the payment of principal and interest on the joint revenue bonds. DFW management is going beyond those requirements and continues to strengthen its financial standing as the Joint Revenue Bond Coverage has gone up from 1.32 in 1997 to 1.64 in 2000 (Table 6.7), which means that the airport is generating revenues at a higher pace than creating new debt. For example, in DFW net income in 2000 totaled \$150 million, while the debt service for the Joint Revenues was only \$91 million. This gave DFW a financial cushion of approximately \$59 million, about \$20 million more than in the previous year! The timing of an increase in the Joint Revenue Bond Coverage coincides with a time when DFW starts its most ambitious capital program.

6.5.4 Recent Developments

The recent weakening of the economy and the major disruption in the airline industry following the incidents of Sept. 11 affected DFW's revenue stream. To cope with this challenge the DFW management team has been able to make the necessary adjustments. For instance, about \$204 million in near-term projects of the capital program have been temporarily deferred. Also, three long-term projects have been placed on hold. They include the eight runway project (which accounts for roughly \$300 million), the proposed terminal F project (about \$840 million), and a proposed light-rail system connecting DFW to Dallas DART and Fort Worth's T light-rail system (Gilliland, Champeau, Soltz and Stettler 2002, 8).

6.6 Conclusion

The steady revenue growth and controlled expenditure increase experienced by DFW between 1991 and 2000 suggests a very stable business environment. Clearly, during that period DFW benefited from a continued growth in parking revenues. The increase in parking revenues caused

landing fees and terminal rentals lower their contribution to the operating revenue. A weakening of the economy between 1999 and 2000 had an immediate impact on parking revenues slowing down its growth considerably. In response, the residual nature of DFW agreement with the airlines obligated the other cost centers to increase their contribution (Figure 6.5). This is the classical example of a residual agreement, under which the airport is guaranteed a minimum revenue to cover its operation expenditures (Section 2.3.1).

About 58% of DFW operating expenses were labor costs in 2000. This is consistent with the findings of Section 4.5, which shows that airports with residual agreements are most likely to have higher labor costs. Contract services accounted for about 20% of operating expenses. This is, again, consistent with the findings of Section 4.5, which shows that in 2000 airports with residual arrangements spent an average 22% of their operating expenses in contracted services.

Table 6.7 DFW Joint Revenue Bond Coverage* (in Thousands of Dollars)

Fiscal Year	Net Revenues				Net Debt Service			
	Operating Revenues	Interest Income	Operating Expenses (excluding depreciation)	Net	Principal	Interest Expense	Net Debt Service	Ratio*
1991	188,479	18,609	-85,222	121,866	26,300	62,511	88,811	1.37
1992	210,559	13,506	-92,722	131,343	28,995	71,995	100,990	1.30
1993	211,087	12,245	-93,632	129,700	22,425	72,666	95,091	1.36
1994	203,805	14,361	-87,675	130,491	28,360	65,916	94,276	1.38
1995	206,478	21,964	-99,106	129,336	25,742	71,844	97,586	1.33
1996	214,216	22,502	-104,984	131,734	34,660	62,157	96,817	1.36
1997	218,499	20,718	-105,254	133,963	35,970	65,618	101,588	1.32
1998	228,594	26,968	-123,887	131,675	37,885	58,253	96,138	1.37
1999	239,867	25,271	-131,274	133,864	39,565	55,136	94,701	1.41
2000	256,759	46,543	-153,065	150,237	39,165	52,677	91,842	1.64

* Revenue bond coverage is computed based on the requirements of the Bond Ordinance and includes debt service for joint revenue bonds. The coverage required by the Bond Ordinance is computed on a rates, fees and charges basis. The above calculation computes coverage in accordance with generally accepted accounting principles, in years applicable. Therefore, the coverage will not equal 1.25 in all years. However, DFW is in compliance with the requirements of the Bond Ordinances as computed on a rates, fees, and charges basis.

Source: Dallas/Fort Worth International Airport Finance Department

DFW management has been able to respond well to a weakening of non-aeronautical revenues. The decrease of parking revenues was immediately met by an increase of landing fees and terminal rents. As the economy continued to struggle, DFW was able to increase its landing fees considerably. Landing fees have been increased from \$1.28 (per 1,000 pounds of maximum approved landed weight) in 1999 to \$1.48 in 2000, to \$2.03 in 2002 (Figure 6.5). As a result DFW has been able to increase its Joint Revenue Bond coverage from 1.41 in 1999 to 1.64 in 2000 (Table 6.7). This shows bondholders that DFW not only has the means to honor its obligations, it also shows investors the resourcefulness of the management team and the sound financial and legal structure of DFW.

Chapter 7

Baltimore/Washington International Airport

This chapter presents Baltimore/Washington International Airport (BWI) as an example of an airport that uses a hybrid approach to set its aeronautical fees. As seen in Section 4.5, airports using a hybrid approach to rate-setting are more reliant on aeronautical fees (over 60% of operating revenues). Also, they are the least reliant on parking or concession revenues. In the end, according to the findings in Section 4.5, airports with hybrid agreements such as BWI should achieve operating margins in between of those with compensatory or residual approaches. This chapter will be set to evaluate whether these patterns hold for BWI. It is important to point out that all financial information on this chapter pre-dates Sep. 11, 2001.

7.1 Background

The Baltimore/Washington International Airport (BWI) is located in Baltimore, Maryland, 30 miles north of Washington D.C. Serving over 19 million people in 2000 (an average of over 53,000 daily passengers), BWI ranked 27th among large U.S. hubs. BWI has become one of the fastest growing airports in the nation reaching double-digit growth in terms of enplanements between 1999 and 2001 (Figure 7.3).

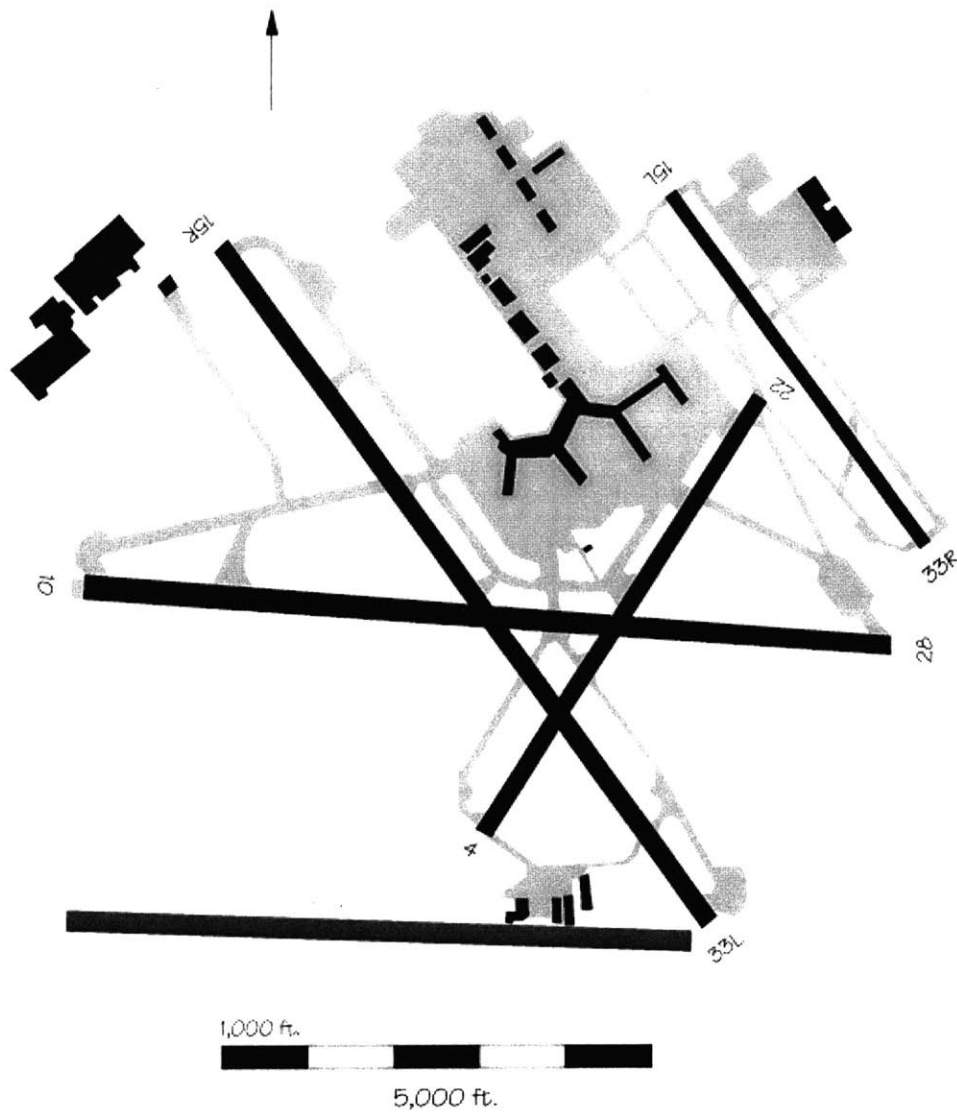
The presence of Southwest Airlines at BWI is being credited as one of the main factors for this impressive growth rate. BWI has a very strong O&D market, as about 82% of the traffic originates and/or terminates at this facility. BWI traffic is mostly domestic with 97% of the passengers travelling to or from U.S. destinations.

BWI's 1.4million sq. ft. passenger terminal has 5 piers (four domestic and one international). As of 2000, BWI had 65 jet gates (18 gates were dedicated to commuter aircraft). The FAA air capacity benchmark at Baltimore Washington is 111-120 flights per hour in good weather. Current capacity falls to 72-75 flights (or fewer) per hour in adverse weather conditions (i.e., poor visibility, unfavorable winds, or heavy precipitation). Because of its unique runway configuration, the potential gain in future arrivals over the next ten years due to technology and procedural improvements cannot be achieved without a decline in departures. According to the FAA, the demand is projected to grow by 27% over the next ten years suggesting that delays may grow significantly in the future (FAA 2001). A new 11,000 ft. Runway 10R/28L is planned to be constructed at the south end of the airport by 2008, 3,500 ft. south of Runway 10/28 (Figure 7.1). After the new runway is completed, Runway 4/22 will be converted to a taxiway. The estimated cost of these airside improvements is approximately \$150 million.

A series of events in recent years contributed to improve the BWI business environment. For example, in 1990 Interstate I-195 opened connecting BWI directly to I-95 and greatly improving access to and from both the Washington and Baltimore areas. In 1991 a \$29 million, 4-level parking garage, located in front of the main terminal, was inaugurated. The garage featured 2,800 parking spaces. In September 1993, Southwest Airlines began serving the Baltimore area. The

following year (1994) over 12.8 million passengers used BWI, representing a 36% increase over the previous year. An expansion project was completed in 1997 doubling the parking garage size to accommodate 5,600 vehicles (4,600 for public use and 1,000 for car rentals). In 1999 BWI initiated a program to renovate Piers A and B at a cost of \$85 million to provide more gates for the expansion of Southwest Airlines.

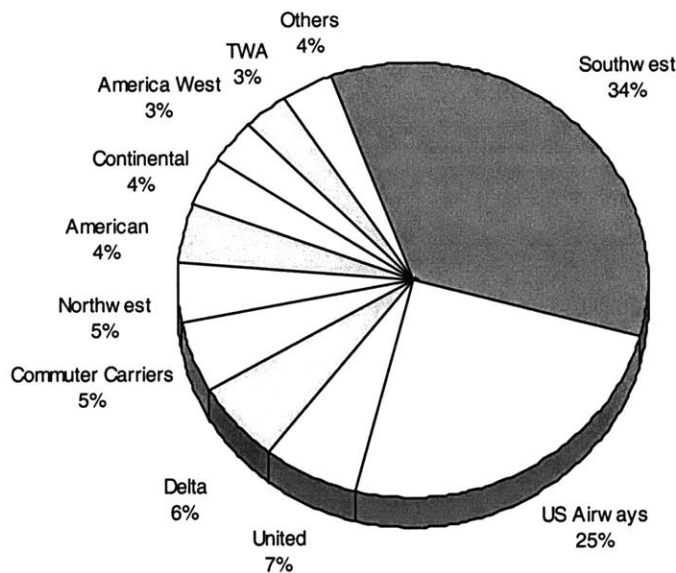
Figure 7.1 Baltimore International Airport Layout



Source: FAA

During 2000, about 34% of the passengers that used BWI flew Southwest Airlines, while another 25% flew US Airways. Consequently, the two leading airlines served about 60% of the passengers using BWI. The rest of the traffic was quite evenly distributed with no other carrier holding more than 8% market share (Figure 7.2).

Figure 7.2 Airline Share of Total Passenger Traffic at BWI, Fiscal Year 2000



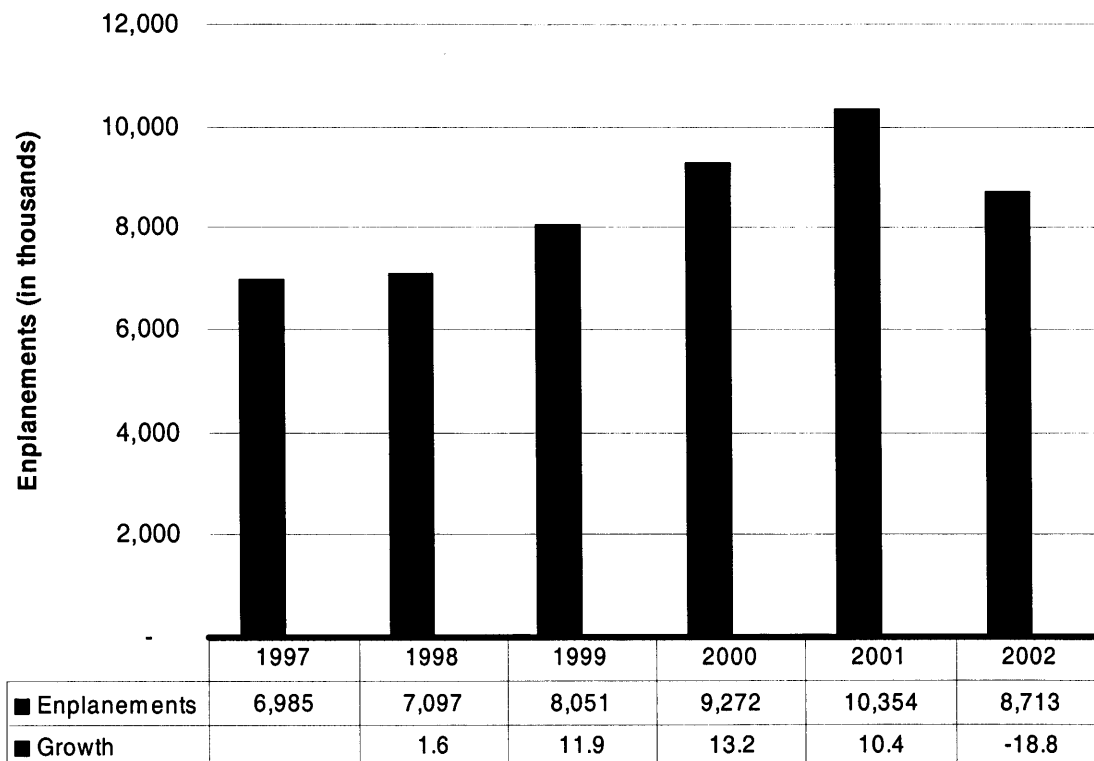
Source: 2002 Aviation and Aerospace Almanac

7.2 Ownership, Governance And Management

Commissioned by the Baltimore Aviation Commission, the master plan for a new airport was completed in 1946. Under the name of Friendship International Airport operations started in July 1950. In 1972 the State of Maryland, through the Department of Transportation, purchased the airport for \$36 million from the City of Baltimore. The airport was renamed to

Baltimore/Washington International Airport in 1973 to reflect its role as a transportation center for the Baltimore-Washington region. Under the Maryland Department of Transportation, the State Aviation Administration took over the operations of the airport. Today the Maryland Aviation Administration controls the operation of BWI. BWI and HNL are the only two large hubs in the United States under the jurisdiction and control of a state government (Table 2.2).

Figure 7.3 Enplanements at BWI, Fiscal Years 1997-2002*



* Figures for 2002 includes preliminary estimates for June 2002 and is subject to be revised.

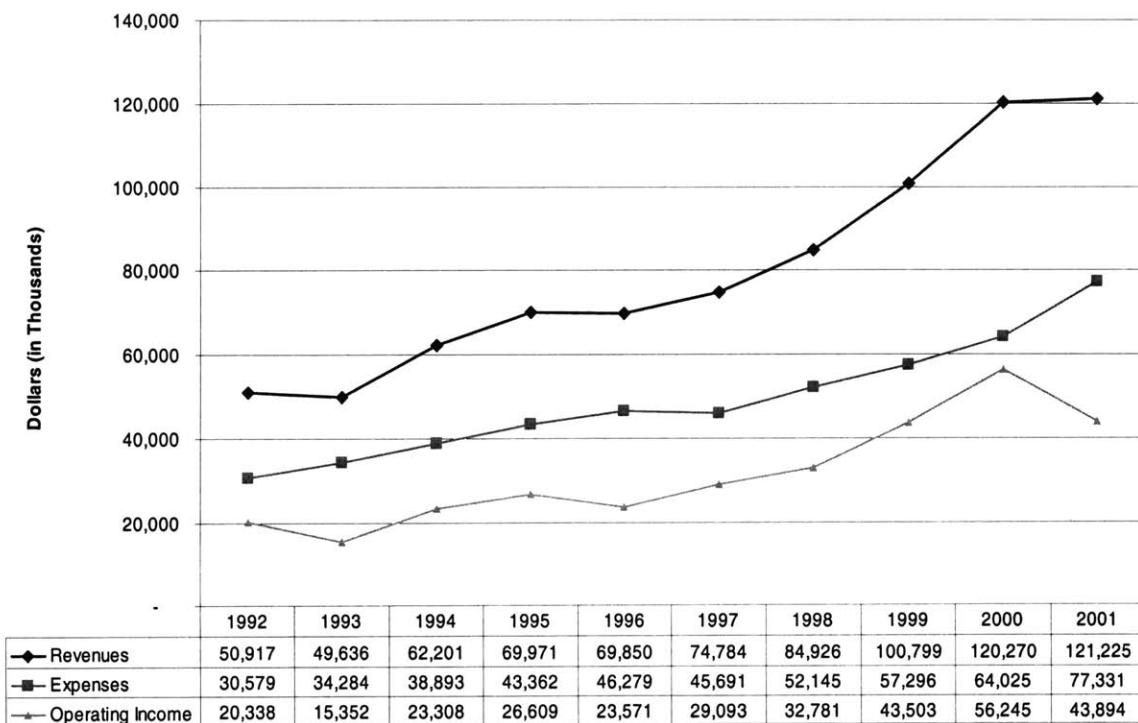
Source: Maryland Aviation Administration

7.3 Operating Revenue Structure

Just as traffic volumes have increased consistently during the last few years, so have the revenues. Figure 7.4 shows a dramatic increase in operating income during the period 1992 - 2000. Operating revenues increased 140% from over \$50 million in 1992 to \$120 million in

2000. Expenses, on the other hand, increased 113% from \$30 million in 1992 to \$64 million in 2000. Operating revenues showed a dramatic improvement between 1993 and 1994, the same year that Southwest started operations at BWI (during that period traffic at BWI grew by 36%). A weakening economy contributed to a decline in the growth of operating revenues in 2001.⁴¹ By contrast, the growth of operating expenses continued to increase, resulting in a decline of operating income.

Figure 7.4 Operating Revenues and Expenses at BWI , Fiscal Years 1992-2001



Source: Maryland Aviation Administration

⁴¹ BWI ends its fiscal year at the end of June, therefore the fiscal year ended in June 2001 did not capture the negative impact of Sept. 11 to the airline industry.

Table 7.1 BWI Operating Revenues, Fiscal Years 1992-2001
(in Thousands of Dollars)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	(2001) %
Landing Fees	11,364	10,586	14,044	15,635	14,657	15,889	16,054	18,163	19,027	23,585	19.5
Rents	17,691	16,491	19,184	19,502	18,919	18,755	20,174	21,592	21,850	21,822	18
Passenger concessions	19,719	20,508	26,820	32,678	33,836	37,421	45,321	56,997	67,126	69,285	57.2
Other concessions (a)	1,527	1,715	1,645	1,561	1,839	2,124	2,565	2,734	3,309	3,791	3.1
Other revenues (b)	616	336	508	595	599	595	812	1,313	867	2,742	2.3
Totals	50,917	49,636	62,201	69,971	69,850	74,784	84,926	100,799	112,179	121,225	100

(a) Taxi stand permits, general aviation complex, advertising poster and diorama, motor vehicle fuel commissions, hotel, service station, land rental property tax, automotive service station.

(b) Airport traffic fines, sale of documents, sale of specifications, charge for lost lds, auditorium and meeting rooms, automobile parking decals, airport development program.

Source: Maryland Aviation Administration

Table 7.2 BWI Operating Expenses, Fiscal Years 1992-2001
(in Thousand of Dollars)

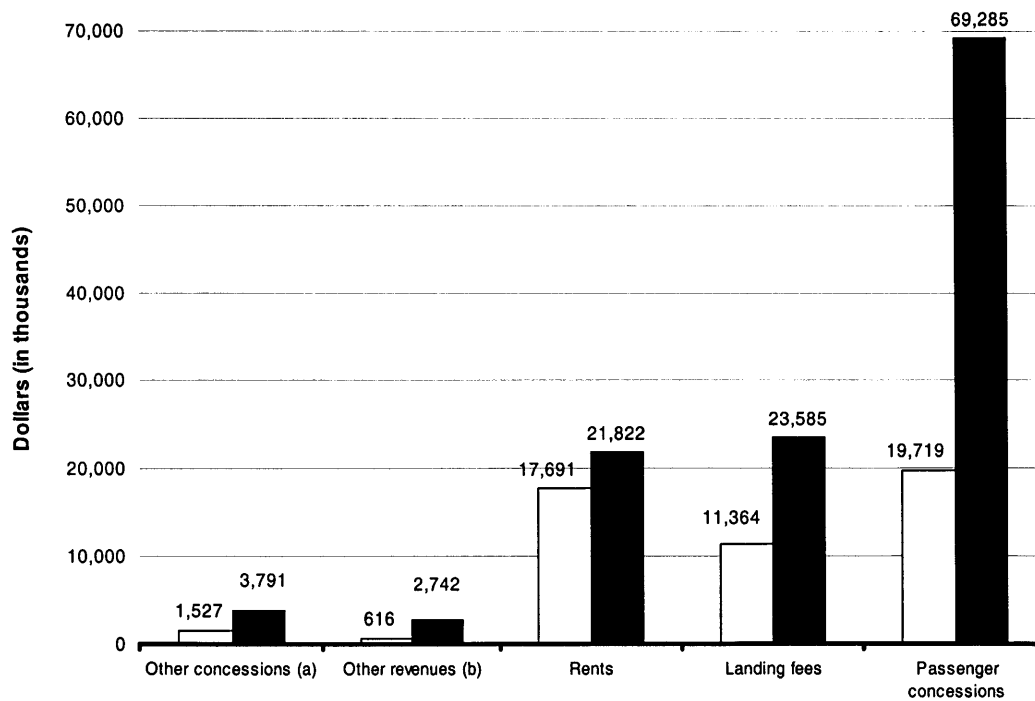
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	(2001) %
Salaries	10,901	11,609	12,422	14,393	14,853	15,657	15,729	17,979	20,569	22,965	29.7
Technical & Spec. Fees	787	1,130	1,371	689	1,372	1,444	1,593	1,762	1,192	2,685	3.5
Communications	453	512	595	634	636	804	909	824	968	1,317	1.7
Travel	36	62	104	155	135	226	177	266	368	326	0.4
Fuel and utilities	3,609	3,514	3,985	3,629	3,947	4,177	4,279	4,720	4,897	5,834	7.5
Motor vehicle operations	436	987	565	1,280	1,951	555	702	657	735	874	1.1
Contractual services	12,166	13,309	14,889	17,021	18,078	18,118	23,436	25,258	27,663	32,595	42.1
Supplies and materials	993	1,166	1,858	1,385	1,771	1,475	1,456	2,060	2,098	2,325	3.0
Replacement of equipment	8	61	70	464	368	150	540	186	260	181	0.2
Additional equipment	-29	111	152	603	422	370	229	45	298	385	0.5
Grants, subsidies and & contr.	543	423	887	542	420	471	493	672	179	337	0.4
Fixed charges	206	461	385	559	797	885	874	772	1,334	3,980	5.1
Land/structure	470	939	1,610	2,008	1,529	1,359	1,728	2,095	3,464	3,527	4.6
Totals	30,579	34,284	38,893	43,362	46,279	45,691	52,145	57,296	64,025	77,331	100.0

Source: Maryland Aviation Administration

7.3.1. Operating Revenues

Figure 7.5 highlights the level of growth of the various categories of operating revenues at BWI between 1992 and 2001. Passenger concession revenues⁴² have been the major driving force behind the formidable growth of operating revenue. Between 1992 and 2001 passenger concession revenues increased by 251%, an average annual growth of 25%! The impressive rate of growth of concession revenues outpaced the revenue growth experienced by all other line items making them lose ground in the overall revenue structure.

Figure 7.5 Operating Revenue Growth at BWI Between 1992 and 2001



- (a) Includes taxi stand permits, general aviation complex, advertising poster and diorama, motor vehicle fuel commissions, hotel, service station, land rental property tax, automotive service station.
- (b) Includes airport traffic fines, sale of documents, sale of specifications, charge for lost lds, auditorium and meeting rooms, automobile parking decals, airport development program.

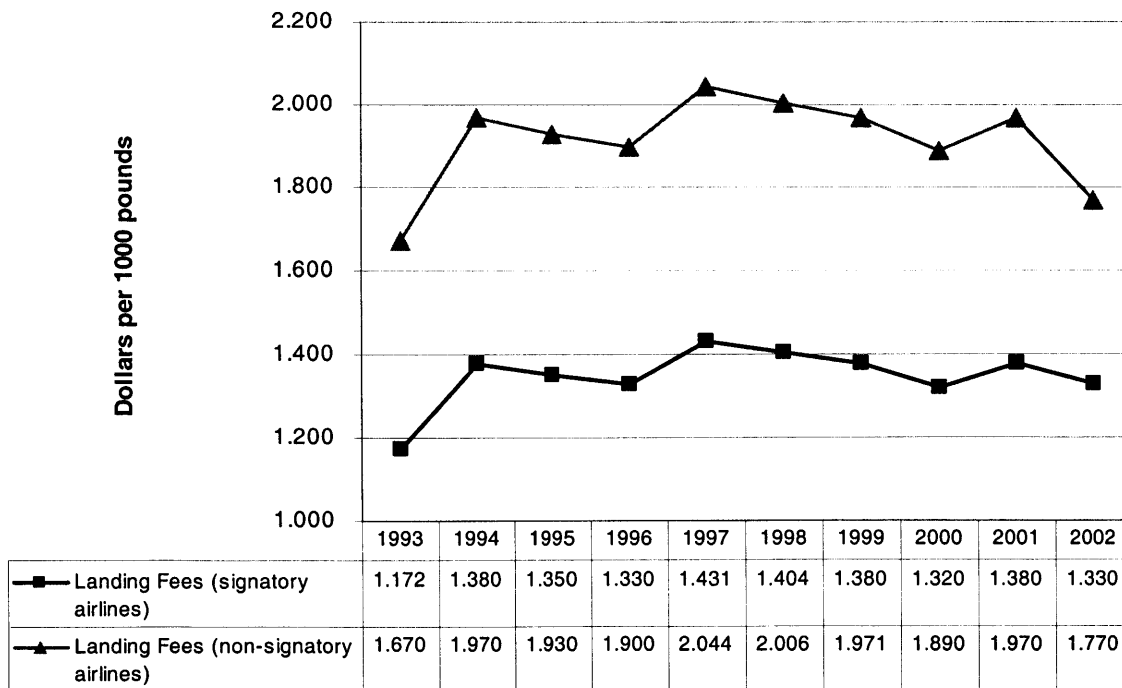
Source: Maryland Aviation Administration

⁴² Passenger concession revenues include parking, car rental facilities, foods and beverages, retail establishments and other revenues such as taxi, limousines and other transportation services; flight insurance, telephone, automated teller machines (ATMs), baggage carts, etc.

Contributions that are derived primarily from the airlines, namely landing fees, grew by 107%. This growth was generated mainly by increased traffic volumes (Figure 7.3), which translated into more aircraft operations. Notice that between 1998 and 2000 when traffic growth was high (Figure 7.3) landing fees for individual aircraft actually declined (Figure 7.6). Figure 7.6 shows that between 2000 and 2001 landing fees had a slight increase (six cents per 1,000 thousand pounds of landing weight for signatory airlines and 8 cents for non-signatory airlines) while traffic continued to grow (Figure 7.3). This minor fee increase resulted in a 23% landing fees revenue increase from \$19 million in 2000 to \$23.5 million in 2001 (Table 7.1).

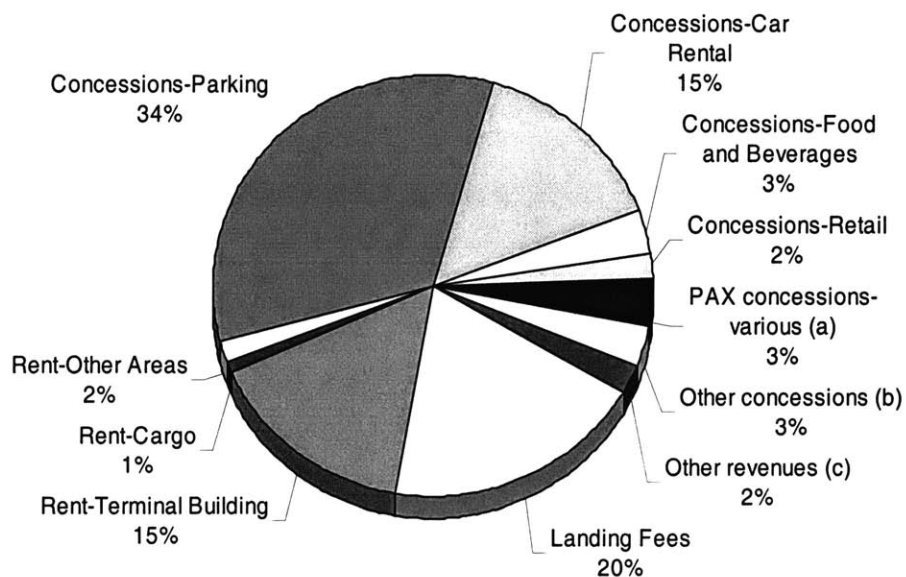
The revenues from rents increased from \$17.6 million in 1992 to \$21.8 million in 2001. This was a modest 23% growth rate on the 10-year span, averaging an annual 2.3% increase.

Figure 7.6 Landing fees at BWI, Fiscal Years 1993-2002



Source: Maryland Aviation Administration

Figure 7.7 Composition of BWI's Operating Revenue, Fiscal Year 2001



- (a) Taxi, limo and other transportation services, light insurance, telephone, automated teller machines (ATMs), baggage carts, catering services.
- (b) Taxi stand permits, general aviation complex, advertising poster and diorama, motor vehicle fuel commissions, hotel, service station, land rental property tax, automotive service station.
- (c) Airport traffic fines, sale of documents, sale of specifications, charge for lost lds, auditorium and meeting rooms, automobile parking decals, airport development program.

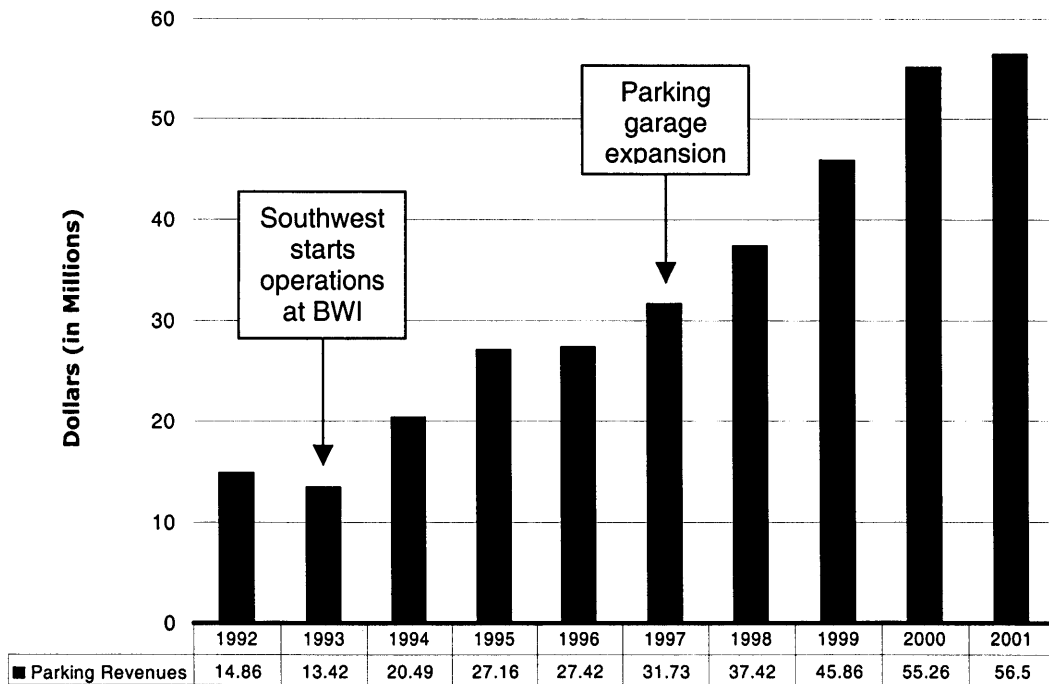
Source: Maryland Aviation Administration

Figure 7.7 shows the composition of BWI operating revenues for 2001, including a detailed view of concession and rent revenues. In 2001 BWI operating revenues were over \$121 million (Table 7.1). Of all passenger concessions, parking revenue was the most important line item accounting for \$40 million or 34% of BWI operating revenues. The airlines contributed \$23.5 million (20%) in landing fees, and \$18 million (15%) in terminal building rents. Revenues for the car rental business were \$17.9 million or 15%. The food and beverages business raised \$3.9 million, while retail establishments contributed \$2.3 million. It is important to highlight the fact that

automobile-related revenues (i.e., parking and car rentals) contributed about half (approximately \$58.3 million) of all operating revenues at BWI during 2001.

Parking revenues are the catalyst behind the impressive revenue growth at BWI. Figure 7.6 shows the dramatic increase of 380% in parking revenues from over \$14 million in 1992 to over \$56 million in 2000. Two major developments contributed to this growth: the arrival of Southwest and added parking capacity. Notice how parking revenue growth comes almost to a complete stop at the end of 2001.⁴³ Airport administrators will have to examine this carefully as parking revenues seem to be extremely sensitive to negative economic conditions.

Figure 7.8 Parking Revenues at BWI, Fiscal Years 1992-2001



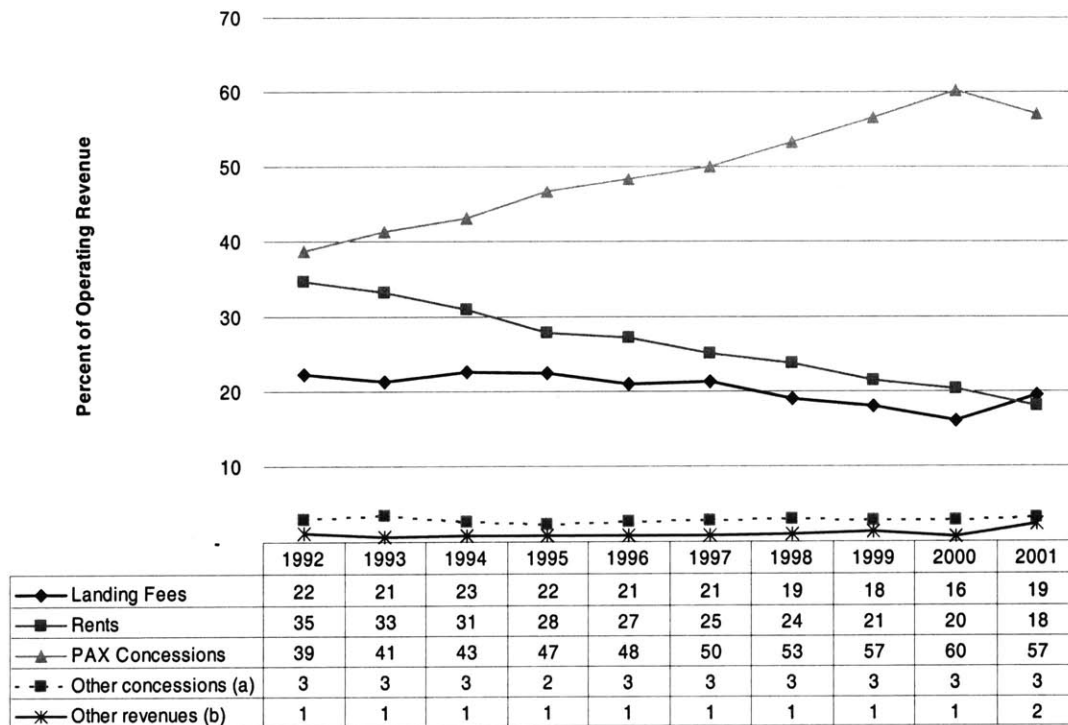
Note: Parking revenues included only the following main line items: Auto Parking-Garage, Auto Parking-Daily Surface, Auto Parking-Satellite, Valet Parking, and Express Service Parking (ESP).

Source: Maryland Aviation Administration

⁴³ BWI ends its fiscal year at the end of June, therefore the fiscal year ended in June 2001 did not capture the negative impact of Sept. 11 to the airline industry.

Figure 7.9 shows the percent contribution of the revenue line items for each year between 1992 and 2001. In 1992 passenger concessions⁴⁴ and rents generated 39% and 35% of operating revenue respectively. After that year, passenger concessions started to become more important while rents declined, creating a gap that widened every year. In 2001 the upward passenger concession trend reversed, while rent revenue continued to decline. Landing fees, on the other hand, have remained relatively flat at about 21% of operating revenues up until 1997.

Figure 7.9 BWI Operating Revenues Share, Fiscal Years 1992-2001



- (a) Taxi stand permits, general aviation complex, advertising poster and diorama, motor vehicle fuel commissions, hotel, service station, land rental property tax, automotive service station.
- (b) Airport traffic fines, sale of documents, sale of specifications, charge for lost I.D.s, auditorium and meeting rooms, automobile parking decals, airport development program.

Source: Maryland Aviation Administration

⁴⁴ Passenger concession revenues include parking, car rental facilities, foods and beverages, retail establishments and other revenues such as taxi, limousines and other transportation services; flight insurance, telephone, automated teller machines (ATMs), baggage carts, etc.

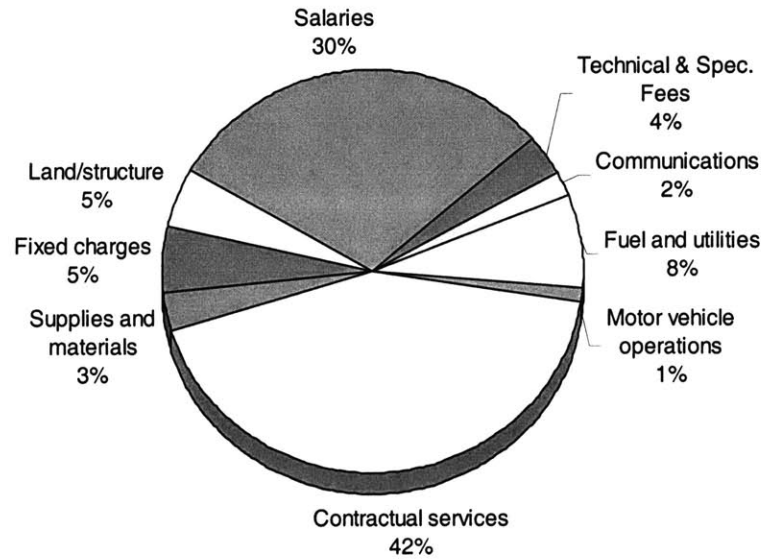
The following three years landing fees lost ground reaching a low of 16% in 2000. In 2001, as passenger concession revenues experienced a dramatic decline, landing fees suddenly surged. This demonstrates the presence of hybrid fee-setting arrangement at BWI. In a hybrid type of arrangement, a decline in revenues from a landside cost center will cause the airside cost center linked to it to increase its contribution to maintain a predetermined minimum financial outcome at the end of the year. Conversely, an increase of revenues from the concession cost centers can contribute to a decrease in landing fees (see Section 2.3.3). Consistent with a hybrid approach, other revenue sources not linked to landing fees were not affected (see how the share of rent revenue continues to decrease).

7.3.2 Operating Expenses

Between 1992 and 2001 operating expenses increased smoothly and continuously (Figure 7.4). Unlike operating revenues, expenses show a high degree of stability. For example, during 2001 when revenues were hit by the initial effects of an economic recession operating expenses showed almost no change on their upward trend (Figure 7.3). Between 1992 and 2001, expenses increased from over \$30 million to \$77 million, an increase of 250% (Figure 7.4 and Table 7.2).

Figure 7.10 shows the distribution of BWI operating expenses during 2001: contractual services costs accounted for over \$32 million or 42% of the operating expenses, while salaries reached \$22 million or 29% of operating expenses. This differs with most large commercial airports, where labor (salaries and employee benefits) is usually the largest expense item (Figure 4. 2). Fuel and utilities accounted for approximately \$5.8 million or 8%, while expenditures in land, structure and physical upkeep cost was \$3.5 million or 4.6% of operating expenses. The remaining expenditures were equivalent to 15-16% and were distributed among various line items that include supplies and materials, communications, motor vehicle operations, etc.

Figure 7.10 Operating Expenses at BWI, Fiscal Year 2001

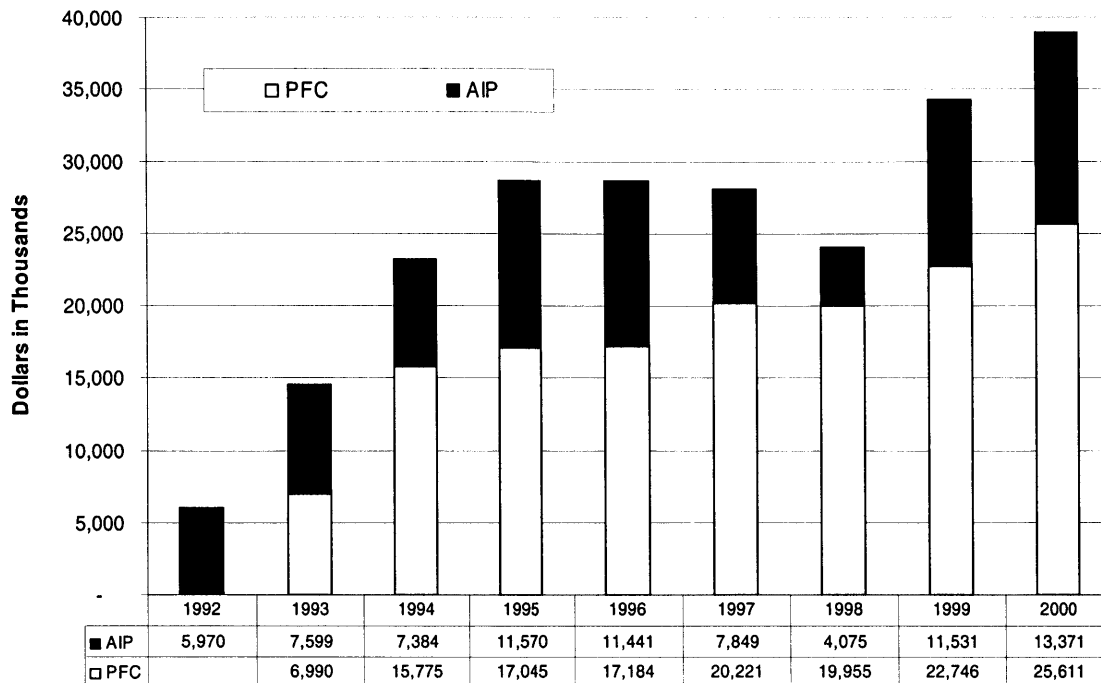


Source: Maryland Aviation Administration

7.4 Capital Program

To cope with increasing needs due to BWI's traffic growth of recent years, the Maryland Aviation Administration is implementing a capital improvement program for the period 2001-2007. The Maryland Aviation Administration, which runs BWI, says it is committed to \$1.2 billion worth of construction projects out of the \$1.6 billion planned over the next five years. Table 7.3 displays the timetable and phasing of the \$1.6 billion capital program at BWI.

Figure 7.11 BWI Government Sponsored Funding, Fiscal Years 1992-2001 (in Thousands of Dollars)



Source: Maryland Aviation Administration

7.4.1 Projects

People Mover

BWI is proposing the construction of a monorail transit system that will connect the expanding facilities. This project is aimed at increasing BWI parking capacity as the people mover will link the terminal to new parking facilities.

Concourse A expansion and new Concourse F

This phase of the project will increase the terminal building capacity. Concourse A will be a self-contained facility with all services and amenities, including concession space and 16 new gates. The construction of concourse F will add 4 gates and 120,000sq. ft. of additional space. This

two-level structure with holdrooms, baggage claim area, and concession space, for both domestic and international traffic, will be built next to the international terminal.

Improved Roadway and Access

The capital program will include improvements to existing roadways to facilitate access to the terminal. In addition, skybridges will connect parking areas directly to the new mezzanine level of the terminal.

Intermodal Center

This part of the project is aimed at integrating the various improvements proposed for BWI. As BWI continues its efforts to attract Washington D.C. customers, a new intermodal facility will link trains, buses and the people mover to provide seamless access to the main terminal.

Parking

To capitalize on its tremendous growth BWI will continue to expand its parking capacity. By 2005 BWI will have increased its parking capacity to 13,000 parking spaces. During the first phase, the car-rental facility will be moved to a new consolidated car-rental facility west of the terminal. This will free about 1,000 parking spaces next to the terminal. This will be followed by the construction of a major parking structure (Elm Road Garage) that will add another 8,400 parking spaces. The first phase of this project will provide 3,000 parking spaces by November 2002. The remaining 5,400 parking spaces will be made available by January 2004.

7.4.2 Funding Sources

Most large commercial airports rely heavily on borrowed money (in the form of revenue bonds or special facility bonds) to finance their capital programs, however BWI does not rely on bond money as much. As Table 7.4 shows, this is due to a strong financial support from the state and the federal government. Indeed, the largest contribution to BWI's capital program will derive

from the State of Maryland Transportation Trust Funds that over the 7-year span will provide \$638 million or almost 38% of the total cost of the program. In addition, BWI continues to receive federal funding from AIP grants and is authorized to levy PFCs that provide an annual revenue of over \$20 million (Figure 7.9). BWI will use about \$288 million (or 17%) of PFC money for its capital program. In addition, the federal government will contribute \$176 million for environmental projects.

BWI is starting to capitalize on its strong operating revenue structure. A series of deals have been secured or are underway to make BWI's capital program a reality. In February 2002 BWI issued via the Maryland Transportation Authority \$267 million of project construction bonds (secured by garage revenues), and later the same year expects to issue \$120 million of special facility bonds (secured by consolidated rental car facility charges), as well as \$137 million of PFC-backed bonds in 2003. Additionally, the Maryland Economic Development Corp. (MEDCO) anticipates issuing \$180 million in bonds secured by airline lease payments and by concession revenue (Gilliland, Champeau, Soltz and Stettler 2002, 14).

7.4.3 Debt Service

Setting aside the PFC-backed debt, BWI bond obligations will be approximately \$580 million (according to Table 7.4). That includes a \$252 million revenue bond, a \$179 million bond issued by the Maryland Economic Development Corp. (MEDCO), \$117 special facility bond secured by the rental car facility, and \$33 million of the Certificate of Participation.⁴⁵ The operating income, which in 2001 was over \$43 million, should be sufficient to cover BWI's financial obligations.

7.4.4 Recent Developments

The impact of 9/11 was immediately felt by the airlines, and consequently the airports. As seen previously, BWI was already experiencing a revenue slow down due to the existing economic conditions. BWI's Acting Executive Director, Beverly K. Swaim-Staley's, reaction after 9/11 was that the state had to be monitoring the industry "every day, even every hour" to make sure

the expansion of Maryland's major airport still makes sense. ". . . at this point we're not aware of any changes with the airlines that would cause us to alter our plan." Swaim-Staley added, "Fortunately for us, we're in a much better financial position than most other airports, who carry a lot of debt." (Little 2001, 2)

State Transportation Secretary John D. Porcari said the expansion is continuing because many of those projects are necessary even if business declines. "We're moving full speed ahead," he added. "If you think about the elements of the BWI expansion plan, which would mean greater customer convenience, more parking – all of that will still be needed," Mr. Porcari concluded (Little 2001, 2).

7.5 Conclusion

The big story at BWI is the pace at which traffic is been growing. The presence of low-fare carrier Southwest Airlines is credited for this impressive growth rate. Still, the dependence of BWI on the large presence of US Airways was felt between 2001 and 2002 when the airline decreased its service, resulting in decreased traffic and revenue for the airport (Figure 7.3).

Section 4.5 shows that airports with hybrid rate-setting methodologies are least dependent on non-aeronautical revenues (e.g., parking and concession revenues). BWI, which has a hybrid cost recovery methodology, does not follow this pattern. On the contrary, in recent years BWI has increased considerably its reliance on concession revenues. The main force behind concession revenue growth has been parking revenues. In 2001 parking revenues accounted for 34% of BWI operating revenues (Figure 7.7). This is twice as much as the average parking revenues for airports with hybrid arrangements, which in 2000 was slightly over 14% (Figure 4.14). The continued parking revenue growth came to an abrupt end during the fiscal year ended in June 2001. Parking revenues almost did not grow compared to the previous year affecting the overall revenue structure. However, the hybrid agreement of the airport with the airlines allowed BWI to slightly increase landing fees (Figure 7.6), which resulted in a substantial increase in landing fee

⁴⁵ Special bond issue for specific airport projects by the Maryland Dept. of Transportation.

revenues (Table 7.1). It is important to mention that, consistent with a hybrid arrangement, an increase in landing fees did not affect the continued decline in rent revenues (Figure 7.9). This highlights the flexibility of a hybrid agreement under difficult circumstances.

In 2001 labor costs accounted for about 30% of BWI operating expenses. This is consistent with the findings of Section 4.5, which indicates that about 30% of operating expenses for airports with hybrid arrangements were labor costs. It is important to note that in 2001 BWI spent about 42% of its operating expenses on contractual services. This is in contrast to the 17% used in services by hybrid airports in 2000 (Figure 4.16).

Unlike most large commercial airports in the United States, BWI receives significant financial support from local government sources (Section 7.4.3). Consequently, BWI debt is small compared to other airports its size. Strong government support, as well as a capital program aimed at strengthening the airport's concession revenue growth, the commitment of a strong airline (i.e., Southwest Airlines), and an economically strong region suggest that BWI is well positioned to continue serving the aeronautical needs of the Baltimore/Washington region.

Table 7.3 Phases of BWI's Capital Program, Fiscal Years 2001-2007
(in Thousands of Dollars)

	2001	2002	2003	2004	2005	2006	2007	Total Estimated Cost	%
Preliminary Planning	7,806	4,720	8,794	704				22,024	1.3
Preliminary Engineering (Design)	77,604	23,764	26,202	14,076	11,505	10,454	9,656	173,261	10.3
Right of Way (Property Acquisition)	76,779	4,835	6,086	6,295	6,420	7,075	5,075	112,565	6.7
Construction and Construction Management & Inspection	334,442	162,443	334,736	311,595	93,417	90,725	49,724	1,377,082	81.7
Total	496,631	195,762	375,818	332,670	111,342	108,254	64,455	1,684,932	100

Source: Maryland Aviation Administration

Table 7.4 Funding Sources For BWI's Capital Program, Fiscal Years 2001-2007
(in Thousands of Dollars)

	2001	2002	2003	2004	2005	2006	2007	Total Estimated Cost	%
Federal Funds (a)	67,261	17,360	25,307	23,294	21,042	10,779	11,086	176,129	10.5
MAA State Funds	269,642	78,883	108,157	57,292	42,137	39,020	43,045	638,176	37.9
Medco (b)		17,365	45,621	115,211	1,034			179,231	10.6
PFCs	128,883	4,055	26,374	13,716	47,129	58,455	10,324	288,936	17.1
Customer Facility Charge (c)		22,892	63,852	30,639				117,383	7
COP Certificate of Participation (d)	30,845	805	1,369					33,019	2
Revenue Bond		54,402	105,138	92,518				252,058	15
Total	496,631	195,762	375,818	332,670	111,342	108,254	64,455	1,684,932	100

(a) ILEAV-Inherently Low-Emission Airport Vehicle/Entitlement/Discretionary/Noise Discretionary

(b) Maryland Economic Development Corporation - Quasi-state government agency providing loan to third parties

(c) Related to the Consolidated Rental Car Facility

(d) Special bond issue for specific airport projects by the Maryland Dept. of Transportation

Source: Maryland Aviation Administration

Chapter 8

Conclusion

This study has provided a framework for the analysis and evaluation of the operating revenue structure of large hub airports in the United States. In the process, the consolidated financial data of all large hub airports were first examined in order to create a profile of their revenue structure. Next, the major operating revenue line items were analyzed. The same operation was performed with regard to major operating expenses. The final objective was to identify the main drivers and factors that shape the most relevant revenue line items.

In addition, by synthesizing scattered operational and financial data this research has tried to highlight the impact of airport operations and business practices on the revenue structure of large commercial airports.

Part I, which consists of Chapters 1, 2, 3 and 4, examines large commercial airports at an aggregate level. The high concentration of the air traffic in the United States suggests that a large portion of investments into airport infrastructure will be destined to large hub airports. Hence, these airports became the primary area of concern of this study. After a review of the airports' main characteristics, the study focuses on trends affecting their revenues and expenses. Each of the principal revenues line items is assessed individually. Then, the study identifies the main drivers that affect airports' revenues and expenses. In addition, funding alternatives are examined against the need for capital programs. Part II, which includes chapters 5, 6, and 7 presents the case studies of three airports. Each case is evaluated within the basic framework used to analyze the system at an aggregate level in Part I. However, the evaluation emphasizes the unique characteristics of each case.

Chapter 2 shows that air traffic in the United States is highly concentrated. In fact, in 2000 the 31 large hub airports handled over 74% of passenger enplanements (FAA 2001, 77, 78). This suggests that these airports will also need to make massive investments in the near future to maintain or increase their capacity, while coping with the far more stringent safety and security requirements of the post-September 11, 2001 era. The chapter points out that large hub airports are public entities owned by local governments or specially created authorities, and are controlled by local operators. Consequently the decisions regarding capital programs are often driven by strong local considerations.

Special emphasis was placed on the cost recovery methodologies used by the airports to set their fees. These establish the guidelines for two of the most important operating revenue line items: landing fees and terminal building rental fees. Large hub airports use one of the following rate-setting schemes: residual, compensatory or hybrid. Residual arrangements combine all operating revenues and expenses into a single account. Deficits are covered by the airlines⁴⁶ through

⁴⁶ This relates to airlines that sign an *Use and Lease Agreement* with the airport operator.

appropriate aeronautical fee increases. Conversely, surpluses usually lead to reductions in aeronautical fees. Under compensatory arrangements every business or operational unit at the airport is treated separately. Therefore, airlines pay only for the use of specific facilities. Deficits or surpluses in facilities not used by the airlines are the responsibility of the airport operator. Under a hybrid rate-setting arrangement, the operator links certain non-aeronautical cost centers to some or all of the aeronautical cost centers. For example, landing fees can be linked to parking revenues. If parking revenues generate surpluses the result might be a reduction in landing fees.

The use of a residual arrangement entails increased risk for the airlines as they agree to cover deficits. This results in the inclusion of Majority-in-Interest (MII) clauses in the Use and Lease Agreements. MII clauses allow the airlines to review and approve or reject capital projects. In 2000 about 90% of the large hubs with residual arrangements had MII clauses in place. In a compensatory arrangement most of the risk rests with the airport operator. As a result only 33% of airports with compensatory arrangements had MII clauses in place. About 72% airports with hybrid arrangements included MII clauses in their agreements.

The study shows that, despite some resistance from the airlines, large airports seem to be turning away from purely residual cost recovery methodologies and toward compensatory and hybrid approaches. There is some evidence that compensatory arrangements may create an adversarial environment (contentious in some cases) between airport operators and the airlines. Residual agreements, on the other hand, tend to foster more cooperation among stakeholders. In sum, the fundamental difference between the cost recovery methodologies lies in who assumes the risk for financial operations and who has control over airport capital decisions (Whiteman, Hu and Cahill 2000, 10)

Section 2.6 examines the issue of airline competition within an airport facility. The use of the hub-and-spoke network structure has contributed to increased traffic concentration. According to the Hirfendahl-Hirschmann Index and the scale used by the Department of Justice to measure market competition about 61% of the large hub airports in the U.S. can be considered highly concentrated offering a less competitive environment. Among the least competitive airports in the nation are IAH, CLT, PIT, and STL. About 39% of the large airports can be considered

moderately concentrated. The airports that offer the most competitive environments are BOS, TPA, MCO and FLL.

Chapter 3 emphasizes that today's airport operators are not only managers, but highly skilled developers constantly dealing with the planning and implementation of complex capital programs. To finance these programs airport operators rely mostly on capital markets, specifically the bond markets. Most of the money raised for capital programs is in the form of revenue bonds. For many years this financing mechanism has proven to be a very safe investment vehicle for bondholders. The remarkable performance achieved by airport revenue bonds has its foundation in the revenue structure of large hub airports.

The study also found that increased access to capital markets by large commercial airports has not resulted in a reduction of the role of the federal government in the funding of capital programs. While the direct support that the federal government provides through grants has declined, the FAA has been instrumental in increasing the revenue potential of large hub airports by allowing them to charge special passenger fees (known as Passenger Facility Charges-PFCs⁴⁷). As a result, the federal government maintains the role of a regulator of the airport system and can act as a catalyst for increasing large hub airport revenue and airline competition. This scheme has also allowed the federal government to direct unused AIP grant money to smaller airports.

Chapter 4 presents a 5-year analysis of the consolidated operating revenues and operating expenses of large commercial airports. The analysis found a clear upward trend in both revenues and operating income. In 2000 the consolidated operating revenues were \$7.23 billion, while operating expenses reached \$4.22 billion. This resulted in a consolidated operating income of \$3 billion. The consolidated data helped create the following profile of large hub airports for 2000: aeronautical revenues accounted for 54% of operating revenues and non-aeronautical revenues for 46%. Five line items accounted for 82% of operating revenues. They were: landing fees (20%), terminal building rental fees (24%), parking (24%), concessions (13%), and car rentals (8%). An analysis of individual revenue line items found a fairly good correlation between traffic

⁴⁷ Passenger Facility Charges (PFCs) are fees charged to passengers for using an airport facility. The fees are included in the passenger's air ticket and range in value from \$1 to \$4.50.

volumes and non-aeronautical revenues, specifically parking and concessions. For instance, the study found that as O&D traffic increases the revenue from parking generally increases as well (Figure 4.5). A similar pattern was found for concession revenues.

An analysis of the data regarding federal government-sponsored revenues confirms the fact that PFC funding has more than compensated for the loss of parts of AIP funding by large hub airports. The consolidated data show that the federal government is limiting the amount of grant (AIP) money allocated to large hub airports. Simultaneously, there is a noticeable increase in PFC revenues. AIP funding has declined from \$498 million in 1996 to \$376 million in 2000. Conversely, PFC revenues have increased from \$713 million in 1996 to \$1.12 billion in 2000.

One of the main objectives of this project was to determine the factors that influence the airports' operating revenues. Since cost recovery methodologies are used to set the charges for landing fees and terminal rentals, which represent 20% and 24% of operating revenues respectively, an evaluation of the impact of the rate-setting methodologies was performed. Contrary to what was expected, the analysis in Section 4.5 found that airports using compensatory arrangements seem to be the least reliant on aeronautical revenues. These airports are the least dependent on terminal rental revenues, while their landing fee revenues have declined dramatically to be almost as low as those of facilities with residual arrangements (which are the least dependent on landing fee revenues). Airports with residual arrangements have a higher dependence on aeronautical revenues than those with compensatory arrangements. Airports with hybrid rate-setting methodologies are the most reliant on aeronautical revenues.

The study also found that airports with compensatory arrangements outsource substantially more services than other airports. In fact, in 1996 airports with compensatory arrangements spent twice as much, percentage-wise, on outsourcing services than their counterparts with hybrid and residual arrangements. However, in recent years, airports with residual and hybrid arrangements have also steadily increased their reliance on outsourced services. Labor accounts for 42% of operating expenses in airports with residual agreements. Despite having large service

expenditures, airports with compensatory arrangements also have high labor expenditures. Airports with hybrid arrangements have relatively low labor expenditures.

As expected, the study also found that airports with compensatory arrangements achieved the highest operating margins, with hybrid facilities the second highest and those with residual arrangements the lowest. This is consistent with the very nature of residual agreements, which limit risk to airports by shifting it to the airlines, but at the same time limit the potential of the airport for increased revenues. Airports with compensatory arrangements generate the least revenue per passenger, but their operating expenses are also very low. This results in a high operating margin. Nevertheless, it is facilities with hybrid arrangements that realize the highest operating surplus per passenger on an absolute basis.

Section 4.5 identifies the drivers and main factors that affect the operating revenue structure of large hub airports. The relationship between the airport operator and the airlines is the main driver that shapes aeronautical revenues. This relationship is influenced by factors that include existing contractual agreements, airport ownership structure and management philosophy, O&D market, competitive environment among airlines and the financial strength of the dominant airlines. The business environment is the main driver that shapes the non-aeronautical revenues. At the same time, the business environment is influenced by factors such as management philosophy of the airport operator, traffic volumes, O&D demand, state of the economy, and trends in the retail industry. Agendas set by federal and state government influence the policy driver that determine government-sponsored revenues.

Chapter 5 examines the case of Logan International Airport (BOS). This airport stands out for having the lowest market concentration of all large hub airports in the U.S. In fact, no airline has more than 25% of market share at Logan. In terms of traffic volume it ranks 18th among U.S. large hubs, yet it has operating revenues comparable to those of airports with much higher passenger volumes (e.g. ATL, DFW). BOS stands out as one of the most profitable airports in the nation. For instance, its operating revenues have grown from \$144 million in 1991 to \$274 million in 2001. Similarly the airport's operating income has grown from \$61 million in 1991 to \$117 million in 2001. As seen in Chapter 4.3.1 a strong O&D base can strengthen parking and

concession revenues. BOS, an airport with a very strong O&D base, has been able to capitalize with substantial parking and concession revenue increases. It is important to point out that the reliance of BOS on airline-driven revenues (i.e., landing fees, terminal rentals) has diminished considerably in recent years. This is consistent with the findings of Section 4.5 regarding facilities using the compensatory rate-setting methodology. Section 4.5 shows that during the period 1996-2000 airports with compensatory arrangements showed a decline in aeronautical revenues (i.e., landing fees and terminal building rentals) and an increase in non-aeronautical revenues (mainly parking and concession revenues).

Chapter 6 features Dallas/Fort Worth International Airport. The steady revenue growth and controlled expenditure increases experienced by DFW between 1991 and 2000 suggests a very stable business environment. The study shows that during that period DFW benefited from a continued growth in parking revenues. The increase in parking revenues caused the contribution to operating revenue of landing fees and terminal rentals to diminish. A weakening of the economy between 1999 and 2000 had a noticeable impact on parking revenues slowing down growth considerably. Consistent with the residual fee-setting approach used at DFW, this led to a corresponding increase in the contribution that all other cost centers had to make.. Thus, the use of a residual approach still allowed DFW to achieve revenue growth during fiscal year 2000. The case study also points out that, due to large traffic volumes, DFW relies heavily on PFC funding.

Chapter 7 focuses on Baltimore/Washington International, one of the nation's fastest growing airports. The big story at BWI is the pace at which traffic is growing. The presence of low-fare carrier Southwest Airlines is credited for this impressive growth rate. The dependence on the large presence of US Airways was clearly felt when in 2001 the airline decreased its service with a corresponding decrease in traffic and in revenue. In recent years, BWI has also relied more heavily on parking revenues. This came to an abrupt end during fiscal year 2001. Parking revenues did not grow compared to the previous year, affecting overall revenues. However, the hybrid agreement of the airport with the airlines allowed BWI to increase slightly landing fees, resulting in a substantial increase in landing fee revenues. Consistent with a hybrid arrangement other cost centers were not affected. This highlights the flexibility of a hybrid agreement under difficult circumstances. An issue worth mentioning is BWI's dependence on the support of local

government for funding capital programs. This has resulted in lower debt when compared to other airports of similar size.

The case studies have provided an insightful view into how operating revenues are structured in different settings. They also helped illustrate the effect that a decline in a strong revenue source has on other revenue sources. In addition, the case studies generally corroborated the findings of the consolidated evaluation of large hub airports performed in Chapter 4 (i.e., strength of individual revenue line items, trends based on cost recovery methodologies, etc.). This only strengthens the view that consolidated financial data analysis can be a useful tool in helping to assess industry trends.

Continued research on financial issues affecting airports can shed light on existing trends, and patterns developing in the industry and should help decision-makers when responding to funding initiatives. Increased knowledge and awareness is vital for the air transportation system in general as responses to funding problems must address local issues while adequately responding to issues of national concern. Airports will certainly continue to invest in capital improvements and must in the short-run face the challenges of a depressed airline industry. This thesis should be viewed just as a starting point for continued research aimed at contributing to the body of knowledge which is vital to the efficient use of existing resources.

Large Hub Airports Key Operational Indicators, Fiscal Year 2000

Rank	Enplanements	% of total scheduled enplanements	Total PAX Traffic	PAX Connecting Flights	(%)	O&D	(%)	International	%	Domestic	%	Dominant Airline	Passengers Handled by Main Airline	Dominant Airline Share (%)	
1	ATL	39,375,330	5.92	80,162,407	50,742,804	63.3	29,419,603	36.7	5,851,856	7.3	74,310,551	92.7	Delta	58,526,573	73.01
2	ORD	34,153,190	5.13	72,144,244	38,236,449	53.0	33,907,795	47.0	10,460,915	14.5	61,683,329	85.5	United American	31,274,530 22,573,934	43.35 31.29
3	LAX	32,332,452	4.86	66,424,767	16,473,342	24.8	49,951,425	75.2	18,067,537	27.2	48,357,230	72.8	United	16,088,079	24.22
4	DFW	28,066,194	4.22	60,687,122	37,322,580	61.5	23,364,542	38.5	5,037,031	8.3	55,650,091	91.7	American	37,668,497	62.07
5	SFO	18,498,749	2.78	41,040,995	11,450,438	27.9	29,590,557	72.1	7,879,871	19.2	33,161,124	80.8	United	19,317,996	47.07
6	DEN	18,883,765	2.84	38,751,687	20,460,891	52.8	18,290,796	47.2	1,046,296	2.7	37,705,391	97.3	United	23,909,791	61.70
7	PHX	18,652,345	2.80	36,040,469	14,199,945	39.4	21,840,524	60.6	1,045,174	2.9	34,995,295	97.1	America West	14,798,217	41.06
8	LAS	17,530,409	2.63	36,865,866	7,594,368	20.6	29,271,498	79.4	958,513	2.6	35,907,353	97.4	Southwest	11,498,464	31.19
9	DTW	17,873,801	2.69	35,535,080	19,082,338	53.7	16,452,742	46.3	3,589,043	10.1	31,946,037	89.9	Northwest	24,661,346	69.40
10	EWB	17,144,940	2.58	34,188,468	7,521,463	22.0	26,667,005	78.0	8,854,813	25.9	25,333,655	74.1	Continental	18,369,464	53.73
11	MSP	17,203,373	2.59	36,751,632	20,176,646	54.9	16,574,986	45.1	2,866,627	7.8	33,885,005	92.2	Northwest	26,549,379	72.24
12	MIA	16,716,291	2.51	33,621,273	11,565,718	34.4	22,055,555	65.6	17,651,168	52.5	15,970,105	47.5	American	16,659,341	49.55
13	IAH	16,564,385	2.49	35,251,372	21,045,069	59.7	14,206,303	40.3	5,499,214	15.6	29,752,158	84.4	Continental	25,581,921	72.57
14	JFK	16,080,974	2.42	32,856,220	4,698,439	14.3	28,157,781	85.7	20,962,268	63.8	11,893,952	36.2	American	6,508,817	19.81
15	STL	14,552,733	2.19	30,561,387	19,773,217	64.7	10,788,170	35.3	519,544	1.7	30,041,843	98.3	TWA	22,429,002	73.39
16	MCO	15,136,268	2.27	30,823,509	4,870,114	15.8	25,953,395	84.2	2,435,057	7.9	28,388,452	92.1	Delta	8,362,418	27.13
17	SEA	14,225,451	2.14	28,408,553	8,039,620	28.3	20,368,933	71.7	2,386,318	8.4	26,022,235	91.6	Alaska	8,093,597	28.49
18	BOS	13,816,195	2.08	27,412,926	3,810,397	13.9	23,602,529	86.1	4,084,526	14.9	23,328,400	85.1	Delta	5,647,063	20.60
19	LGA	12,567,451	1.89	25,374,866	2,334,488	9.2	23,040,378	90.8	1,370,243	5.4	24,004,623	94.6	Delta	6,262,517	24.68
20	PHL	13,022,732	1.96	24,918,276	10,042,065	40.3	14,876,211	59.7	2,541,664	10.2	22,376,612	89.8	USAirways	14,788,997	59.35
21	CLT	11,936,722	1.79	23,073,894	17,120,829	74.2	5,953,065	25.8	738,365	3.2	22,335,529	96.8	USAirways	18,844,449	81.67
22	CVG	9,185,962	1.38	22,237,525	16,767,094	75.4	5,470,431	24.6	1,089,639	4.9	21,147,886	95.1	Delta	13,642,722	61.35
23	HNL	10,511,446	1.58	23,016,542	3,912,812	17.0	19,103,730	83.0	5,869,218	25.5	17,147,324	74.5	Hawaiian	5,876,123	25.53
24	PIT	10,520,627	1.58	19,816,511	12,940,182	65.3	6,876,329	34.7	634,128	3.2	19,182,383	96.8	USAirways	14,975,337	75.57
25	BWI	10,617,714	1.60	19,602,609	3,489,264	17.8	16,113,345	82.2	588,078	3.0	19,014,531	97.0	Southwest	6,829,549	34.84
26	IAD	8,501,994	1.28	19,971,260	7,009,912	35.1	12,961,348	64.9	3,914,367	19.6	16,056,893	80.4	United	8,879,222	44.46
27	SLC	9,297,702	1.40	19,900,810	10,885,743	54.7	9,015,067	45.3	39,802	0.2	19,861,008	99.8	Delta	13,309,662	66.88
28	TPA	8,200,264	1.23	16,043,383	2,053,553	12.8	13,989,830	87.2	529,432	3.3	15,513,951	96.7	Delta	3,282,476	20.46
29	SAN	7,953,273	1.20	15,820,342	2,199,028	13.9	13,621,314	86.1	316,407	2.0	15,503,935	98.0	Southwest	5,285,576	33.41
30	FLL	8,541,532	1.28	15,860,004	777,140	4.9	15,082,864	95.1	1,252,940	7.9	14,607,064	92.1	Delta	4,023,683	25.37
31	DCA	7,959,838	1.20	15,724,613	3,883,979	24.7	11,840,634	75.3	0	0	15,724,613	###	USAirways	4,772,420	30.35

Sources: FAA, ACI-NA and Aviation Week

APPENDIX 2

FEE-SETTING METHODOLOGY AT LOGAN (BOS)

Massport charges tenants for the use of the airport facilities according to a compensatory fee approach. To set the fees it first must determine the cost of running the facilities. For this purpose, Logan Airport facilities have been classified into eight cost centers that include 1) landing fields, 2) terminal building, 3) general aviation facilities, 4) airline support, 5) parking, 6) non-aeronautical, 7) roadways and access, and 8) airport service facilities. Table 1 contains a sample part of the expenditure allocation prepared by Massport at the end of August 2000 to help set the fees for fiscal year 2001. To determine the annual direct expenditures, a matrix is prepared with each cost center assigned a column and each row representing an expenditure line item (e.g., pumping station, fire training area, [airline X] hangar, parking garage management, etc.). The dollar amount of the rows will be placed on the column corresponding to the cost center where the expense should be allocated (Rows A, B and C). The sum of all amounts in the columns will provide the total direct expenses of each cost center.

The next step is to allocate expenses of line items⁴⁸ whose costs can be distributed among several cost centers (e.g., electrical maintenance, field maintenance, building maintenance, fire control, state police, etc.). These costs are assigned to cost centers on a percent basis, in proportion to the estimated value of the services to be received. For example, the 2001 budgeted expenses for the state police (Row D) were assigned depending on the amount of services projected to be provided to each cost center. The projections indicate, that the majority of the services to be provided by the State Police, and thus the expenses, will be allocated to the terminal buildings (41.2%) and the landing fields (15.5%).

⁴⁸ Massport labels these line items as undistributed expenses.

Table 1 Extract of BOS Allocation of Budgeted Expenses (Y/E 6-30-01)

		FY 01 Budget Exclude Utilities	Landing fields	Terminal Buildings	General Aviation Facilities	Airline support	Parking	Non- aeronauti cal	Roadways and Access	Airport Service Facilities	
A	Noise Mgmt.	1,149,431	1,149,431								
B	Parking Meters	92,229					92,229				
C	Terminal B	1,602,396		1,602,396							
		%	100.00%	15.50%	41.20%	1.00%	9.54%	9.54%	9.54%	9.55%	4.13%
D	2080 State Police	Amount	1,938,676	300,495	798,735	19,387	184,950	184,950	184,950	185,144	80,067
E	Airport Service Facilities		152,507	1,302,893	12,664	534,423	178,062	375,984	74,855	(2,631,389)	
F	Roadway & Access Allocation		3,738,477	1,580,354	42,866	735,921	3,200,072	1,019,075	(10,316,764)		
	Totals		75,058,156	22,819,954	20,234,935	131,484	3,105,334	26,701,425	2,065,024	0	0
	Percent		100.00 %	30.40%	26.96%	0.18%	4.14%	35.57%	2.75%	0.00%	0.00%

Source: Massachusetts Port Authority

Some cost centers have expenses, that are allocated to other cost centers. For example, Airport Service Facilities and Roadways and Access ⁴⁹ (Rows E and F) have expenses allocated to all other cost centers. The amount charged to all other cost centers is then subtracted from the "charging" cost center. Finally, office expenses and taxes are allocated to all cost centers in proportion to the services to be rendered and/or tax liability. At BOS over 90% of the cost centers expenditures are allocated among Landing Fields, the Terminal Buildings and Parking.

⁴⁹ A detailed analysis of roads usage is prepared to allocate the corresponding expense proportion.

Table 2 Landing Fee Computation for Logan Airport (in thousand dollars)

		Totals FY 01	Totals FY 00
1	Amortization & Interest	20,016	19,051
2	Equipment--Amortization & Interest	802	803
3	Equipment--Expense	381	1,020
4	Maintenance & Operation Expense Excluding Snow Removal Contract Services	21,955	19,649
5	Administration Expenses Including AVSEC Level III Security	13,179	11,748
6	Contract Snow Removal Services	864	864
7	Allocated Portion of Estimated Tax Liability	1,873	1,792
8	Credits Applied	(4,521)	(3,991)
9	Prior Years Adjustment to Actual (FY00)	(1,751)	(1,047)
10	Bad Debt Write-Offs (@ 10% Over Five Years)	124	149
Annual Cost of Public Aircraft Facilities		52,922	50,038
Scheduled Air Carrier Projected Weights In Thousand Pounds (1)		24,000	23,350
Landing Fee Per Thousand Pound		2.21	2.14

(1) 1% Increase over FY00 Actual Weights

Source: Massachusetts Port Authority

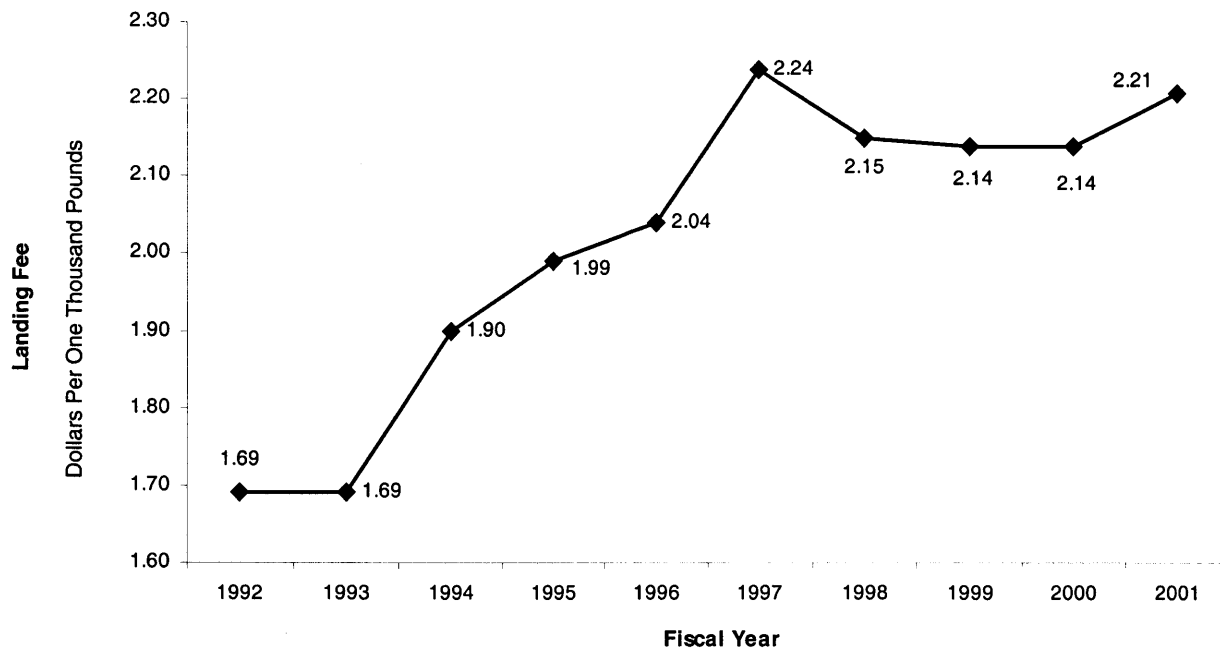
Landing fees

Setting the landing fees is a simple and straightforward procedure. Under the compensatory scheme the airport has to recover the cost of operating the landing field. In order to set the landing fees for the next year airport administrators have to prepare a budget and air traffic projections. Table A.2 shows BOS landing fee computation calculations for fiscal year 2001.⁵⁰ The expenses list has 10 line items

⁵⁰ This is a preliminary calculation and was subject to later revisions.

including amortization and interest, maintenance and operations, and administration expenses. Adjustments regarding prior year overpayments are included (Row 10). The sum of all 10 line items in Table A.2 shows projected expenses of \$52.9 million for fiscal year 2001. Next, projected scheduled air carrier weights in thousand pounds for the year are incorporated. The projected weight in thousand pounds for BOS for fiscal year 2001 was 24 million. The landing fee per thousand pounds is found by dividing the budgeted cost of operating the airfield by the projected weight in thousand pounds. BOS landing fee for 2001 was set at \$2.21 per thousand pounds.

Figure 3 Historical trend of landing fees at BOS



Source: Massachusetts Port Authority

TERMINAL RENTAL COMPUTATION AT LOGAN AIRPORT

To calculate the space rental rates and passenger fees for a terminal building space, Massport uses the procedure shown in Table 1 (the example is the actual calculation for a terminal building at BOS FY2001). The process begins with a breakdown of the square footage in the building and a determination of the total annual costs of operating and maintaining the terminal. Rent differentials are applied, to account for differences in the type of space being used. Then the differentials are multiplied by the relevant square footage to produce a dollar amount that is subtracted from the total annual cost of the terminal.

To find the average rental rate (ARR), the adjusted net annual costs are divided by the gross square footage of the terminal. In this case the rate is \$33.90. The next step is to allocate the cost to the different areas of the terminal. Using the average rental rate, a dollar value is given to every space in the terminal. Then, the \$3.00 and \$13.50 rental rate differentials are added to the average rate for Type 2 and Type 3 spaces respectively.

The next step is the allocation of public space value (PSV). First, it is necessary to distinguish between FIS and non-FIS public space. This is done on the basis of the percentage of passengers using the FIS and non-FIS areas. In the case of this terminal the projections show that about 52% of the users will be inbound international passengers, while the remaining 48% will be outbound (domestic and international) and inbound domestic passengers. Next an adjustment is made for the results of the previous year. The adjustment amount represents the difference between payments made by the tenants based on the prior year projections and the true costs calculated on the basis of the actual passenger count.

Finally, the calculation of the terminal building rental rates is made. Type 1 rental rate is charged for the use of non-FIS public space. The value is calculated by dividing the annual value of the non-FIS public space by the total tenant space. In this case the rate is \$15.86. This amount is added to the base rate

Table 1 Terminal Rental Calculation

1 Square Footage Summary			
Type 1 baggage sq. ft.			24,318
Type 1 Common Baggage sq. ft.			1,318
Type 2 Office sq. ft.			84,400
Type 2 Common Office sq. ft.			337
Type 3 Finished sq. ft.			31,755
Type 3 Common Finished sq. ft.			440
Common Holdrooms			19,133
Subtotal			161,701
FIS sq. ft.			75,890
Total Rentable sq. ft.			237,591
Public sq. ft.			112,558
Total sq. ft			350,149
2 Annual Costs in thousands (FY01)			
Amortization & Interest			3,159,000
Maintenance & Operating Expenses			6,071,000
Administrative Expenses			3,520,000
Utilities			1,708,000
Roadway & Access Allocation			
Allocated Portion of Tax Liability			560,000
Less Free Baggage Cart Expense			(388,000)
Prior Year Expense Adjustment to Actual			416,000
Maintenance Reserve Deposit Fee for PFC Projects			316,000
Total Annual cost			15,362,000
3 Rental Rate Differentials			
Type 2 Office Space	\$3.00		
Type 3 Finished Premises	\$13.50		
	Sq. Ft.	Rate Diff.	
Type 2 Office sq. ft.	84,400	\$3.00	(253,200)
Type 2 Common Office sq. ft.	337	\$3.00	(1,011)
Type 3 Finished sq. ft.	31,755	\$13.50	(428,693)
Type 3 Common Finished sq. ft.	440	\$13.50	(5,940)
Common Holdrooms	19,133	\$13.50	(258,296)
FIS sq. ft.	75,890	\$13.50	(1,024,515)
Public sq. ft.	112,558	\$13.50	(1,519,533)
			(3,491,187)
Adjusted Net Annual Costs			11,870,813

Source: Massachusetts Port Authority

Table 1—(Continued)

4 Setting of Average Rental Rate					
Adjusted Net Annual Costs	11,870,813				
Gross Square Footage of Terminal	350,149				
Average Rental Rate (ARR)	\$ 33.90				
5 Allocation of Terminal Costs					
Tenant Space:	Sq. Ft.	ARR	DIFF	TOTAL	
Type 1 Baggage	25,636	\$33.90	N/A	\$33.90	869,116
Type 2 Office	84,737	\$33.90	\$3.00	\$36.90	3,126,980
Type 3 Finished	32,195	\$33.90	\$13.50	\$47.40	1,526,113
Common Holdrooms	19,133	\$33.90	\$13.50	\$47.40	906,946
Total Value of Tenant Space					6,429,155
FIS Space Value	75,890	\$33.90	\$13.50	\$47.40	3,597,351
Public Space Value (PSV)	112,558	\$33.90	\$13.50	\$47.40	5,335,494
Total Terminal Value					15,362,000
6 Allocation of Public Space Value			%	Cost	
Projected Inbound Intl. Passengers (FIS)		1,675,000	52	2,774,457	
Projected Outbound Passengers (Non-FIS)		1,250,000	39		
Projected Inbound Domestic Passengers (Non-FIS)		300,000	9		
Sub-Total (Non-FIS)		1,550,000	48	2,561,037	
Total		3,225,000	100	5,335,494	
Projected Common Space Usage		500			
7 FY00 Actual Passenger Adjustment to Actual					
Inbound	(428,728)				
Outbound	(259,032)				
Total FY00 Paxs. Adj. To Actual	(687,760)				

Source: Massachusetts Port Authority

resulting in \$49.75 sq. ft. The other two rental rates are calculated by adding their corresponding differential to the average rental rate. Then the common space rate is calculated by multiplying the rate assigned to each type by the square footage. This provides the total cost of all spaces, which is \$111,198. Since the objective of this calculation is to recover the cost for the use of the facilities, the airport operator will

have to estimate how much this common space will be used. Then, the total cost (which in this case was \$111,198) is divided by the projected usage (500), resulting in the price the operator will charge (\$222.31) for the use of the common space.

Table 1—(Continued)

8 Calculation of Terminal building rates			
Type 1 (Base) Rate			
Average Rental Rate			\$33.90
Annual Value of Non-FIS Public Space		2,561,037	
Total Tenant Space		161,701	
Non-FIS Allocated Public Space Rate			\$15.84
Type 1 Rental Rate			\$49.74
Type 2 Rental Rate			
Type 2 Rental Rate Differential			\$3.00
Type 2 Rental Rate			\$52.74
Type 3 Rental Rate			
Type 2 Rental Rate Differential			\$13.50
Type 2 Rental Rate			\$63.24
Common Space Rate Per Use			
Common Space	Sq. Ft.	RATE	COST
Type 1 Baggage	1,318	\$49.74	\$65,558
Type 2 Office	337	\$52.74	\$17,773
Type 3 Finished	440	\$63.24	\$27,826
			\$111,157
Projected Usage		500	
Cost per Use			\$222.31

Source: Massachusetts Port Authority

In addition to the rent for the use of space, airlines pay a fee per passenger served. The fee depends on the services and space usage. Table 2 displays the fee calculation procedure. The passenger fee rates are separated into three main categories: inbound international, outbound, and inbound domestic. The base charge per international inbound passenger includes charges for the use of the FIS facilities. The cost per international inbound passenger was \$3.84, which includes charges for the use of FIS facilities, baggage handling fee and AvioBridge fee. The fee per outbound passenger (domestic and international) was set at \$0.78; while the fee per inbound domestic passenger was set at \$0.26.

Table 2 Calculation of Passenger Fee Rates

9 Calculation of Passenger Fee Rates

Inbound International

Base inbound fee

Total annual value of FIS space	3,597,351	
Total public space value allocated to FIS	2,774,457	
Annual passenger adjustment to actual	(428,728)	
Sub Total	5,943,080	
Projected International Inbound PAX	1,675,000	
	Base Intl. Inbound Fee	\$ 3.55

Baggage handling fee

Inbound Passenger Service Fees (free bag carts)	387,882	
Projected International Inbound PAX	1,675,000	
	Inbound Intl. Passenger Baggage Fee	\$ 0.23

Avio Bridge fee

Avio Bridge annual costs	180,706	
Projected percentage inbound passenger/total	52%	
Allocation of Avio Bridge cost to inbound PAX	93,967	
Projected inbound Intl. Passengers (FIS)	1,675,000	
	Avio Bridge fee per inbound passenger	\$ 0.06

Total International Inbound Fee **\$ 3.84**

Note: Adjustments were made to simplify the table. Total reflect Massport final figure

Source: Massachusetts Port Authority

Large Hubs Aeronautical Operating Revenues, Fiscal Year 1996

	Airport	Landing Fees	Terminal	Apron	Fuel_Flowage	Utilities	FBO	Cargo	Security	Miscellaneous	Other Aero Fees	Total
1	ATL	26,006,832	21,641,740	4,041,601	168,494	0	187,307	12,050,010	6,437,228	0	4,555,946	75,089,158
2	ORD	92,736,229	144,422,074	0	5,585,429	638,823	1,178,493	4,923,670	0	735,958	0	250,220,676
3	LAX	97,010,000	34,471,000	2,293,000	670,000	1,734,000	0	8,023,000	0	1,171,000	0	145,372,000
4	DFW	73,082,000	12,881,000	0	0	11,165,000	2,014,000	1,741,000	0	3,344,000	3,225,000	107,452,000
5	SFO	28,782,982	34,340,328	47,915	1,257,831	11,859,167	342,900	15,074,826	1,934,240	69,804	494,455	94,204,448
6	DEN	86,562,044	238,145,480	0	0	0	55,023	3,535,292	989,337	1,788,405	13,552,077	344,627,658
7	MSP	22,097,000	11,147,000	4,242,000	132,000	1,264,000	451,000	13,690,000	455,000	154,000	0	53,632,000
8	DTW	56,479,837	18,971,492	0	0	4,219,646	0	0	0	0	0	79,670,975
9	MIA	40,651,000	95,257,000	3,450,000	0	0	0	0	0	0	0	139,358,000
10	LAS	22,426,000	39,525,000	5,215,000	963,000	0	2,949,000	0	0	969,000	0	72,047,000
11	EWR	91,317,000	98,314,000	0	29,449,000	7,179,000	0	19,201,000	0	0	0	245,460,000
12	PHX	18,504,645	34,716,661	115,912	1,942,906	0	781,751	1,543,112	0	74,739	0	57,679,726
13	IAH	40,233,000	42,154,000	486,000	1,022,000	0	0	4,651,000	1,288,000	0	0	89,834,000
14	JFK	142,777,000	146,330,000	0	9,092,000	43,199,000	0	79,766,000	0	0	0	421,164,000
15	STL	30,738,685	21,786,993	263,998	347,257	1,175,347	1,470,655	1,911,448	0	118,873	0	57,813,256
16	MCO	39,572,000	49,744,000	3,247,000	2,000,000	55,000	2,003,000	2,786,000	2,281,000	6,000	-23,433,000	78,261,000
17	SEA	28,629,218	0	0	77,682	3,109,937	0	423,438	52,535	1,120,715	0	33,413,525
18	BOS	45,349,301	32,917,645	2,618,193	0	11,502,609	1,954,971	12,534,675	906,241	0	0	107,783,635
19	LGA	91,028,000	26,936,000	0	1,004,000	9,121,000	0	3,758,000	0	0	0	131,847,000
20	PHL	26,738,976	47,285,929	2,608,233	922,106	2,874,844	628,645	2,629,327	1,207,696	381,513	586,540	85,863,809
21	HNL	31,909,488	39,378,379	179,489	231,400	103,746	0	280,259	0	4,323,837	13,023,486	89,430,084
22	CVG	16,874,754	12,590,502	3,941,101	0	2,672,232	165,776	872,800	0	327,560	628,850	38,073,575
23	CLT	9,634,000	20,856,000	0	29,900	0	742,342	6,896,582	0	0	0	38,158,824
24	SLC	10,816,699	17,364,719	0	224,437	466,713	119,488	1,455,501	423,400	1,567,144	4,719,048	37,157,149
25	IAD											
26	PIT	22,568,952	44,404,959	2,272,875	43,170	3,378,655	77,792	9,929,036	0	0	14,575,187	97,250,626
27	BWI	14,178,717	13,358,262	478,435	75,087	110,752	837,229	1,682,243	570,338	0	0	31,291,063
28	SAN	11,143,461	13,839,228	0	120,740	75,937	0	0	0	0	838,581	26,017,947
29	TPA	11,253,079	22,611,910	488,221	284,610	271,817	760,466	1,033,919	0	608,423	748,546	38,060,991
30	DCA	23,032,700	27,412,800	0	0	3,533,400	770,081	0	0	0	2,146,229	56,895,210
	Totals	1,252,133,599	1,362,804,101	35,988,973	55,643,049	119,710,625	17,489,919	210,392,138	16,545,015	16,760,971	35,660,945	3,123,129,335

Source: FAA's Form 5100-127

Large Hubs Non-Aeronautical Operating Revenues, Fiscal Year 1996

	Airport	Rent	Concessions	Parking	Rental Cars	Catering	Interest	Royalties	Miscellaneous	Other Non Aero Fees	Total Nonaeronautical	Total Operating
1	ATL	15,115,860	25,310,306	44,354,041	21,944,082	0		205,156	1,195,006	2,893,446	111,017,897	186,107,055
2	ORD	18,121,063	35,612,785	62,129,977	17,968,136	34,100		0	1,832,651		135,698,712	385,919,388
3	LAX	27,911,000	67,387,000	48,743,000	33,140,000	110,000		0	1,656,000	4,753,000	183,700,000	329,072,000
4	DFW	8,646,000	19,580,000	62,785,000	14,102,000	0		0	1,485,000	168,000	106,766,000	214,218,000
5	SFO	850,224	43,996,299	50,374,686	26,390,985	0		0	563		121,612,757	215,817,205
6	DEN	3,550,090	11,848,566	47,118,216	20,421,947	834,566		842,199	6,459,088		91,074,672	435,702,330
7	MSP	2,216,000	8,678,000	30,291,000	8,496,000	386,000		320,000	1,215,000		51,602,000	105,234,000
8	DTW	0	17,652,999	26,289,473	12,187,674	962,045		0	0		57,092,191	136,763,166
9	MIA	83,583,000	152,145,000	25,518,000	17,608,000	0		0	13,082,000		291,936,000	431,294,000
10	LAS	7,572,000	37,228,000	7,582,000	14,488,000	1,929,000		0	860,000		69,659,000	141,706,000
11	EWR	301,000	10,142,000	46,009,000	18,249,000	5,754,000		0	2,210,000	19,144,000	101,809,000	347,269,000
12	PHX	13,483,099	6,866,684	24,710,017	20,835,534	0		0	3,150,796		69,046,130	126,725,856
13	IAH	4,018,000	14,366,000	33,004,000	12,719,000	0	Non-Operating	0	2,659,000	2,619,000	69,385,000	159,219,000
14	JFK	4,347,000	36,255,000	26,205,000	7,286,000	23,299,000	Revenues	0	5,346,000	12,204,000	114,942,000	536,106,000
15	STL	326,715	8,906,159	10,875,070	7,458,637	885,702	(Expenses)	0	1,900,623		30,352,906	88,166,162
16	MCO	4,895,000	25,039,000	19,453,000	33,833,000	1,759,000		0	699,000	21,238,000	106,916,000	185,177,000
17	SEA	5,968,180	10,272,533	35,066,832	14,216,784	2,889,238		0	1,260,957	31,347,450	101,021,974	134,435,499
18	BOS	6,687,292	15,025,657	55,891,668	15,897,943	0		0	3,228,843	5,684,666	102,416,069	210,199,704
19	LGA	2,624,000	6,459,000	23,433,000	8,482,000	5,596,000		0	2,056,000	29,517,000	78,167,000	210,014,000
20	PHL	1,180,983	5,846,967	14,734,478	10,487,168	2,158,529		0	615,679	1,216,068	36,239,872	122,103,681
21	HNL	4,814,611	131,364,874	10,275,211	351,155	332,897		0	704,156	4,139,293	151,982,197	241,412,281
22	CVG	1,057,426	2,964,739	8,383,151	3,436,260	1,604,413		0	57,600		17,503,589	55,577,164
23	CLT	39,135	6,690,487	10,266,000	4,977,293	1,145,261		0	0		23,118,176	61,277,000
24	SLC	5,881,994	4,979,742	11,062,964	9,236,947	1,436,128		0	1,596,558		34,194,333	71,351,482
25	IAD											
26	PIT	1,545,462	7,495,829	15,132,386	7,719,926	0		0	77,732	194,235	32,165,570	129,416,196
27	BWI	1,331,095	6,031,437	20,227,880	9,152,204	533,942		0	599,906	683,251	38,559,715	69,850,778
28	SAN	3,034,239	12,202,758	9,137,230	0	0		0	615,402		24,989,629	51,007,576
29	TPA	5,254,856	5,614,279	21,210,839	13,737,368	886,058		0	2,125,637	2,434,567	51,263,604	89,324,595
30	DCA	222,000	3,254,200	10,555,200	11,610,500	1,529,700		0	0	4,809,969	31,981,569	88,876,779
	Totals	234,577,324	739,216,300	810,818,319	396,433,543	54,065,579		1,367,355	56,689,197	143,045,945	2,436,213,562	5,559,342,897

Source : FAA's Form 5100-127

Large Hubs Operating Expenses, Fiscal Year 1996

	Airport	Personnel Compensation	Communications	Supplies	Services	Insurance	Government	Miscellaneous	Other Operating Expenses	Total
1	ATL	25,081,729	2,726,570	18,891,744	6,379,279	1,116,562	139,128	81,544	3,890,436	58,306,992
2	ORD	122,699,415	20,253,497	57,174,747	29,558,570	6,561,437	0	15,452,910	90,361,522	342,062,098
3	LAX	70,136,000	15,416,000	14,040,000	76,546,000	5,334,000	0	3,429,000	11,417,000	196,318,000
4	DFW	67,183,000	10,314,000	0	17,222,000	0	0	10,265,000	45,800,000	150,784,000
5	SFO	70,700,898	17,746,868	32,580,416	26,584,068	932,907	532,595	962,204	0	150,039,956
6	DEN	54,105,270	32,809,648	21,392,883	28,861,221	1,540,753	0	726,233	0	139,436,008
7	MSP	26,341,000	6,106,000	9,035,000	1,021,000	1,114,000	0	2,042,000	7,870,000	53,529,000
8	DTW	36,466,908	8,523,995	9,043,051	31,249,436	2,131,718	0	1,311,340	0	88,726,448
9	MIA	135,067,000	30,614,000	49,896,000	57,657,000	6,124,000	0	16,847,000	15,515,000	311,720,000
10	LAS	29,541,000	6,530,000	8,800,000	11,503,000	1,505,000	0	942,000	0	58,821,000
11	EWR	56,572,000	6,257,000	65,638,000	23,464,000	3,412,000	1,680,000	7,485,000	35,264,000	199,772,000
12	PHX	26,883,258	7,296,793	8,454,687	20,261,104	402,475	1,833	622,281	0	63,922,431
13	IAH	39,659,000	8,689,000	3,506,000	39,337,000	645,000	0	0	0	91,836,000
14	JFK	85,011,000	52,338,000	72,788,000	27,839,000	7,208,000	1,003,000	6,201,000	66,953,000	319,341,000
15	STL	24,466,710	5,065,208	4,393,796	14,205,153	599,723	0	50,000	0	48,780,590
16	MCO	33,691,000	18,394,000	12,845,000	2,800,000	680,000	5,827,000	-210,000	15,514,000	89,541,000
17	SEA	37,711,610	6,952,452	15,225,725	6,805,981	1,458,149	22,257	1,954,909	13,467,614	83,598,697
18	BOS	50,532,103	15,532,831	6,326,810	20,526,584	1,464,311	8,103,704	6,200,070	19,772,746	128,459,159
19	LGA	39,731,000	7,643,000	24,246,000	21,067,000	2,747,000	181,000	3,705,000	49,514,000	148,834,000
20	PHL	27,329,987	8,147,922	15,728,454	22,834,016	664,145	18,931	2,593,554	1,920,046	79,237,055
21	HNL	22,128,705	11,003,919	12,098,090	14,340,283	1,171,617	13,203,244	613,091	0	74,558,949
22	CVG	13,513,917	6,489,643	6,374,739	1,930,392	669,759	0	923,176	0	29,901,626
23	CLT	7,357,464	2,788,240	5,097,022	5,871,633	521,167	0	11,738	0	21,647,264
24	SLC	16,712,670	3,367,995	3,112,586	9,493,912	583,163	0	306,868	0	33,577,194
25	IAD									
26	PIT	23,580,883	15,248,886	12,880,960	2,049,107	847,518	0	1,905,137	44,500,088	101,012,579
27	BWI	14,680,551	4,582,741	3,684,507	20,930,869	341,216	0	974,555	760,103	45,954,542
28	SAN	1,293,398	1,958,694	4,147,137	5,190,267	326,692	0	232,965	32,569,742	45,718,895
29	TPA	13,822,234	5,346,619	8,478,356	9,335,488	835,518	0	287,571	4,556,350	42,662,136
30	DCA	28,317,000	3,964,000	16,333,000	0	1,880,000	0	0	26,508,000	77,002,000
	Totals	1,200,316,710	342,107,521	522,212,710	554,863,363	52,817,830	30,712,692	85,916,146	486,153,647	3,275,100,619

Source: FAA's Form 5100-127

Large Hubs Aeronautical Operating Revenues, Fiscal Year 1997

	Airport	Landing Fees	Terminal	Apron	Fuel_Flowage	Utilities	FBO	Cargo	Security	Miscellaneous	Other Aero Fees	Total
1	ATL	26,617,679	19,701,412	4,240,829	1,512,224	0	207,766	0	7,305,158	0	5,110,570	64,695,638
2	ORD	98,993,520	138,618,512	0	5,275,627	743,095	1,637,878	5,054,555	0	21,261	0	250,344,448
3	LAX	103,322,000	38,099,000	1,642,000	680,000	1,813,000	0	7,356,000	0	835,000	0	153,747,000
4	DFW	68,157,000	11,436,000	0	0	10,824,000	1,879,000	1,715,000	14,418,000	3,052,000	0	111,481,000
5	SFO	35,199,149	40,296,032	105,932	1,496,873	12,361,172	345,473	16,979,302	1,913,323	77,027	1,863,571	110,637,854
6	DEN	72,954,018	247,917,746	0	0	0	177,946	4,016,995	1,026,466	3,024,693	11,512,797	340,630,661
7	MSP	24,565,000	13,598,000	4,699,000	132,000	1,194,000	504,000	2,796,000	656,000	144,000	0	48,288,000
8	DTW	49,016,755	25,923,118	0	0	3,991,464	0	0	0	0	0	78,931,337
9	MIA	46,276,580	99,971,752	3,364,632	0	0	0	0	0	0	0	149,612,964
10	LAS	23,514,000	39,266,000	5,064,000	908,000	0	3,837,000	0	0	1,072,000	0	73,661,000
11	EWR	86,143,000	111,165,000	0	31,409,000	7,024,000	0	21,609,000	0	0	0	257,350,000
12	PHX	18,272,540	38,952,265	85,877	1,473,699	0	865,857	1,595,550	0	62,560	0	61,308,348
13	IAH	41,929,000	42,855,000	379,000	1,062,000	0	0	5,171,000	1,287,000	0	0	92,683,000
14	JFK	128,885,000	116,203,000	0	9,010,000	52,070,000	0	84,256,000	0	0	0	390,424,000
15	STL	32,562,209	14,047,985	167,358	278,990	1,679,256	5,404	2,274,736	0	903,818	0	51,919,756
16	MCO	41,165,000	37,390,000	3,269,000	1,494,000	49,000	1,318,000	3,353,000	2,319,000	2,403,000	-21,009,000	71,751,000
17	SEA	29,768,152	0	0	76,349	3,133,775	0	710,678	53,147	0	0	33,742,101
18	BOS	49,053,405	33,256,770	2,596,145	0	11,694,866	2,067,065	12,731,043	841,496	0	0	112,240,790
19	LGA	97,904,000	28,277,000	0	1,002,000	9,640,000	0	3,821,000	0	0	0	140,644,000
20	PHL	24,112,082	47,195,572	2,803,772	941,215	2,572,250	624,571	2,695,404	1,304,847	228,309	1,328,065	83,806,087
21	HNL	25,888,777	40,258,774	92,358	498,183	1,056,447	0	301,210	0	418,859	10,517,708	79,032,316
22	CVG	15,998,309	12,947,324	3,943,628	0	2,628,347	161,925	883,726	0	327,325	3,080,490	39,971,074
23	CLT	10,440,000	20,520,848	0	54,845	0	819,307	8,331,113	0	0	0	40,166,113
24	SLC	15,042,405	18,939,953	0	306,954	138,153	96,460	1,578,870	449,187	1,628,080	5,176,826	43,356,888
25	IAD											
26	PIT	17,093,903	44,825,719	2,368,163	60,202	3,283,558	77,792	10,833,961	0	0	14,334,214	92,877,512
27	BWI	15,430,193	13,080,864	459,055	12,608	372,972	978,688	1,429,571	598,717	0	0	32,362,668
28	SAN	14,485,609	17,278,432	0	74,555	15,924	0	0	0	0	736,771	32,591,291
29	TPA	11,393,375	19,034,453	555,898	346,020	244,494	802,575	1,149,334	0	441,290	707,631	34,675,070
30	DCA	22,693,234	39,322,300	0	0	3,396,411	464,666	0	0	0	1,790,979	67,667,590
	Totals	1,246,875,894	1,370,378,831	35,836,647	58,105,344	129,926,184	16,871,373	200,643,048	32,172,341	14,639,222	35,150,622	3,140,599,506

Source: FAA's Form 5100-127

Large Hubs Non-Aeronautical Operating Revenues, Fiscal Year 1997

Airport	Rent	Concessions	Parking	Rental_Cars	Catering	Interest	Royalties	Miscellaneous	Other Non Aero		Total Operating
									Fees	Total Nonaeronautical	
1 ATL	23,419,850	34,250,276	53,527,452	22,628,309	0	1,263,183	115,816	1,442,901	2,050,187	137,434,791	202,130,429
2 ORD	19,383,298	39,935,633	67,314,887	19,049,104	75,652	0	0	2,009,146	0	147,767,720	398,112,168
3 LAX	35,799,000	67,059,000	51,052,000	33,505,000	146,000	27,445,000	0	1,471,000	5,024,000	194,056,000	347,803,000
4 DFW	9,044,000	22,621,000	65,097,000	15,890,000	0	0	0	3,347,000	4,075,000	120,074,000	231,555,000
5 SFO	889,128	45,769,264	56,173,687	28,903,874	0	49,459,243	0	-338	0	131,735,615	242,373,469
6 DEN	2,763,845	14,368,779	55,829,073	21,727,001	940,585	46,189,473	892,663	6,130,212	0	102,652,158	443,282,819
7 MSP	2,114,000	10,663,000	31,675,000	9,507,000	413,000	0	322,000	2,153,000	926,000	57,773,000	106,061,000
8 DTW	0	18,041,898	28,455,683	13,377,528	1,181,315	0	0	0	0	61,056,424	139,987,761
9 MIA	89,849,958	151,911,955	26,278,225	19,315,805	0	23,390,235	0	10,329,858	0	297,685,801	447,298,765
10 LAS	9,819,000	43,432,000	9,715,000	16,150,000	1,868,000	30,170,000	0	1,395,000	0	82,379,000	156,040,000
11 EWR	293,000	12,159,000	51,828,000	20,931,000	6,418,000	0	0	1,011,000	34,444,000	127,084,000	384,434,000
12 PHX	14,300,713	7,331,834	27,842,904	22,620,388	0	8,786,732	0	3,862,186	0	75,958,025	137,266,373
13 IAH	3,701,000	14,670,000	35,794,000	14,412,000	0	10,894,000	0	2,887,000	2,906,000	74,370,000	167,053,000
14 JFK	4,083,000	31,521,000	28,143,000	8,457,000	25,546,000	0	0	3,384,000	52,324,000	153,458,000	543,682,000
15 STL	642,184	9,179,366	9,200,951	7,757,048	889,267	8,509,875	0	1,672,919	7,828,588	37,170,323	89,090,079
16 MCO	2,672,000	28,579,000	22,259,000	39,148,000	1,760,000	18,207,000	0	317,000	0	118,293,000	190,044,000
17 SEA	6,711,038	11,148,375	37,020,135	14,794,980	2,758,640	0	0	2,775,446	33,019,757	108,228,371	141,970,472
18 BOS	7,072,440	17,309,823	54,325,574	16,571,444	0	10,211,817	0	3,221,725	5,705,779	104,206,785	216,447,575
19 LGA	2,572,000	8,447,000	25,546,000	9,472,000	6,097,000	0	0	1,736,000	25,465,000	79,335,000	219,979,000
20 PHL	1,260,797	7,103,471	17,946,557	11,927,665	2,516,899	1,926,585	0	762,772	1,296,608	42,814,769	126,620,856
21 HNL	4,135,586	127,232,658	10,624,537	6,177,503	2,208,813	30,873,149	0	4,592,948	2,534,707	157,506,752	236,539,068
22 CVG	1,066,719	2,615,550	9,543,459	4,008,930	1,814,327	3,064,780	0	121,769	0	19,170,754	59,141,828
23 CLT	39,135	8,493,038	12,243,000	5,612,962	1,418,752	7,869,000	0	0	0	27,806,887	67,973,000
24 SLC	5,874,936	5,773,367	12,297,627	10,306,788	1,572,799	4,280,524	0	1,152,470	0	36,977,987	80,334,875
25 IAD	0	0	0	0	0	0	0	0	0	0	0
26 PIT	1,940,461	7,982,435	16,082,452	7,755,405	0	6,725,579	0	167,109	214,216	34,142,078	127,019,590
27 BWI	1,368,970	6,554,389	22,441,359	10,164,888	577,730	0	0	597,413	717,444	42,422,193	74,784,861
28 SAN	4,302,212	14,275,769	7,840,428	0	0	0	0	1,005,838	0	27,424,247	60,015,538
29 TPA	5,328,676	5,949,132	23,419,166	14,495,984	826,776	9,392,463	0	2,280,338	2,206,579	54,506,651	89,181,721
30 DCA	7,439,388	5,590,729	13,753,908	13,969,203	1,439,622	6,205,469	0	0	5,105,668	47,298,518	114,966,108
Totals	267,886,334	779,968,741	883,270,064	438,636,809	60,469,177	304,864,107	1,330,479	58,819,874	210,407,371	2,700,788,849	5,841,388,355

Source: FAA's Form 5100-127

Large Hubs Operating Expenses, Fiscal Year 1997

	Airport	Personnel Compensation	Communications	Supplies	Services	Insurance	Government	Miscellaneous	Other Operating Expenses	Total
1	ATL	26,645,413	2,827,610	16,262,834	7,131,704	652,904	348,279	153,114	3,658,685	57,680,543
2	ORD	130,808,976	23,265,159	63,400,767	18,465,983	5,766,442	0	12,211,811	86,571,524	340,490,662
3	LAX	76,258,000	16,809,000	15,201,000	80,965,000	7,140,000	0	4,144,000	12,000,000	212,517,000
4	DFW	72,083,000	8,503,000	0	13,702,000	0	0	10,966,000	48,747,000	154,001,000
5	SFO	75,599,416	15,871,955	32,493,497	34,543,104	994,402	539,513	1,125,371	0	161,167,258
6	DEN	59,112,778	34,342,046	27,697,702	31,042,090	1,610,252	0	7,318,327	9,124,995	170,248,190
7	MSP	30,653,000	5,889,000	9,917,000	1,335,000	952,000	4,027,000	2,383,000	4,069,000	59,225,000
8	DTW	37,137,424	8,908,510	9,105,906	29,450,997	1,529,394	0	1,278,565	0	87,410,796
9	MIA	142,755,000	33,161,109	47,811,139	61,897,697	6,839,225	0	7,401,261	24,659,569	324,525,000
10	LAS	34,134,000	6,977,000	9,169,000	12,984,000	1,222,000	0	778,000	0	65,264,000
11	EWR	51,384,000	7,872,000	62,567,000	33,088,000	3,614,000	1,020,000	6,437,000	33,572,000	199,554,000
12	PHX	28,092,964	7,750,108	10,615,704	22,091,877	407,829	10,754	507,859	0	69,477,095
13	IAH	39,583,000	9,094,000	3,933,000	40,849,000	444,000	0	0	0	93,903,000
14	JFK	72,614,000	50,085,000	59,858,000	20,578,000	6,220,000	132,000	11,603,000	101,641,000	322,731,000
15	STL	25,246,010	4,559,056	5,826,517	18,830,890	507,821	0	0	0	54,970,294
16	MCO	32,908,000	18,327,000	14,297,000	3,307,000	801,000	6,129,000	1,429,000	16,216,000	93,414,000
17	SEA	35,001,618	6,723,457	7,838,737	19,572,168	777,340	0	1,548,296	17,492,501	88,954,117
18	BOS	51,966,179	15,038,027	5,868,808	21,482,482	1,572,762	8,458,578	6,476,028	19,037,299	129,900,163
19	LGA	37,740,000	7,310,000	23,227,000	29,300,000	2,734,000	0	2,627,000	49,044,000	151,982,000
20	PHL	27,305,553	7,777,803	14,896,038	29,732,412	934,054	4,675	217,855	2,413,292	83,281,682
21	HNL	22,465,583	11,321,749	17,504,036	15,182,751	961,627	6,723,046	576,625	0	74,735,417
22	CVG	14,840,687	6,200,718	6,747,441	1,945,752	569,928	0	1,142,532	0	31,447,058
23	CLT	7,570,461	2,903,931	6,491,686	5,351,410	739,384	0	0	0	23,056,872
24	SLC	19,355,224	3,407,737	3,334,850	15,276,424	605,849	0	39,868	0	42,019,952
25	IAD									
26	PIT	21,625,685	15,526,914	10,148,305	2,330,781	767,761	0	2,447,537	44,086,517	96,933,500
27	BWI	15,444,120	4,980,403	1,987,140	20,886,127	365,249	0	1,129,779	513,719	45,306,537
28	SAN	1,335,642	2,199,521	2,408,146	7,376,082	333,041	0	471,227	43,669,618	57,793,277
29	TPA	14,547,025	4,911,435	8,679,371	7,929,725	894,040	0	745,609	4,725,839	42,433,044
30	DCA	29,304,598	6,441,996	18,760,746	0	2,067,602	0	0	34,830,765	91,405,707
	Totals	1,233,517,356	348,985,244	516,048,370	606,628,456	52,023,906	27,392,845	85,158,664	556,073,323	3,425,828,164

Source: FAA's Form 5100-127

Large Hubs Aeronautical Operating Revenues, Fiscal Year 1998

	Airport	Landing Fees	Terminal	Apron	Fuel_Flowage	Utilities	FBO	Cargo	Security	Miscellaneous	Other Aero Fees	Total
1	ATL	26,382,789	30,151,801	5,068,864	2,052,090	0	189,895	0	6,365,574	0	5,341,999	75,553,012
2	ORD	124,001,569	155,405,795	0	5,487,308	882,993	1,103,047	4,701,812	0	0	0	291,582,524
3	LAX	79,634,000	43,298,000	1,658,000	390,000	1,087,000	0	8,649,000	0	726,000	0	135,442,000
4	DFW	65,344,000	3,344,000	127,000	1,913,000	12,053,000	0	1,718,000	0	0	12,372,465	96,871,465
5	SFO	44,988,249	51,693,836	225,523	1,341,652	13,322,362	1,460,741	16,826,315	1,873,104	80,865	3,427,637	135,240,284
6	DEN	76,386,656	255,532,624	0	0	0	55,023	4,317,234	1,048,695	2,603,428	12,510,913	352,454,573
7	MSP	27,638,000	15,427,000	5,232,000	162,000	1,637,000	494,000	2,878,000	0	912,000	0	54,380,000
8	DTW	52,473,183	18,841,497	0	0	3,351,582	0	0	0	0	0	74,666,262
9	MIA	49,378,943	108,067,847	6,231,244	0	0	0	0	0	0	0	163,678,034
10	LAS	23,260,000	39,862,000	5,191,000	1,137,000	0	3,321,000	0	0	771,000	0	73,542,000
11	EWR	87,089,000	131,784,000	0	31,584,000	6,718,000	0	19,919,000	0	0	0	277,094,000
12	PHX	18,214,793	40,392,501	107,861	269,805	0	831,492	1,682,924	0	27,690	0	61,527,066
13	IAH	42,275,000	42,876,000	353,000	1,111,000	0	0	3,147,000	1,270,000	0	0	91,032,000
14	JFK	139,402,000	113,814,000	0	8,577,000	60,815,000	0	87,444,000	0	0	0	410,052,000
15	STL	35,143,097	16,068,682	167,358	212,244	1,931,985	4,208	2,326,784	0	817,484	0	56,671,842
16	MCO	40,352,000	35,224,000	3,320,000	1,074,000	49,000	1,228,000	2,921,000	2,455,000	2,406,000	-14,986,000	74,043,000
17	SEA	35,720,259	28,786,360	0	74,774	3,282,344	0	1,093,089	43,073	0	0	68,999,899
18	BOS	50,809,442	36,997,479	2,630,159	0	12,494,590	2,051,530	12,867,952	847,340	0	0	118,698,492
19	LGA	88,333,000	32,840,000	0	1,010,000	8,302,000	0	3,908,000	0	0	0	134,393,000
20	PHL	23,660,294	44,845,077	2,996,475	1,050,315	2,753,447	635,208	2,554,241	1,376,206	404,244	485,621	80,761,128
21	HNL	2,192,795	40,484,366	79,171	352,366	1,151,946	0	330,750	0	0	10,428,804	55,020,198
22	CVG	14,650,738	12,566,299	4,108,939	0	2,858,063	160,000	877,102	0	96,206	6,764,991	42,082,338
23	CLT	8,053,000	19,899,823	0	70,977	0	703,200	5,426,137	0	0	0	34,153,137
24	SLC	15,439,216	19,306,988	0	312,213	314,679	94,925	1,675,697	490,439	2,244,130	5,168,278	45,046,565
25	IAD	22,764,400	0	0	0	4,335,700	0	0	0	40,262	59,129,500	86,269,862
26	PIT	19,399,697	47,889,385	2,888,948	265,611	2,879,729	77,792	10,167,265	0	0	13,930,173	97,498,600
27	BWI	15,570,160	13,548,769	484,257	263,545	122,859	882,664	1,959,458	689,370	5,940	0	33,527,022
28	SAN	16,031,530	19,850,335	0	147,609	4,533	0	0	0	0	2,067,434	38,101,441
29	TPA	10,023,362	18,910,729	576,540	365,266	222,824	851,247	799,510	0	488,848	574,854	32,813,180
30	DCA	24,417,400	0	0	0	3,296,600	0	0	0	542,891	59,595,000	87,851,891
Totals		1,279,028,572	1,437,709,193	41,446,339	59,223,775	143,867,236	14,143,972	198,190,270	16,458,801	12,166,988	176,811,669	3,379,046,815

Source: FAA's Form 5100-127

Large Hubs Non-Aeronautical Operating Revenues, Fiscal Year 1998

Airport	Rent	Concessions	Parking	Rental_Cars	Catering	Interest	Other Non Aero			Total Nonaeronautical	Total Operating
							Royalties	Miscellaneous	Fees		
1	ATL	29,191,181	38,587,606	59,111,899	27,057,171	0	368,851	1,484,221	2,597,213	158,398,142	233,951,154
2	ORD	16,870,687	42,148,106	74,456,322	20,074,385	50,869	0	1,687,243	0	155,287,612	446,870,136
3	LAX	76,656,000	80,176,000	53,799,000	36,089,000	125,000	0	2,332,000	5,044,000	254,221,000	389,663,000
4	DFW	7,944,000	25,803,000	63,461,000	27,073,000	0	0	5,651,000	4,267,743	134,199,743	231,071,208
5	SFO	904,237	46,963,783	62,967,736	30,345,876	0	0	0	0	141,181,632	276,421,916
6	DEN	1,604,989	16,875,306	66,288,624	27,308,210	1,029,978	771,703	6,556,271	0	120,435,081	472,889,654
7	MSP	1,947,000	10,709,000	35,052,000	10,567,000	481,000	0	2,496,000	1,313,000	62,565,000	116,945,000
8	DTW	0	14,594,012	24,898,443	11,837,463	1,224,003	0	0	0	52,553,921	127,220,183
9	MIA	100,760,089	137,494,713	30,317,427	18,494,819	0	0	0	0	287,067,048	450,745,082
10	LAS	11,113,000	20,589,000	11,445,000	16,676,000	1,871,000	0	745,000	24,755,000	87,194,000	160,736,000
11	EWR	249,000	13,582,000	57,545,000	21,915,000	6,203,000	0	5,831,000	33,493,000	138,818,000	415,912,000
12	PHX	15,954,072	6,747,118	34,475,839	25,396,196	0	0	2,932,903	1,378,524	86,884,652	148,411,718
13	IAH	5,913,000	16,455,000	39,214,000	15,828,000	1,272,000	0	997,000	3,334,000	83,013,000	174,045,000
14	JFK	4,887,000	35,678,000	29,412,000	8,112,000	27,596,000	0	5,045,000	72,658,000	183,388,000	593,440,000
15	STL	775,955	8,907,186	9,690,839	8,639,885	860,452	0	2,847,688	7,828,588	39,550,593	96,222,435
16	MCO	3,339,000	35,139,000	25,597,000	39,985,000	1,862,000	0	1,587,000	26,807,000	134,316,000	208,359,000
17	SEA	6,942,274	13,038,762	40,397,989	15,209,603	2,940,181	0	3,501,809	3,304,177	85,334,795	154,334,694
18	BOS	6,695,844	20,532,444	58,213,870	18,467,402	0	0	5,530,826	5,843,990	115,284,376	233,982,868
19	LGA	2,650,000	8,162,000	29,363,000	10,356,000	6,525,000	0	2,499,000	25,507,000	85,062,000	219,455,000
20	PHL	905,357	8,206,005	19,565,769	12,492,086	2,808,351	0	759,853	1,202,819	45,940,240	126,701,368
21	HNL	4,226,133	130,082,984	10,661,700	5,355,856	2,113,956	0	3,895,321	1,524,750	157,860,700	212,880,898
22	CVG	1,027,755	2,669,258	10,779,237	4,327,171	2,159,679	0	550,241	0	21,513,341	63,595,679
23	CLT	38,293	8,810,017	16,099,000	6,540,983	1,415,570	0	0	0	32,903,863	67,057,000
24	SLC	6,004,174	6,133,451	16,631,498	10,368,804	1,697,689	0	669,555	0	41,505,171	86,551,736
25	IAD	4,393,600	4,764,900	23,285,017	10,621,200	4,144,200	0	1,434,700	12,364,739	61,008,356	147,278,218
26	PIT	1,046,721	8,746,223	17,021,496	8,027,701	0	0	384,810	271,327	35,498,278	132,996,878
27	BWI	1,620,808	7,492,812	28,038,928	12,042,413	633,358	0	814,142	763,287	51,405,748	84,932,770
28	SAN	3,984,485	15,445,868	9,255,270	0	0	0	30,970	978,984	29,695,577	67,797,018
29	TPA	5,861,167	5,642,977	26,397,667	16,254,928	843,614	0	2,391,938	2,345,975	59,738,266	92,551,446
30	DCA	6,816,500	6,033,000	17,112,096	14,672,200	1,578,000	0	541,100	5,661,595	52,414,491	140,266,382
Totals		330,322,321	796,209,531	1,000,554,666	490,135,352	69,434,900	1,140,554	63,196,591	243,244,711	2,994,238,626	6,373,285,441

Source: FAA's Form 5100-127

Large Hubs Operating Expenses, Fiscal Year 1998

	Airport	Personnel Compensation	Communications	Supplies	Services	Insurance	Government	Miscellaneous	Other Operating Expenses	Total
1	ATL	28,511,115	2,913,827	17,909,885	7,369,437	675,084	237,666	65,553	3,346,116	61,028,683
2	ORD	132,200,465	22,657,944	65,794,067	25,775,238	5,776,350	0	9,506,322	2,415,396	264,125,782
3	LAX	83,719,000	17,580,000	17,655,000	82,427,000	5,569,000	0	8,941,000	1,554,000	217,445,000
4	DFW	78,464,000	9,618,000	8,555,000	19,095,000	2,496,000	0	0	1,623,377	119,851,377
5	SFO	84,176,283	17,309,227	37,425,908	41,347,310	1,572,644	536,918	2,265,866	0	184,634,156
6	DEN	61,389,859	34,246,921	24,110,236	39,387,012	1,601,753	0	3,082,255	5,786,473	169,604,509
7	MSP	32,433,000	6,466,000	10,415,000	1,543,000	1,013,000	0	2,606,000	9,376,000	63,852,000
8	DTW	35,700,862	9,366,128	8,240,351	26,165,205	1,346,804	0	1,262,329	0	82,081,679
9	MIA	138,665,138	39,586,149	73,778,945	32,253,525	6,273,196	0	9,324,347	24,247,282	324,128,582
10	LAS	37,982,000	7,044,000	10,334,000	14,085,000	1,203,000	0	880,000	0	71,528,000
11	EWR	57,551,000	7,572,000	76,607,000	23,614,000	3,963,000	0	7,849,000	44,039,000	221,195,000
12	PHX	29,665,522	8,347,960	10,428,314	23,718,045	431,835	6,770	564,578	0	73,163,024
13	IAH	42,234,000	9,201,000	5,023,000	43,438,000	136,000	0	0	0	100,032,000
14	JFK	72,154,000	56,668,000	73,564,000	9,531,000	5,672,000	0	10,611,000	129,281,000	357,481,000
15	STL	27,478,585	4,448,945	5,799,247	19,689,645	519,067	0	0	0	57,935,489
16	MCO	32,869,000	8,871,000	17,240,000	25,486,000	706,000	537,000	1,400,000	18,186,000	105,295,000
17	SEA	45,392,812	7,824,022	6,281,291	17,100,142	763,714	0	4,000,950	18,164,201	99,527,132
18	BOS	53,410,131	14,988,574	6,300,116	22,825,327	1,387,831	10,153,723	5,930,942	19,614,738	134,611,382
19	LGA	40,757,000	7,273,000	31,049,000	4,636,000	3,024,000	0	5,229,000	55,744,000	147,712,000
20	PHL	27,868,308	8,754,532	14,413,129	30,755,049	673,503	7,120	-89,750	2,070,932	84,452,823
21	HNL	24,936,609	10,742,681	16,726,162	17,903,256	1,287,956	5,366,272	350,942	13,696	77,327,574
22	CVG	16,386,167	5,384,187	10,049,255	894,737	556,441	0	772,071	0	34,042,858
23	CLT	8,108,497	3,196,094	6,182,407	6,892,736	445,266	0	0	0	24,825,000
24	SLC	20,609,122	3,240,249	3,759,589	14,674,191	677,841	0	0	0	42,960,992
25	IAD	35,395,743	0	19,712,039	0	207,602	0	0	52,053,296	107,368,680
26	PIT	25,732,579	15,820,693	10,839,825	2,978,069	590,978	0	1,612,237	44,265,182	101,839,563
27	BWI	15,703,008	5,188,879	2,157,665	26,782,363	359,415	0	1,184,640	769,775	52,145,745
28	SAN	2,585,092	2,902,190	710,883	5,939,168	316,815	0	0	25,509,514	37,963,662
29	TPA	15,325,173	4,980,335	8,829,652	8,112,843	870,509	0	98,029	5,202,944	43,419,485
30	DCA	30,302,100	0	23,498,000	0	1,961,300	0	0	49,900,350	105,661,750
	Totals	1,337,706,170	352,192,537	623,388,966	594,418,298	52,077,904	16,845,469	77,447,311	513,163,272	3,567,239,927

Source: FAA's Form 5100-127

Large Hubs Aeronautical Operating Revenues, Fiscal Year 1999

	Airport	Landing Fees	Terminal	Apron	Fuel Flowage	Utilities	FBO	Cargo	Security	Miscellaneous	Other Aero Fees	Total
1	ATL	24,695,697	47,692,316	7,055,242	2,049,978	0	198,826	0	7,251,322	0	5,861,481	94,804,862
2	ORD	128,270,162	161,346,178	0	5,805,949	879,376	1,650,806	5,257,787	0	0	0	303,210,258
3	LAX	93,390,785	39,237,754	1,888,687	527,689	1,057,986	0	8,425,766	0	524,464	0	145,053,131
4	DFW	59,212,422	30,485,375	230,732	3,879,825	12,613,981	0	1,786,988	0	0	12,237,330	120,446,653
5	SFO	56,951,765	68,353,381	690,497	1,217,416	4,317,028	2,238,125	18,754,089	1,817,225	2,391,260	0	156,730,786
6	DEN	77,408,463	218,023,835	0	0	0	55,685	4,735,760	1,190,047	2,887,278	10,747,525	315,048,593
7	PHX	17,885,909	41,765,097	27,691	323,381	0	408,577	1,676,346	0	0	0	62,087,001
8	LAS	24,080,000	48,091,000	5,195,000	1,516,000	0	3,543,000	0	0	1,002,000	0	83,427,000
9	DTW	53,852,975	23,551,525	0	0	7,535,089	0	0	0	0	0	84,939,589
10	EWR	97,420,000	172,320,000	0	31,794,000	6,084,000	0	21,742,000	0	0	0	329,360,000
11	MSP	30,097,000	21,462,000	5,891,000	428,000	1,332,000	728,000	3,013,000	0	746,000	0	63,697,000
12	MIA	49,462,000	15,069,000	6,496,488 (a)	0	0	0	0	0	0	0	64,531,000
13	IAH	35,929,000	47,777,000	598,000	978,000	0	0	3,098,000	1,287,000	0	0	89,667,000
14	JFK	161,738,000	118,124,000	0	11,597,000	58,844,000	0	99,435,000	0	0	0	449,738,000
15	STL	39,464,459	15,971,350	167,358	206,938	1,799,992	2,338	2,405,465	0	714,629	0	60,732,529
16	MCO	37,780,000	31,615,000	3,413,000	896,000	18,000	975,000	2,583,000	2,252,000	2,404,000	-12,406,000	69,530,000
17	SEA	46,628,093	32,197,182	0	81,391	2,428,619	0	6,150,094	48,789	244,373	0	87,778,541
18	BOS	51,990,066	36,735,040	3,184,025	0	11,873,729	2,013,200	12,962,180	852,444	0	0	119,610,684
19	LGA	101,053,000	39,255,000	0	1,042,000	8,281,000	0	4,482,000	0	0	0	154,123,000
20	PHL	31,390,137	49,036,630	3,064,115	1,280,257	2,421,712	813,347	2,729,237	1,532,860	227,015	465,852	92,960,962
21	CLT	10,494,000	22,610,645	0	67,374	0	784,981	1,303,782	0	0	7,746,000	43,006,782
22	CVG	16,042,099	12,789,585	3,710,031	0	2,730,069	160,000	940,312	0	96,079	7,311,000	43,779,175
23	HNL	0	36,731,808	88,604	348,570	1,138,671	0	329,182	0	3,268,705	8,346,789	50,252,329
24	PIT	18,538,184	42,681,545	2,642,012	188,430	3,055,164	77,792	9,955,195	0	0	13,983,639	91,121,961
25	BWI	17,341,867	14,579,238	1,024,871	1,027,597	154,242	429,444	2,610,364	941,405	8,000	0	38,117,028
26	IAD	20,418,500	45,596,700	0	0	4,040,200	0	0	0	0	23,871,300	93,926,700
27	SLC	15,636,439	20,228,696	0	321,531	322,989	61,614	1,913,858	481,221	2,709,521	6,263,661	47,939,530
28	TPA	11,286,551	18,993,291	536,265	445,676	556,420	961,640	1,021,740	0	314,952	675,757	34,792,292
29	SAN	13,288,649	20,794,898	0	160,937	0	0	0	0	0	2,303,459	36,547,943
30	FLL	7,360,000	13,868,000	552,000	232,000	505,000	1,341,000	317,000	1,072,000	0	0	25,247,000
31	DCA	25,533,600	0	0	0	2,715,200	0	0	0	504,100	56,458,600	85,211,500
	Totals	1,374,639,822	1,506,983,069	39,959,130	66,415,939	134,704,467	16,443,375	217,638,145	18,726,113	18,042,376	143,866,393	3,537,418,829

(a) Figure was changed from \$107.4 million to reflect the average of fiscal years 1996, 1997, 1998 and 2000.

Source: FAA's Form 5100-127

Large Hubs Non-Aeronautical Operating Revenues, Fiscal Year 1999

Airport	Rent	Concessions	Parking	Rental Cars	Catering	Interest	Royalties	Miscellaneous	Other Non Aero Fees	Total	
										Nonaeronautical	Total Operating
1 ATL	7,335,531	48,219,227	62,147,017	28,207,281	0	0	255,892	829,807	79,396	147,074,151	241,879,013
2 ORD	17,973,493	45,982,436	79,886,650	20,221,125	68,457	0	0	2,265,177	0	166,397,338	469,607,596
3 LAX	37,652,298	85,239,469	56,944,260	37,056,668	96,471	0	0	1,811,597	5,433,404	224,234,167	369,287,298
4 DFW	8,189,601	0	68,372,597	26,701,886	0	0	0	7,465,915	9,005,665	119,735,664	240,182,317
5 SFO	4,570,681	46,610,226	58,782,737	33,264,859	0	0	0	2,063,233	0	145,291,736	302,022,522
6 DEN	1,895,461	19,997,234	71,442,342	27,090,503	1,019,569	0	969,229	5,431,476	0	127,845,814	442,894,407
7 PHX	18,066,476	7,527,269	38,947,226	24,834,411	0	0	0	2,877,897	5,184,920	97,438,199	159,525,200
8 LAS	11,455,000	25,288,000	13,641,000	17,484,000	1,921,000	0	0	896,000	25,058,000	95,743,000	179,170,000
9 DTW	0	14,886,399	31,542,827	16,566,183	1,609,884	0	0	0	0	64,605,293	149,544,882
10 EWR	229,000	15,103,000	66,474,000	28,390,000	7,060,000	0	0	5,238,000	35,508,000	158,002,000	487,362,000
11 MSP	3,046,000	13,125,000	36,670,000	16,544,000	476,000	0	0	2,937,000	1,490,000	74,288,000	137,985,000
12 MIA	101,968,000	125,266,000	32,082,000	18,950,000	0	0	0	1,682,000	0	279,948,000	344,479,000
13 IAH	6,414,000	19,803,000	42,304,000	15,423,000	1,346,000	Moved to	0	2,714,000	4,701,000	92,705,000	182,372,000
14 JFK	4,450,000	29,470,000	32,472,000	8,769,000	24,727,000	non-operating	0	2,428,000	72,483,000	174,799,000	624,537,000
15 STL	1,201,167	10,675,096	10,949,038	9,244,545	827,816	revenue	0	2,912,097	7,828,588	43,638,347	104,370,876
16 MCO	3,383,000	38,082,000	26,651,000	47,857,000	2,027,000	0	0	510,000	25,796,000	144,306,000	213,836,000
17 SEA	6,805,353	17,189,321	40,844,963	15,927,143	3,296,916	0	0	17,006	2,496,079	86,576,781	174,355,322
18 BOS	8,138,929	23,411,869	63,930,868	19,037,013	0	0	0	2,417,482	5,906,172	122,842,333	242,453,017
19 LGA	44,000	10,679,000	33,246,000	11,275,000	6,609,000	0	0	4,395,000	25,550,000	91,798,000	245,921,000
20 PHL	179,161	10,978,716	20,466,349	14,343,230	3,038,387	0	0	613,136	1,326,822	50,945,801	143,906,763
21 CLT	1,039,218	9,975,431	15,865,000	7,902,569	0	0	0	0	0	34,782,218	77,789,000
22 CVG	1,148,986	3,080,640	14,595,456	4,835,480	2,073,740	0	0	461,807	430	26,196,539	69,975,714
23 HNL	3,967,218	132,919,126	10,216,914	6,071,793	1,924,267	0	0	1,244,441	2,062,655	158,406,414	208,658,743
24 PIT	1,273,930	9,265,988	18,912,146	8,555,886	0	0	0	15,004	209,768	38,232,722	129,354,683
25 BWI	1,476,705	8,951,664	37,733,921	13,842,553	630,412	0	0	1,380,629	865,509	64,881,393	102,998,421
26 IAD	5,772,400	6,524,564	31,011,100	13,013,200	4,886,900	0	0	13,082,459	854,700	75,145,323	169,072,023
27 SLC	6,149,216	6,816,566	17,510,165	10,567,875	1,889,919	0	0	1,005,637	0	43,939,378	91,878,908
28 TPA	5,694,335	7,275,526	30,112,716	17,090,065	888,171	0	0	12,416	2,359,245	63,432,474	98,224,766
29 SAN	4,260,183	15,838,396	12,226,023	0	0	0	0	76,886	478,281	32,879,769	69,427,712
30 FLL	5,273,000	12,172,000	19,062,000	9,194,000	427,000	0	0	832,000	0	46,960,000	72,207,000
31 DCA	11,700,500	16,747,507	13,335,000	0	1,768,300	0	0	1,717,300	13,641,209	58,909,816	144,121,316
Totals	290,752,842	837,100,670	1,108,377,315	528,260,268	68,612,209		1,225,121	69,333,402	248,318,843	3,151,980,670	6,689,399,499

Source: FAA's Form 5100-127

Large Hubs Operating Expenses, Fiscal Year 1999

		Personnel						Other Operating		
	Airport	Compensation	Communications	Supplies	Services	Insurance	Government	Miscellaneous	Expenses	Total
1	ATL	30,137,759	2,903,167	20,623,085	6,917,475	1,206,488	143,488	408,280	2,896,238	65,235,980
2	ORD	141,473,054	21,623,376	82,930,633	34,883,869	5,301,109	0	12,301,366	3,052,270	301,565,677
3	LAX	95,162,639	19,058,866	22,877,600	84,346,911	4,809,196	0	10,808,158	1,601,685	238,665,055
4	DFW	76,320,988	11,381,502	8,738,415	32,641,672	1,705,981	0	-813,895	1,353,116	131,327,779
5	SFO	97,329,271	11,284,091	21,274,440	74,195,019	1,191,802	1,094,560	3,657,299		210,026,482
6	DEN	68,023,383	34,634,905	32,661,532	53,600,707	1,654,193	0	756,760	3,074,652	194,406,132
7	PHX	31,144,901	7,073,206	11,128,749	33,479,398	976,771	0	105,710		83,908,735
8	LAS	43,828,000	9,668,000	13,626,000	15,763,000	1,387,000	0	1,312,000		85,584,000
9	DTW	45,708,362	7,620,610	10,513,743	38,280,837	1,146,417	0	1,726,618		104,996,587
10	EWR	59,968,000	9,277,000	89,775,000	66,821,000	4,830,000	0	10,979,000	43,161,000	284,811,000
11	MSP	34,497,000	7,318,000	12,053,000	1,606,000	1,172,000	0	2,595,000	11,676,000	70,917,000
12	MIA	136,063,000	38,723,000	98,912,000	25,763,000	5,461,000	0	79,000		305,001,000
13	IAH	50,463,000	10,893,000	16,132,000	38,230,000	364,000	0	0		116,082,000
14	JFK	74,815,000	55,375,000	78,352,000	18,299,000	6,196,000	0	10,694,000	132,737,000	376,468,000
15	STL	30,538,872	5,120,729	5,580,160	20,768,080	610,702	0	0		62,618,543
16	MCO	34,828,000	9,358,000	20,114,000	29,402,000	659,000	0	3,428,000	17,760,000	115,549,000
17	SEA	53,924,872	7,417,811	4,917,558	16,519,637	966,423	0	2,395,772	22,251,913	108,393,986
18	BOS	57,270,535	16,076,113	6,967,401	25,890,071	1,277,275	10,400,395	6,507,168	22,291,581	146,680,539
19	LGA	43,325,000	7,784,000	40,231,000	13,277,000	2,965,000	2,000	4,087,000	56,517,000	168,188,000
20	PHL	29,531,979	9,410,949	16,196,460	35,009,091	3,641,540	6,859	-150,782	7,712,866	101,358,962
21	CLT	8,678,750	3,201,487	6,270,276	8,610,153	602,334	0	0		27,363,000
22	CVG	17,983,949	6,042,435	11,507,270	1,174,952	544,368	0	872,979		38,125,953
23	HNL	25,453,954	10,342,619	18,987,720	16,926,639	1,344,547	6,681,210	380,138		80,116,827
24	PIT	23,537,119	16,300,123	12,666,626	4,073,113	693,362	0	2,203,751	42,483,289	101,957,383
25	BWI	17,978,555	5,545,477	2,717,158	29,531,803	305,839	0	1,402,835	230,549	57,712,216
26	IAD	41,444,700	0	36,366,700	0	1,860,300	0	0	66,160,650	145,832,350
27	SLC	23,161,403	3,075,590	3,833,099	16,263,784	665,065	0	0		46,998,941
28	TPA	16,732,950	5,014,886	9,632,308	8,462,308	534,112	0	80,873	36,096,992	76,554,429
29	SAN	2,911,571	2,756,020	2,180,234	6,557,078	471,518	0	0	31,061,775	45,938,196
30	FLL	14,150,000	2,826,000	1,033,000	23,526,000	963,000	0	571,000		43,069,000
31	DCA	32,105,900	0	27,551,200	0	1,860,300	0	0	52,548,950	114,066,350
	Totals	1,458,492,466	357,105,962	746,350,367	780,819,597	57,366,642	18,328,512	76,388,030	554,667,526	4,049,519,102

Source: FAA's Form 5100-127

Large Hubs Aeronautical Operating Revenues, Fiscal Year 2000

	Airport	Landing Fees	Terminal	Apron	Fuel Flowage	Utilities	FBO	Cargo	Security	Miscellaneous	Other Aero Fees	Total
1	ATL	24,407,703	53,290,659	7,063,212	2,290,661	0	198,826	0	8,402,699	0	5,545,984	101,199,744
2	ORD	125,845,477	135,472,814	0	5,813,664	957,809	1,780,905	5,146,157	0	0	0	275,016,826
3	LAX	101,117,305	42,664,124	2,423,672	448,691	1,073,885	0	7,761,758	0	103,824,529 (a)	0	155,489,435
4	DFW	69,922,221	30,570,213	318,182	3,966,901	13,285,936	0	1,812,454	0	0	11,773,788	131,649,695
5	SFO	70,077,532	89,002,435	855,997	979,336	5,620,303	2,922,600	20,790,546	2,194,859	3,611,160	0	196,054,768
6	DEN	81,282,885	191,041,132	0	0	0	55,023	5,266,904	1,065,029	2,936,829	14,387,933	296,035,735
7	PHX	20,968,393	43,677,586	67,180	506,336	0	429,954	1,959,316	0	0	0	67,608,765
8	LAS	29,130,000	51,916,000	6,036,000	2,372,000	0	971,000	0	0	735,000	0	91,160,000
9	DTW	51,759,001	28,355,276	0	0	7,941,503	0	0	0	0	0	88,055,780
10	EWR	109,126,000	189,682,000	0	31,763,000	5,993,000	0	23,163,000	0	0	0	359,727,000
11	MSP	39,610,000	22,993,000	7,413,000	496,000	1,417,000	726,000	3,950,000	0	279,000	0	76,884,000
12	MIA	52,379,000	124,934,000	5,966,000	0	0	0	0	0	0	0	183,279,000
13	IAH	25,221,000	55,107,000	499,000	291,000	0	0	2,016,000	0	0	0	83,134,000
14	JFK	177,705,000	115,167,000	0	15,198,000	69,885,000	0	100,709,000	0	0	0	478,664,000
15	STL	40,692,020	21,663,209	167,358	342,213	1,822,653	17,740	2,657,335	0	925,130	0	68,287,658
16	MCO	20,916,000	41,603,000	3,480,000	1,067,000	316,000	596,000	2,809,000	2,366,000	2,331,000	0	75,484,000
17	SEA	59,216,661	35,412,568	0	105,759	5,056,262	0	6,775,991	131,353	828,958	0	107,527,552
18	BOS	52,929,656	39,346,134	3,552,266	0	12,487,811	2,622,920	13,659,387	948,275	0	0	125,546,449
19	LGA	93,174,000	41,052,000	0	995,000	10,384,000	0	4,648,000	0	0	0	150,253,000
20	PHL	33,535,970	49,982,340	3,425,157	1,479,470	2,447,913	864,538	2,588,351	1,697,854	469,919	109,963	96,601,475
21	CLT	11,334,000	22,780,187	0	93,233	0	861,515	1,845,000	0	0	7,744,000	44,657,935
22	CVG	15,827,008	12,588,725	4,295,116	0	3,054,271	471,334	712,949	0	99,813	7,309,867	44,359,083
23	HNL	25,700,426	36,753,310	99,916	350,715	1,228,343	0	369,156	0	570,204	11,045,322	76,117,392
24	PIT	16,447,706	43,823,134	2,751,994	226,849	3,265,973	77,792	8,730,614	0	0	13,728,231	89,052,293
25	BWI	18,486,001	15,881,931	836,302	0	243,384	245,140	2,261,957	849,121	42,048	0	38,845,884
26	IAD	28,528,572	70,457,055	1,836,802	315,780	7,121,214	2,414,520	0	837,211	0	0	111,511,154
27	SLC	16,183,382	20,849,801	0	348,522	347,185	83,894	2,053,111	558,096	2,540,390	5,927,072	48,891,453
28	TPA	8,261,654	26,121,251	218,417	446,066	341,573	957,907	1,073,188	-4,596,748	880,127	1,076,493	34,779,928
29	SAN	16,539,041	20,416,910	0	210,925	0	0	0	0	0	2,903,998	40,070,874
30	FLL	9,905,000	16,125,000	551,000	239,000	574,000	310,000	626,000	1,126,000	0	0	29,456,000
31	DCA	28,392,115	68,134,988	0	50,499	5,991,814	2,433,333	0	2,184,264	0	0	107,187,013
	Totals	1,474,620,729	1,756,864,782	51,856,571	70,396,620	160,856,832	19,040,941	223,385,174	17,764,013	16,249,578	81,552,651	3,872,587,891

(a) The negative \$103 million amount was eliminated from the database.

Source: FAA's Form 5100-127

Large Hubs Non-Aeronautical Operating Revenues, Fiscal Year 2000

Airport	Rent	Concessions	Parking	Rental Cars	Catering	Interest	Royalties	Miscellaneous	Other Non Aero		Total Nonaeronautical	Total Operating
									Fees			
1	ATL	10,612,748	41,499,768	65,083,464	31,097,866	0	174,109	3,005,012	23,181		151,496,148	252,695,892
2	ORD	16,489,887	50,821,902	91,252,210	19,846,217	113,473	0	1,810,734			180,334,423	455,351,249
3	LAX	38,943,283	83,290,644	59,356,211	37,777,347	147,709	0	2,149,842	8,108,073		229,773,109	385,262,544
4	DFW	3,526,364	0	70,921,857	31,825,273	0	0	5,911,827	7,388,406		119,573,727	251,223,422
5	SFO	2,168,810	52,708,746	65,811,068	42,111,077	0	0	4,296,782			167,096,483	363,151,251
6	DEN	1,875,396	23,030,293	77,269,240	31,219,471	1,418,094	1,275,732	6,216,482			142,304,708	438,340,443
7	PHX	22,238,581	10,628,774	40,349,482	31,168,648	0	0	3,258,266	2,668,163		110,311,914	177,920,679
8	LAS	13,351,000	58,499,000	15,450,000	19,749,000	2,512,000	0	400,000			109,961,000	201,121,000
9	DTW	0	17,827,705	35,515,982	19,344,658	1,582,980	0	0			74,271,325	162,327,105
10	EWR	412,000	14,465,000	62,948,000	21,325,000	7,527,000	0	8,344,000	38,224,000		153,245,000	512,972,000
11	MSP	3,644,000	14,796,000	42,951,000	18,556,000	485,000	0	4,395,000	1,704,000		86,531,000	163,415,000
12	MIA	92,070,000	138,211,000	33,576,000	19,392,000	0	0	10,824,000			294,073,000	477,352,000
13	IAH	5,433,000	22,383,000	33,758,000	12,843,000	0	0	2,292,000	1,950,000		78,659,000	161,793,000
14	JFK	3,858,000	36,341,000	33,912,000	9,157,000	28,416,000	0	6,487,000	72,483,000		190,654,000	669,318,000
15	STL	1,196,138	12,372,744	12,394,040	9,816,508	986,563	0	2,860,512	7,828,588		47,455,093	115,742,751
16	MCO	3,481,000	39,696,000	32,806,000	55,491,000	2,158,000	0	1,049,000	27,772,000		162,453,000	237,937,000
17	SEA	7,207,451	17,520,288	47,108,400	18,711,351	3,546,895	0	562,230	4,731,992		99,388,607	206,916,159
18	BOS	11,231,720	21,286,453	71,107,801	20,280,504	0	0	2,686,215	6,031,396		132,624,089	258,170,538
19	LGA	105,000	9,864,000	35,545,000	11,573,000	6,907,000	0	4,560,000	25,555,000		94,109,000	244,362,000
20	PHL	182,431	12,755,329	21,894,091	15,663,025	2,733,066	0	354,519	1,505,494		55,087,955	151,689,430
21	CLT	1,116,742	11,140,575	17,689,000	7,401,748	0	0	0			37,348,065	82,006,000
22	CVG	366,813	7,097,458	16,620,465	3,806,612	1,164,127	0	1,017,679			30,073,154	74,432,237
23	HNL	3,808,883	130,713,231	10,795,600	7,021,961	2,080,660	0	1,515,121	1,939,628		157,875,084	233,992,476
24	PIT	1,481,699	9,071,036	19,456,044	9,142,047	0	0	436,562	297,518		39,884,906	128,937,199
25	BWI	2,133,607	11,875,194	50,103,640	14,844,535	652,689	0	703,785	1,110,869		81,424,319	120,270,203
26	IAD	2,596,649	13,778,678	31,012,228	13,177,485	5,499,300	0	6,334,124			72,398,464	183,909,618
27	SLC	5,874,986	6,803,695	17,984,703	10,633,158	1,915,376	0	1,017,462			44,229,380	93,120,833
28	TPA	5,990,529	8,115,606	33,647,588	20,491,108	922,382	0	145,621	2,409,776		71,722,610	106,502,538
29	SAN	4,713,457	15,597,585	13,976,747	0	0	0	8,397	624,063		34,920,249	74,991,123
30	FLL	5,323,000	14,341,000	25,538,000	10,283,000	448,000	0	655,000			56,588,000	86,044,000
31	DCA	398,025	7,190,839	23,402,684	13,232,623	1,907,000	0	3,666,498			49,797,669	156,984,682
Totals		271,831,199	913,722,543	1,209,236,545	586,982,222	73,123,314		1,449,841	86,963,670	212,355,147	3,355,664,481	7,228,252,372

Source: FAA's Form 5100-127

Large Hubs Operating Expenses, Fiscal Year 2000

Airport	Personnel Compensation	Communications	Supplies	Services	Insurance	Government	Miscellaneous	Other Operating Expenses	Total	
1	ATL	33,950,000	2,902,358	22,760,007	2,838,787	1,801,716	0	296,717	2,419,275	66,968,860
2	ORD	156,247,993	24,440,497	82,592,342	36,324,458	6,557,949	0	6,948,550	5,247,913	318,359,702
3	LAX	106,131,571	21,056,411	25,331,412	105,102,242	5,223,048	0	19,765,276	-1,703,119	280,906,841
4	DFW	89,556,704	12,274,414	10,145,756	35,341,964	2,850,744	0	12,104	1,074	150,182,760
5	SFO	111,910,110	11,744,123	12,705,309	81,079,774	1,278,859	598,107	2,781,126		222,097,408
6	DEN	72,378,486	37,100,361	34,423,161	45,700,645	1,588,930	0	263,201	30,869,323	222,324,107
7	PHX	34,552,399	8,807,129	10,531,579	37,408,265	983,923	0	8,997	9	92,292,301
8	LAS	48,709,000	9,253,000	6,071,000	24,717,000	1,429,000	0	883,000		91,062,000
9	DTW	49,214,547	11,570,370	11,479,104	38,006,879	1,180,165	0	1,852,090		113,303,155
10	EWR	63,439,000	9,575,000	112,993,000	53,266,000	4,035,000	0	5,564,000	47,102,000	295,974,000
11	MSP	39,814,000	8,678,000	13,924,000	1,412,000	1,102,000	0	2,254,000	13,838,000	81,022,000
12	MIA	143,627,000	37,239,000	92,017,000	50,957,000	5,873,000	0	8,598,000		338,311,000
13	IAH	30,789,000	9,121,000	13,378,000	29,397,000	89,000	0	0		82,774,000
14	JFK	77,955,000	61,166,000	92,183,000	30,594,000	5,411,000	0	19,159,000	131,111,000	417,579,000
15	STL	30,590,979	5,372,671	5,269,799	20,098,704	612,371	0	0		61,944,524
16	MCO	31,963,000	10,671,000	29,568,000	52,938,000	1,077,000	0	2,850,000	5,680,000	134,747,000
17	SEA	57,940,651	20,612,247	5,087,964	18,583,438	994,890	0	4,281,454	22,845,514	130,346,158
18	BOS	60,581,834	15,867,747	6,368,206	27,025,948	1,269,887	9,715,420	7,345,845	21,316,759	149,491,646
19	LGA	44,376,000	8,710,000	43,289,000	4,190,000	2,664,000	0	4,886,000	56,629,000	164,744,000
20	PHL	31,584,183	8,799,443	18,896,897	34,563,140	922,247	2,600	-260,417	4,847,633	99,355,726
21	CLT	9,471,008	3,461,618	7,351,575	8,534,479	553,320	0	0		29,372,000
22	CVG	19,503,111	7,430,178	13,458,922	1,313,321	551,267	0	1,118,226		43,375,025
23	HNL	25,622,180	12,038,706	18,201,481	16,828,255	1,446,053	9,840,479	490,830		84,467,984
24	PIT	19,039,642	17,718,025	12,981,297	12,388,065	655,368	0	2,102,669	43,669,974	108,555,040
25	BWI	20,569,358	5,865,266	2,832,847	32,108,697	276,156	0	1,504,574	497,538	63,654,436
26	IAD	45,516,045	13,515,309	16,154,519	28,018,719	1,766,923	2,029,180	618,197		107,618,892
27	SLC	23,783,305	2,996,548	4,477,058	16,340,439	820,293	0	0		48,417,643
28	TPA	18,667,687	6,473,998	12,156,479	8,459,247	744,135	0	133,006	2,342,970	48,977,522
29	SAN	3,272,211	3,207,388	839,138	6,586,554	481,797	0	0	34,731,635	49,118,723
30	FLL	15,186,000	3,369,000	1,024,000	26,531,000	814,000	0	939,000		47,863,000
31	DCA	33,454,493	8,035,751	6,342,350	21,473,653	1,562,939	2,029,180	1,432,729		74,331,095
	Totals	1,549,396,497	419,072,558	744,834,202	908,127,673	56,616,980	24,214,966	95,828,174	421,446,498	4,219,537,548

Source: FAA's Form 5100-127

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