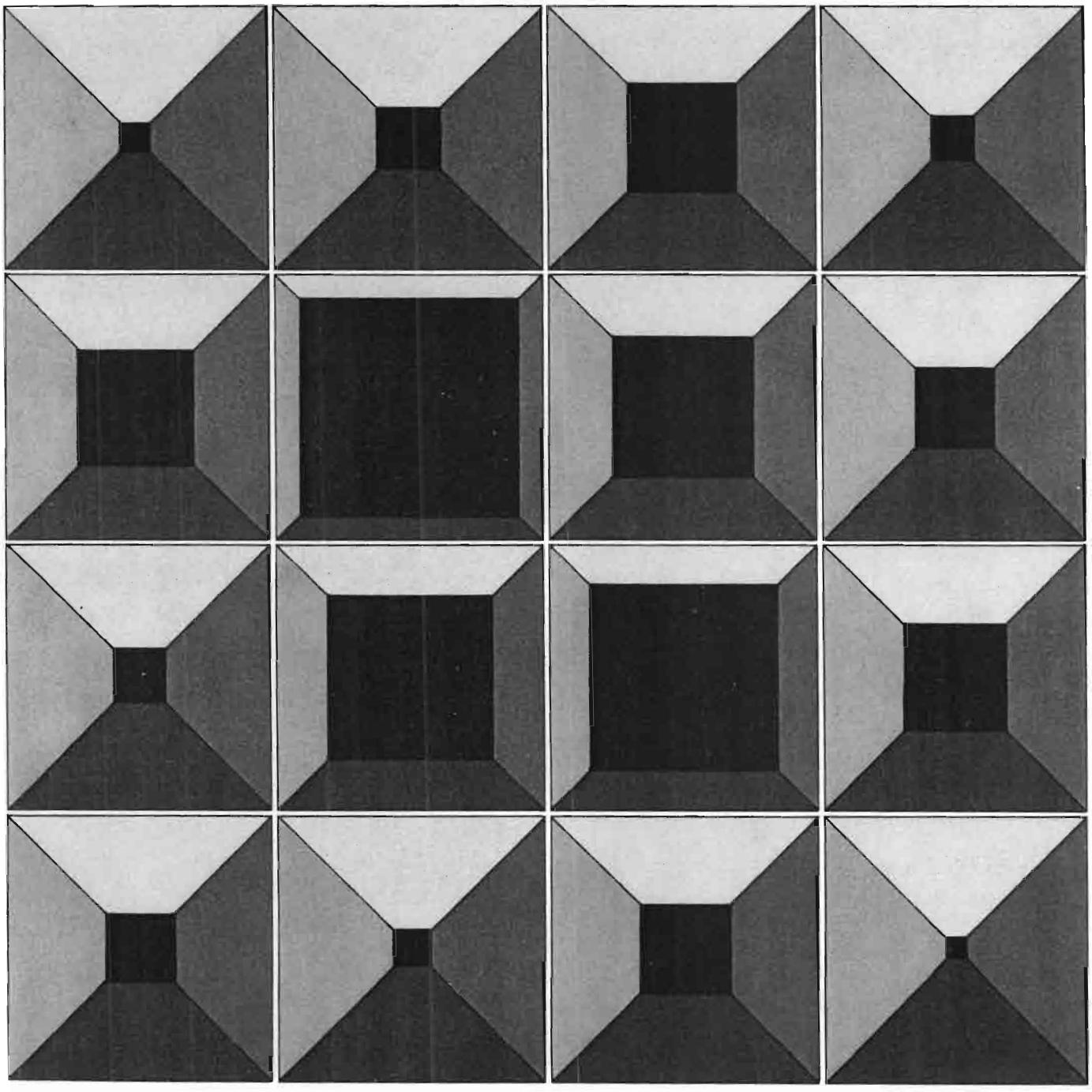
A CBO STUDY

Financing U.S. Airports in the 1980s

April 1984

Congress of the United States
Congressional Budget Office



FINANCING U.S. AIRPORTS

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Washington, D.C. 20402

PREFACE

In the next few years, the Congress may consider whether to continue or adjust the federal government's role in financing civilian U.S. airports. Now part of a fully mature industry characterized by sound business practices and solid financial health, the major commercial U.S. airports nonetheless face mounting problems of overcrowding and pressure to expand capacity at considerable cost. In its deliberations about what part the federal government should play in meeting future airport expansion needs, the Congress will need a full understanding of how airports are managed and funded, how the private sector can contribute, and whether efficiency gains could be achieved. This study, undertaken at the request of the House Committee on Public Works and Transportation, offers detailed information for consideration of these issues as they bear on a future federal role. In keeping with the Congressional Budget Office's mandate to provide objective analysis, the paper offers no recommendations. Portions of this study will also appear in a forthcoming document on airport system development by the Office of Technology Assessment.

David Lewis and Suzanne Schneider performed the analysis and prepared the paper; the authors are indebted to Richard R. Mudge for his valuable participation in the study. The paper was prepared in CBO's Natural Resources and Commerce Division, under the general supervision of David L. Bodde and Everett M. Ehrlich. Jonathan L. Gifford assisted critically in the design and execution of the analysis. Numerous other people also contributed. Within CBO, Pearl Richardson, Kathleen Kelly, Andrew Stoeckle, and Peyton Wynns offered valuable comments. Useful information and criticism also came from staff members of the Air Transport Association of America, the Airport Operators Council International, the American Association of Airport Executives, the U.S. Civil Aeronautics Board, the Federal Aviation Administration, and the Office of Technology Assessment. Of the outside contributors, the authors would like especially to name Craig W. Atwater, Greg Clark, J.J. Corbett, J. Spencer Dickerson, John Drake, Richard Harris, Alfred Kahn, Harold Kluckhohn, Barney Parrella, and John Sekman. For its cooperation in providing bond data, Moody's Investors Service deserves special acknowledgement;

responsibility for analysis of these data rests solely with CBO. The authors also owe special thanks to Johanna Zacharias for assistance in drafting the manuscript and editing it, and to Philip Willis for his skill in typing the many drafts and preparing the manuscript for publication in cooperation with Kathryn Quattrone and Angela Z. McCollough.

Rudolph G. Penner
Director

April 1984

CONTENTS

CONTENTS (Continued)

TABLES

TABLES (Continued)

TABLES (Continued)

FIGURES

ILLUSTRATIVE TEXT BOXES

32-938 O - 84 - 2

SUMMARY

Federal financial assistance has played a critical role in building the nation's system of airports. At present, federal aid for capital investment in airport construction is projected at about $800 million a year (in 1982 dollars) in grants administered by the Federal Aviation Administration (FAA). Of that sum, roughly $300 million, or nearly 40 percent, goes to the nation's 71 large and medium-sized commercial airports, though more than 3,000 airports participate in the program. Fees paid by users, mostly an 8 percent tax on airline tickets, finance these federal outlays.

These 71 facilities serve almost 90 percent of all commercial passengers. Crowding has thus emerged as the major airports' number-one problem, and the FAA anticipates a worsening of airport congestion in coming years. To accommodate mounting traffic, many airport operators have undertaken costly expansion programs or intend to do so soon. Over the next ten years, annual demand for airport capital investment is projected at $1.5 billion to $2.0 billion, of which two-thirds, or about $1 billion to $1.4 billion, would go to expand capacity. Most expansion is planned for the nation's major commercial airports.

In recent years, many of these same 71 major airports have demonstrated an ability to finance their capital spending needs through a combination of retained earnings and conventional financing in the municipal bond market. Between 1978 and 1982, the annual volume of bonds issued for these airports actually exceeded annual investment needs projected for the 1984-1993 period (see Summary Table 1). This apparent capacity of many airports to obtain adequate financing in the private sector raises the issue of the federal role in airport finance.

MAJOR CONSIDERATIONS

Several questions would be central to deliberations about the federal government's future role in airport development and the source of the needed money:

- What fraction of expansion capital must come from the federal government?
- Could the private sector accommodate a sizable share of this capital? and

SUMMARY TABLE 1. PROJECTED AIRPORT CAPITAL NEEDS AND FEDERAL OUTLAYS COMPARED TO ACTUAL BOND SALES (In millions of 1982 dollars)

Airports by Size and Type	Annual Airport Needs a/ 1984-1993	Annual Federal Outlays Under Current Policy 1985-1989	Annual Volume of Airport Bond Sales 1978-1982
	COMMERCIAL		
Large	450-650	200	690
Medium-sized	200-350	104	224
Small	400-450	256	93
Subtotal	1,050-1,450	560	1,006
	GENERAL AVIATION		
Reliever	100-150	84	8
Other	400-450	148	6
Subtotal	500-600	232	14
All Airports	1,550-2,050	800 b/	1,020

SOURCE: Congressional Budget Office.

a. Low estimate derived from data in FAA, *National Airport System Plan* (1980). High estimate derived from preliminary unpublished FAA estimates. Needs data are rounded to the nearest $50 million.

b. Excludes state and local expenditures estimated at $200 million a year. Includes $8 million for planning.

- Could changes both in airport management practices and in public policy encourage adjustments in private behavior that could scale down the size of estimated requirements?

The Outlook Under a Diminished Federal Role

Three distinct factors suggest that a diminished federal role need not imperil the national objective of a safe and comprehensive airport system:

- The nation's major commercial airports are mature business enterprises whose securities are generally regarded in capital markets as good investment opportunities;

- Many airports, and hence their expansion needs, are of local rather than national significance; and

- The demand for expansion of airport facilities might not be so high if more airport charges were set to reflect the cost of airport use.

Management Practices and Financial Strength. Operated in close cooperation with the airlines they serve, the major airports in the United States are run by the up-to-date managerial practices befitting a mature industry. One of two basic approaches to financial management is applied: under a "compensatory" approach, the airlines are charged the actual costs of the facilities and services they use; under a "residual cost" approach, the airlines guarantee an airport's solvency by agreeing to pay all costs not covered by income from non-airline-related sources. The nation's major commercial airports--the 71 facilities that account for most commercial travel--are in strong financial condition, especially relative to other major public enterprises. Though they have more debt than many other municipal enterprises (equal to about 50 percent of assets), they nonetheless appear better able to support additional debt because of their lower operating and maintenance costs.

As a result of their strong financial status, most large and medium-sized airports have relatively easy access to nonfederal capital through the municipal bond markets. Airport bonds typically receive investment-grade ratings by the bond rating agencies, with none rated below Baa. In fact, the airports' interest costs are somewhat lower, on average, than in the municipal bond market as a whole--almost 1 percentage point lower for those airports that use the compensatory approach to financial management. Between 1978 and 1982, the nation's airports raised an average of $1 billion a year through the bond market--$1.4 billion in 1982

alone. Though the bulk of these funds was raised by large and medium-sized airports, even some smaller airports achieved a measure of success in the bond market. Despite the large volumes of debt issued by the major commercial airports and the uncertain business prospects caused by federal deregulation of the airline industry in 1978, the overall financial conditions of these airports has actually improved slightly. For example, during the first four years following airline deregulation, airports' operating costs averaged 50 percent of revenues in contrast to 55 percent during the four previous years.

National Significance. A second consideration is that not all airport investments contribute to the nation's need for an interconnected system of air routes. Of the 560 airports serving commercial airlines, only the 71 cited above are needed to serve the bulk of all traffic. And of the 2,643 facilities serving general aviation (planes owned by corporations and individuals for business use or recreation), only the 219 so-called "reliever" airports are needed to help reduce congestion at major air carrier facilities. (The FAA has compiled a list of general aviation airports thought to offer significant potential for relieving congestion at nearby major airports.) The remaining 2,424 general aviation airports serve needs that are primarily local. General aviation airports--with their currently low landing fees and tie-down (aircraft parking) charges--have considerable opportunity to move toward self-financing of capital improvements. At many airports, local fees might substitute for federal grant assistance.

Pricing. A third consideration is the structure of airport user fees. Local user fees--landing charges--currently in effect do not reflect the high capital costs of relieving the congestion that occurs during periods of peak demand. Rather, landing fees are commonly determined on the basis of aircraft weight and do not vary by time of day. If airports charged higher landing fees during peak periods to reflect the costs of congestion, users would be encouraged to make use of off-peak airport capacity that goes to waste under the current structure of user fees. Many general aviation users--in particular, business jets that use commercial airports--would face sharply higher rates, encouraging many to take advantage of available reliever airport space. To whatever extent pricing changes relieved pressure on capacity, the need to expand facilities would decline, potentially reducing the more than $1 billion a year in spending now projected for capacity expansion over the coming decade. To the extent that traffic demand did not decline at commercial airports, however, added revenues would be available to pay for needed expansion.

ALTERNATIVE FEDERAL APPROACHES

In view of the factors outlined above, three alternatives to current policy could be considered:

- Eliminating federal assistance entirely, with greater application of local airport charges,
- Restricting federal aid on the basis of airports' national significance and financial need, and
- Granting federal aid on the basis of financial need only.

The CBO has analyzed these choices in terms of their potential effects on the airports' financial practices, on the airports' users (primarily commercial airline passengers), and on the federal budget. (The results of CBO's analysis are displayed in Summary Table 2.)

Eliminate Federal Grants

An immediate result of withdrawing federal capital aid to airports, of course, would be elimination of some $800 million in annual federal outlays. Other factors would largely cancel out this saving, however. Reduced outlays would permit concomitant decreases in user fees (notably, ticket taxes), and to the extent that airport operations turned to tax-exempt bonds to secure financing, tax expenditures would increase. The net effect on the federal deficit, therefore, would be negligible. Passengers would, however, note a drop in the current 8 percent federal tax on airline tickets to about 5 1/2 percent (the remaining tax still going toward support of the air traffic control system).

Airport managers might respond to the loss of federal dollars by reassessing investment decisions with particular attention to cost effectiveness, and by applying more aggressive pricing policies--notably, imposition of peak-hour landing surcharges. Without federal financing, funds for capital investments would have to come from airport revenues and increased debt, or both. In either case, however, local user fees would probably have to rise. Repeal of the current federal ban on charges for use of passenger facilities ("head taxes"), plus imposition of peak-hour surcharges, could help airport authorities to substitute nonfederal for federal money. For small airports, however, state and local governments might be expected to subsidize airport development to some extent to minimize losses of service that could result from higher fees.

Restrict Aid on the Basis of National Significance and Financial Need

A strategy of selective federal assistance could differ from the first alternative (above) by preserving some funds to avert risks of regional imbalances in airport development. Federal grant money could be limited to three purposes: large and medium-sized airports that face difficulty in obtaining bond financing--perhaps for major land purchases; small commercial airports; and general aviation reliever airports. With the federal role thus restricted, direct grants might fall to roughly $340 million a year, about 42 percent of currently planned spending; the revenue losses resulting from tax exemption of bond financing and from reduced user fees would again offset these federal savings. The consequences for airport managers would be generally similar to those under the first alternative, in that redoubled efforts to secure bond financing and more aggressive pricing policies might be warranted. Commercial airline passengers might note a minor reduction in the ticket tax portion of fares and possibly, an improvement in services resulting from reduced congestion. Some small airports, however, especially some general aviation airports not meeting the FAA's criteria for designation as relievers, might face severe fiscal constraints and possible forced closure.

Grant Federal Aid on the Basis of Financial Need Only

Direct grants to certain airports might help foster regional development in economically declining areas, while reducing federal airport outlays to some $500 million a year. The regional benefits would result from federal grants' encouraging more commercial air service than the market itself would support. Selective federal aid to upgrade the nation's 219 general aviation reliever airports--particularly in conjunction with congestion fees--might help divert general aviation users away from now overburdened commercial facilities. Operators of large, financially strong airports would be compelled to make their facilities fully self-reliant. Users of those airports would note little or no change in costs or service except possible reductions in congestion-related delays.

CONCLUSIONS

In general, airport management and financial practices appear to be reasonably healthy. In combination, retained earnings and vigorous use of conventional bond financing offer good prospects for keeping the major airports in their current good financial condition. Accordingly, a diminished federal role need not jeopardize the adequacy of airport service nationwide.

SUMMARY TABLE 2. SUMMARY OF ALTERNATIVE FEDERAL ROLES IN AIRPORT ASSISTANCE

Recipient Airports		Annual Federal	
Numbers	Qualifying Types	Commitment (In millions of 1982 dollars)	Principal Effects on Users
	CURRENT POLICY		
3,203	All	800	Ticket tax unchanged
	WITHDRAW ALL ASSISTANCE		
0	None	0	Ticket tax reduced by 2 ½ percent
Large and medium-sized commercial airports would depend more heavily on bond financing. They would also be encouraged to expand use of cost-based pricing to recover lost subsidization. Small commercial and general aviation airports would also be encouraged to apply cost-based pricing; pressure for state aid would increase; some financially weak airports might close.			
	RESTRICT AID TO NATIONALLY SIGNIFICANT AIRPORTS		
708	Small commercial, reliever	340	Ticket tax reduced by 1 ½ percent
Effects on large and medium-sized commercial airports would be similar to those under Alternative 1. General aviation airports would experience particular financial pressure; relievers and small commercial airports would become central in federal program.			
	GRANT AID TO AIRPORTS WITH GREATEST NEED		
3,132	Small commercial, all general aviation	500	Ticket tax reduced by 1 percent
Effects on large and medium-sized commercial airports would be similar to those under Alternatives 1 and 2. Small commercial airports would become major focus of federal program. Though possibly applicable under Alternatives 1 and 2, fees for use of passenger facilities ("head taxes") have been considered most often for this approach; repeal of the federal ban on head taxes would require legislative action.			

SOURCE: Congressional Budget Office.

In considering a reduced federal role in airport finance, the Congress can consider several choices without risk of major disruption in commercial air travel. At the same time, however, any reduced federal role offers only negligible potential budgetary savings. As always, choosing among the several reduction options analyzed is a matter of setting federal priorities, the main possible objectives being efficient pricing and investment decisions on the part of airport operators, aid for airports of national significance, and support for the regional economic concerns of those airports with limited financial alternatives.

Financing U.S. Airports in the 1980s

THE CBO AIRPORT SURVEY AND CATEGORIZATIONS BY SIZE

The information used in this study to describe and analyze the financial management policies and practices of commercial airports was gathered by the Congressional Budget Office in a survey conducted during the summer of 1983. To amass these data (displayed in Appendix A), CBO sought information directly from managerial personnel and records at 60 of the busiest U.S. airports.

These airports, and the several thousand others also considered in this paper, were grouped into several size categories. Size determinations were made on the basis of numbers of passenger boardings in calendar year 1982 for flights by domestic and foreign-flag carriers, commuter airlines, and air taxis. Boardings (also called enplanements) refer to passenger trips through to destination points. A through flight with a stopover, at which passengers may deplane and reboard the same flight, counts as one boarding. Connecting flights, on which passengers must change planes en route, count as multiple boardings.

Large airports handle 1 percent or more of all yearly passenger boardings in the United States. Twenty-four airports fall into this category, with boardings of at least 3,091,521 travelers in 1982.

Medium-sized airports handle between 0.25 percent and 1 percent of all passenger boardings. Forty-seven airports fell into this category, with at least 772,880 and no more than 3,091,520 boardings in 1982.

Small airports have scheduled service but handle no more than 0.25 percent of all passenger boardings and no fewer than 2,500 boardings. This category included 489 airports.

* * * * *

General aviation airports serve aircraft that are owned by private individuals or firms and that are used predominantly for business and recreational flying. There are 2,643 general aviation airports that serve the general public across the nation. Of these, the FAA has designated 219 as **reliever airports**, indicating that they offer potential to relieve traffic congestion at nearby commercial airports.

CHAPTER I. INTRODUCTION

Part of the current Congressional reassessment of the federal role in supporting the nation's public works infrastructure has centered on airports. 1/ The federal government has played a critical part in the development of the nation's airport system. Besides building and operating the air traffic control system, the Federal Aviation Administration (FAA) has provided $9.7 billion (in 1982 dollars) in capital grants for airports since 1960. 2/ By and large, user fees--most importantly an 8 percent tax on airline ticket sales--have financed federal aid to aviation. In turn, local fees including landing fees have backed the bonds that airports have issued to help finance their capital investments. 3/ Federal grants for airports now total about $0.8 billion a year.

For an industry to compete effectively for investment dollars in the private marketplace, it must demonstrate the value of its undertaking through sound financial performance. Industries demonstrating such soundness can attract capital for renewal and growth. Such success appears to have been achieved by many major commercial airports. Accordingly, legislative proposals to "defederalize" large and medium-sized commercial airports--that is, eliminate their eligibility for federal grants--were first advanced in 1978. The Airport and Airway Improvement Act of 1982 raised this possibility again by requiring the U.S. Department of Transportation (DOT) to study the feasibility and potential effects of defederalization and report its findings to the Congress.

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1. For detailed treatment of the needs and effectiveness of federal programs for seven major infrastructure systems, see Congressional Budget Office, *Public Works Infrastructure: Policy Considerations for the 1980s* (April 1983).

2. In this paper, airport investments are treated exclusive of the air traffic control system, which is analyzed in detail in Congressional Budget Office, *Improving the Air Traffic Control System: An Assessment of the National Airspace System Plan* (August 1983).

3. Actual and potential use of user financing for federally provided services is treated in detail in Congressional Budget Office, *Charging for Federal Services* (December 1983).

PURPOSE AND PLAN OF THIS PAPER

This paper examines the financial condition and performance of the nation's airports and their ability to compete for private capital dollars. The remainder of this chapter outlines the evolution of federal policy in airport finance and reviews the demand for airport investment under current policy, summarizes the congestion problem now building, and assesses the demand for airport investment.

Financial management and investment planning in U.S. airports, though similar in many respects to business practices in other public enterprises, are specially conditioned by the involvement of private concerns--the commercial airlines--that act as intermediaries between the airports and their patrons. Chapter II describes how this private sector presence helps determine airport finances and pricing and looks at trends that have been occurring in airport financial management since deregulation of the airline industry began in 1978.

Chapter III analyzes the financial performance of the nation's airports, comparing it with that of other municipal enterprises. The chapter also examines the effect of federal airline deregulation, which, among other things, prompted airlines to reduce service at certain airports and concentrate operations at others.

Chapter IV considers the market for tax-exempt municipal bonds--the primary source of private capital for municipal enterprises--and the position of airports in it. The chapter focuses particularly on the ability of airports of different sizes and types and in different locales to compete for municipal bond financing.

Finally, Chapter V assesses the efficiency of current federal programs and evaluates alternative federal roles in airport finance. Two kinds of inefficiency that can stem from federal subsidies to a mature industry are studied. The first is a tendency among subsidized industries to charge fees that fail to reflect the actual cost of services provided. Cost-based prices cannot only provide the best test of efficiency; they also tend to promote an economically "correct" level and type of service. A second kind of inefficiency is the indiscriminate nature of many federal subsidies to industry. In the case of airports, the federal government finances not only major commercial facilities that serve interstate air travel, but also small "general aviation" airports (those used mainly by private or corporation-owned aircraft for business and personal use) serving primarily regional or local traffic. These two concerns are combined with analysis of the airports' ability to finance their own investments to devise alternatives

to current policy. These options include defederalization, selective aid, and an end to all federal aid with a corresponding decrease in federal user fees.

Several technical appendixes present data gathered in a survey of commercial U.S. airports conducted by the Congressional Budget Office, display statistical analyses of airport finance, and describe regional variations in airports' use of the bond market.

CURRENT POLICY IN AIRPORT DEVELOPMENT

In 1946, recognizing that an adequate system of airports was a matter of national concern, the Congress authorized the Federal-Aid Airport Program, under which the federal government offered public airport authorities matching grants of 50 percent to 94 percent for construction and rehabilitation. As noted earlier, federal capital spending on airports is now financed by user fees, levied chiefly as excise taxes on domestic airline tickets and general aviation fuel. These taxes, which originated in 1933 and 1941, were not formally linked to airport expenditures until 1970, when the Airport and Airways Revenue Act established the Airport and Airway Trust Fund. Most of the fund's income derives from an 8 percent tax on domestic passenger tickets; a 14 cent tax per gallon of general aviation jet fuel (12 cents for gasoline) contributes about 5 percent of trust fund revenues. Funds are disbursed to major airports in the form of matching grants determined by a formula based on passenger volume and through discretionary grants to meet special needs. Federal grants can be used for a wide range of airport development projects, including new construction and upgrading of runways, taxiways, and aprons, public-use terminal areas, and safety- and noise-related projects. Over the next few years, federal aid to airports is expected to increase dramatically from $400 million in 1982 to $800 million by 1986 (all in 1982 dollars, see Table 1).

Total Investment and Trends in Cost Sharing

Between 1960 and 1982, cumulative public and private investment in the nation's airports totaled $25.1 billion (in 1982 dollars), of which the federal share accounted for $9 billion, or just above one-third. 4/ These overall data mask wide year-to-year fluctuations in the federal share of total airport investment, however. Between 1973 and 1977, the federal share swung from a post-1970 low of 20 percent to a high of 85 percent (see

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4. This excludes the value of tax expenditures stemming from tax-exempt bonds issued by municipal and airport authorities.

TABLE 1. PROJECTED FEDERAL CAPITAL EXPENDITURES ON AIRPORTS UNDER CURRENT POLICY, TO 1989 (In millions of 1982 dollars)

	1984	1985	1986	1987	1988	1989
Commercial						
Large	194	188	200	207	196	200
Medium-sized	101	98	104	108	102	104
Small	248	240	256	265	251	256
Subtotal	543	526	560	580	549	560
General Aviation						
Reliever	81	79	84	87	82	84
Other	143	139	148	153	145	148
Subtotal	224	218	232	240	227	232
Total	775	751	801	827	785	800

SOURCE: Congressional Budget Office.

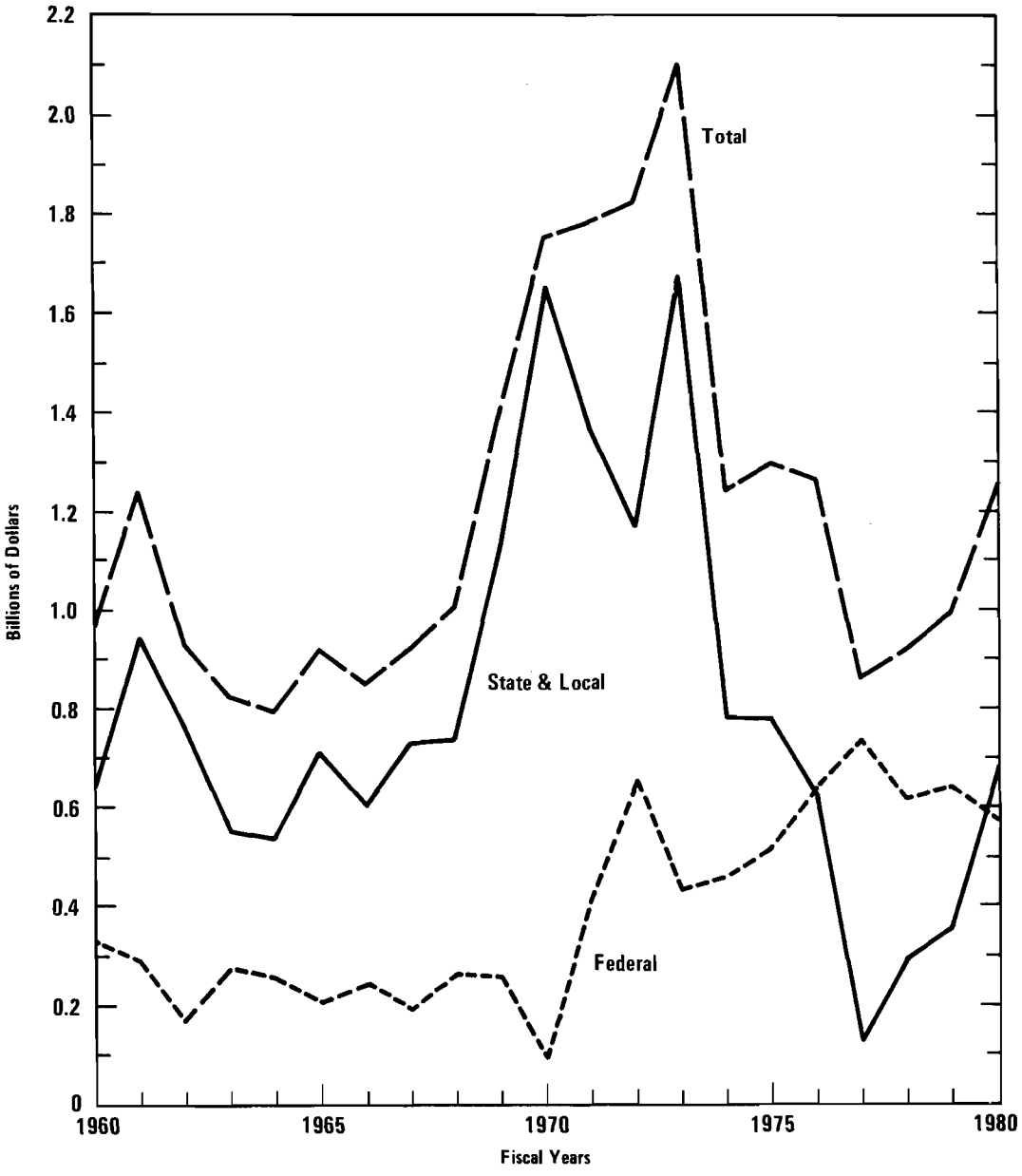
NOTES: Projections assume that obligations equal new authorizations in each year; allocation among airports based on data supplied by the FAA.

Totals may not add because of rounding and because they include 1 percent of funding used for planning.

Figure 1). Such swings have resulted not from shifts in federal outlays, which have remained relatively stable since 1970, but from extreme changes in the mix and total volume of airport investment. Peak investment in 1973, for example, was the result of very large capital outlays by some of the largest commercial airports, which rely for investment capital more on debt financing than on federal aid. On the other hand, many small airports, particularly general aviation airports, earn revenues insufficient to cover debt service; these airports tend to rely much more heavily on federal money. In 1977, a year of low overall airport outlays in which much spending probably reflected general aviation airport improvements,

Figure 1.

The Federal, State, and Local Shares of Public Spending on Airports, 1960-1980



SOURCE: Congressional Budget Office based on data provided by Federal Aviation Administration, and U.S. Department of Commerce, Bureau of the Census.

32-938 O - 84 - 3

the federal share exceeded 80 percent. The states' share of airport investment has remained fairly stable since 1970, at about 11 percent. 5/

Federal Expenditures

Although federal airport spending since 1970 has remained fairly stable at about $600 million a year (in constant 1982 dollars), investment has diversified. The federal Airport and Airway Improvement Program targets funds to both commercial airports and to 2,643 general aviation facilities. Moreover, it channels capital grants-in-aid to 219 "reliever" airports and makes special funds available for noise abatement. Specially targeted funds to develop reliever airports jumped from zero to $35 million between 1970 and 1980 (see Figure 2), and noise-related grant monies grew ten-fold over the same period. Federal investment in general aviation airports also grew steadily throughout the 1970s, and under current policies, outlays in constant dollars would triple again by 1987.

THE CONGESTION PROBLEM AT THE NATION'S AIRPORTS

Of the nation's 15,000 landing places around the country--more than those of all other nations combined--3,203 are public-use airports equipped with at least one paved and lighted runway and eligible for federal aid. Of these, more than 2,600 (83 percent) are used exclusively by small general aviation aircraft. Only the remaining 560 airports have scheduled service by airlines, commuters, or air taxi operators (see opposite). Even at many of these airports, business jets and other general aviation aircraft account for a major share of takeoffs and landings. 6/ (For a full description of size categories, see Text Box on page 2.)

Today's primary airport problem--overcrowding--has meant millions of increased operating dollars for airlines and wasted hours for travelers, with economic and environmental consequences concentrated at a very few

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5. From National Association of State Aviation Officials.

6. See CBO, *Charging for Federal Services*, p. 63.

Type of Airport	Number	Percent of Commercial Air Travelers
	Commercial	
Large	24	64
Medium-sized	47	25
Small a/	489	11
Subtotal	560	100
	General Aviation	
Reliever b/	219	No data
Other	2,424	
Subtotal	2,643	
Total	3,203	

a. Includes FAA-certified commuter and air taxi airports.

b. Small airports designated by the FAA as having capacity to relieve congestion at nearby large airports.

major airports. 7/ Just 2 percent of all public airports--the 71 largest --serve almost 90 percent of the nation's passenger traffic. At least 11 of these already experience severe congestion or will soon. Since airline deregulation began in 1978, a critical contributing factor has been the tendency of many major airlines to concentrate connecting passengers at a few regional airports (hubs), creating large investment requirements to cope with the additional load. The FAA projects that 23 commercial airports will be severely overburdened by the end of this decade, and perhaps twice that

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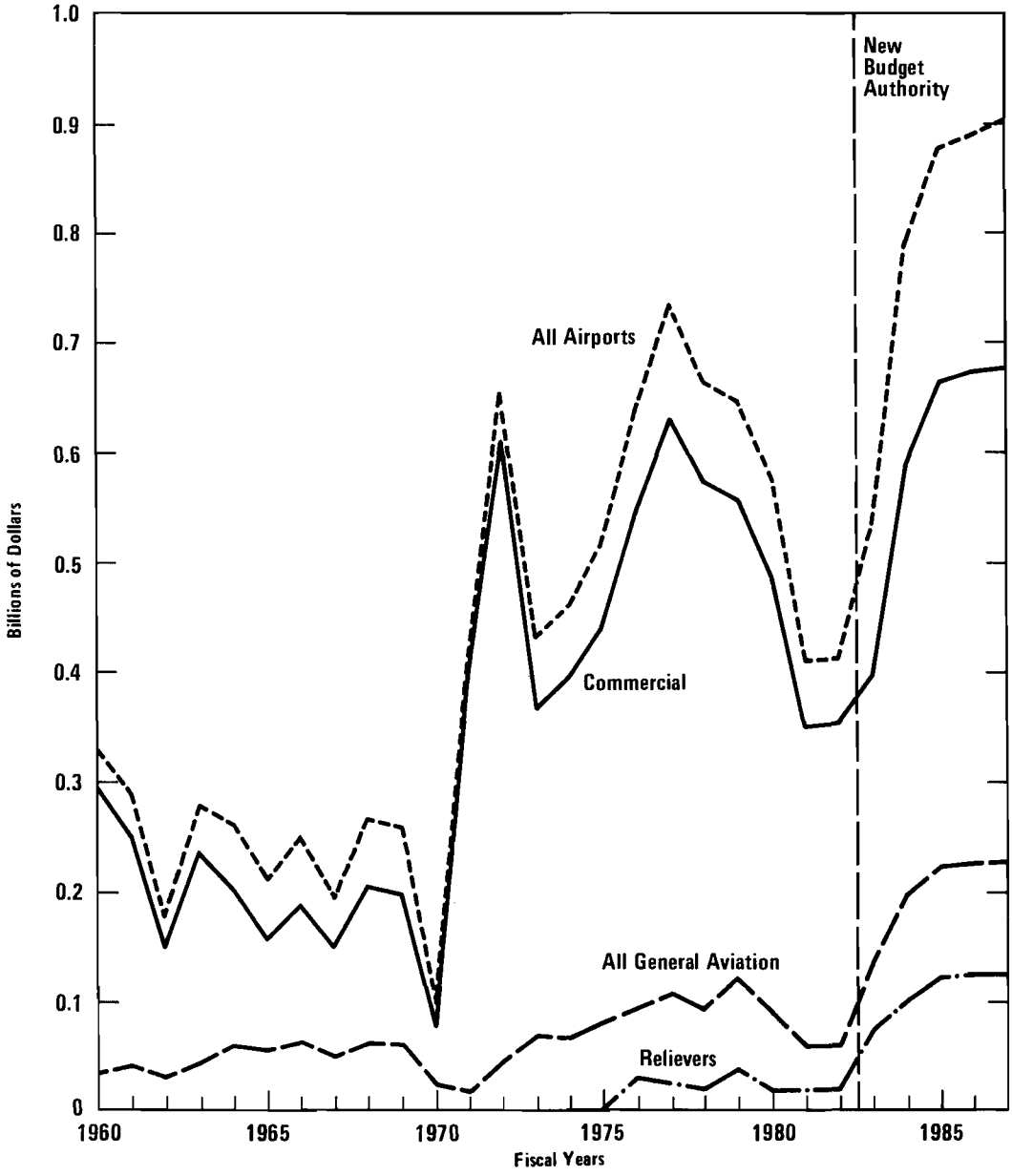
7. See General Accounting Office, *Aircraft Delays At Major U.S. Airports Can Be Reduced* (September 4, 1979) and Mitre Corporation, *Survey of 101 U.S. Airports for New Multiple Approach Concepts* (September 1981); see also General Accounting Office, *Runways at Small Airports Are Deteriorating Because of Deferred Maintenance: Action Needed by FAA and the Congress* (September 13, 1982).

Figure 2.

Actual and Projected Federal Capital Spending on Airports by Type of Airport, 1960-1987



SOURCE: Congressional Budget Office based on data provided by the Federal Aviation Administration.

NOTE: Outlay figures for 1983-1987 are based on authorizations in the Airport and Airways Improvement Act of 1982.

many will be by the end of the century. 8/ One result of this mounting problem has been pressure to expand airport capacity.

DEMAND FOR AIRPORT INVESTMENT UNDER CURRENT POLICY

As a result of national economic development and a general pattern of public-sector subsidization of aviation activity, growth in both commercial airlines and general aviation has led to mounting airport investment needs. Since 1970, the number of general aviation aircraft in use grew by 63 percent to 213,000 in 1982, and the number of hours flown increased by 67 percent. At the same time, with the introduction of wide-body jets, the number of commercial aircraft in service actually declined by 7.7 percent, from 2,690 to 2,483. As a result, general aviation now exerts particular pressure on the runways, taxiways, and other airfield components of a number of major commercial airports, often accounting for more than half of all takeoffs and landings. More frequent commercial flights at the major airports put pressure on terminals and other buildings, parking lots, and access roads.

The resulting congestion has led the FAA to project a need for substantial investment in upgrading, maintenance, and capacity-expansion. Annual airport investment demand, including work not eligible for federal grants, will be some $1.5 billion to $2 billion between 1984 and 1993, of which the federal share--under currently defined programs--would be about $0.8 billion. This sum represents an estimated 3.3 percent of the federal share of all public works infrastructure needs (see Text Box, overleaf). Of the $1.5 billion to $2 billion, roughly 30 percent would be needed just to correct all present and expected deficiencies at commercial airports; two thirds would pay for new capacity (see Table 2).

The remaining chapters describe how airports meet the investment needs at present and discuss several options for change.

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8. See Federal Aviation Administration, *National Airspace System Plan* (December 1981). This projection depends, in part, on the FAA's forecast of future growth in air traffic. Analysis of past FAA projections shows a tendency to overestimate traffic growth, particularly for general aviation. See Congressional Budget Office, *Improving the Air Traffic Control System.*

CAPITAL NEEDS OF AIRPORTS VERSUS OTHER PUBLIC WORKS

(The following synthesis is drawn from Congressional Budget Office, Public Works Infrastructure)

By 1990, federal capital spending in seven areas of public works examined by CBO is projected to average more than $24 billion a year, of which airport investment would represent $800 million, or just over 3 percent (see table below). With current programs unchanged, these outlays would fall somewhat short of meeting demand as defined by the agencies involved in providing services. Meeting needs under federal programs as they are now structured would raise annual federal spending to about $28 billion.

Many current programs do not encourage the most cost-effective investments and channel federal money to projects of greater local than national benefit. Revising programs to emphasize investments with clear national significance could improve the cost effectiveness of federal spending. Under policies so redesigned, federal costs to meet needs in the seven infrastructure areas studied could fall by about $4 billion a year. Accordingly, federal airport investment would decline to $300 million a year, from 3.3 percent of total infrastructure investment to 1.5 percent.

FEDERAL SHARES OF ANNUAL CAPITAL INFRASTRUCTURE COSTS UNDER CURRENT AND REVISED POLICIES, 1983-1990 (In billions of 1982 dollars and as a percent of total associated expenditures)

	Current Spending		Under Current Policies		Under Revised Policies	
	Dollars	Percents	Dollars	Percents	Dollars	Percents
Highways	12.7	52.2	13.1	46.4	9.3	45.8
Public Transit	3.7	15.2	4.1	14.5	2.2	10.8
Wastewater Treatment	3.2	13.1	4.2	14.9	3.7	18.2
Water Resources	2.3	9.4	3.7	13.1	3.1	15.3
Municipal Water Supply	0.9	3.7	1.4	5.0	1.0	4.9
Airports	0.8	3.3	0.9	3.2	0.3	1.5
Air Traffic Control	0.8	3.3	0.8	2.8	0.7	3.4
Total	24.4	100.0	28.2	100.0	20.3	100.0

TABLE 2. PROJECTED ANNUAL DEMAND FOR AIRPORT CAPITAL, BY AIRPORT TYPE, TO 1993 (In millions of 1982 dollars and as percentages of total)

	Estimated Total Demand	Expanded Capacity	Upgrading	Maintenance
Commercial				
Large	450-650	20.4	3.6	4.5
Medium-sized	200-350	9.8	2.1	1.2
Small	400-450	15.1	4.7	5.3
Subtotal	1,050-1,450	45.3	10.4	10.9
General Aviation				
Reliever	100-150	4.9	2.0	1.0
Other	400-450	15.4	5.9	4.1
Subtotal	500-600	20.3	7.9	5.1
Total	1,550-2,050	65.6	18.3	16.0

SOURCE: Congressional Budget Office reestimates of data in Federal Aviation Administration, *National Airport System Plan, Revised Statistics, 1980-1990, National Aviation System Development and Capital Needs for the Decade 1982-1991*(December 1980), General Accounting Office, *Developing a National Airport System: Additional Congressional Guidance Needed* (April 17, 1979), and unpublished FAA data.

NOTE: Includes projects not now eligible for federal grants such as certain revenue-producing components of terminal buildings and hangars (duty-free shops, airline maintenance services, and so forth). Totals rounded to nearest $50 million; details may not add to totals because of rounding.

CHAPTER II. AIRPORT FINANCIAL MANAGEMENT AND PRICING

Unlike other countries' airports, many of which are owned and run by national governments, commercial U.S. airports are typically owned and managed by local governments or other nonfederal public authorities. Although the management of U.S. airports varies according to several factors, including size and type and nature of market served, major U.S. commercial airports function as mature enterprises, applying up-to-date techniques of financial management and administration. These publicly owned and managed facilities are operated in conjunction with private industry--the commercial airlines, which are the airports' link to their patrons. This peculiar public/private character distinguishes the financial operation of commercial airports from that of wholly public or private enterprises, distinctively shaping an airport's management practices, the pricing of its facilities and services, and its investment planning process.

On the basis of a survey conducted by the Congressional Budget Office in 1983 (see Appendix A), this chapter develops a profile of financial policies and practices now followed at 60 of the nation's larger commercial airports and assesses trends in airport financial management since federal deregulation of the airline industry began in 1978. Brief attention is also given to management and financing practices of smaller airports, including publicly owned general aviation airports.

OWNERSHIP AND OPERATION

Public airports in the United States are owned and operated under a variety of organizational and jurisdictional arrangements. In many cases, ownership and operation coincide: commercial airports may be owned and run by a city, county, or state, by the federal government, or by several jurisdictions at once (for example, a city and a county). In some instances, however, a commercial airport is owned by one or more of these governmental entities but operated by a separate public body, such as an airport authority created specifically for the purpose of managing the airport. Regardless of a commercial airport's ownership, its public operator can be any one of five governmental entities or other public bodies with legal responsibility for day-to-day administration:

- A municipal or county government,
- A multipurpose port authority,

- o An airport authority,
- o A state government, or
- o The federal government.

Publicly owned general aviation airports may be owned and operated by a municipality, county, or state, or they may be the property of one or more of these jurisdictions but run by a separate public body (as part of a multi-airport system) or by a private operator, which charges for its managerial services. A small fraction of all general aviation airports are privately owned.

More than half of the nation's large and medium-sized commercial airports are run by municipal or county governments (see Table 3). A

TABLE 3. PUBLIC OPERATION OF COMMERCIAL AIRPORTS BY SIZE, 1983 (In numbers and percents)

Airport Operator	Large		Medium-sized		Small [a]	
	Number	Percent	Number	Percent	Number	Percent
Municipality or County	14	58	23	49	N/A	61
Port Authority	5	21	6	13	N/A	3
Airport Authority	3	13	12	26	N/A	31
State	1	4	5	11	N/A	5
Federal Government	1	4	1	2	N/A	0
Total	24	100	47	100	489	100

SOURCES: Congressional Budget Office 1983 survey and data supplied by Airport Operators Council International and American Association of Airport Executives.

NOTES: Details in percent columns may not add because of rounding. N/A = Not available.

a. Percentages reflect data for 172 (35 percent) of the 489 existing small commercial airports; there is no evidence to indicate that this is not a representative sample. Data for the remaining 317 small airports were not available.

typical municipally operated airport is city-owned and run as a department of the city, with policy direction by the city council, and in some cases, by a separate airport commission or advisory board. County-run airports are organized similarly. Under this type of public operation, airport investment decisions are generally made in the broader context of city-or county-wide public investment needs, budgetary constraints, and development goals. To raise investment capital, these airports usually rely on one of two major forms of tax-exempt municipal bonding: general obligation bonds, which are backed by the full faith, credit, and taxing power of the issuing government; and revenue bonds, for which debt service is paid entirely out of revenues generated by the airport. 1/

Some commercial airports in the United States are run by port authorities--legally chartered institutions with the status of public corporations that operate a variety of different publicly owned facilities, such as harbors, airports, toll roads, and bridges. Multipurpose port authorities run 21 percent of the nation's large commercial airports and 13 percent of the medium-sized airports. In managing the properties under their jurisdictions, port authorities have extensive independence from state and local governments. Their financial independence rests largely on the port authorities' power to issue their own debt, in the form of revenue bonds, and on the breadth of their revenue bases, which may include fees and charges from marine terminals and airports as well as proceeds (such as bridge or tunnel tolls) from other port authority properties. In addition, some port authorities have the power to tax within the port districts, although this authority is rarely exercised.

About one-eighth of all large and one-fourth of the medium-sized commercial airports are operated by airport or aviation authorities. Similar in structure and in legal charter to port authorities, these single-purpose authorities also have considerable independence from the state or local governments that often retain ownership of the airport or airports operated by an authority. Like multipurpose port authorities, airport authorities have the power to issue their own debt to finance capital development, and in a few cases, the power to tax. Compared to port authorities, however, they must rely on a much narrower base of revenues to run a financially self-sustaining enterprise.

State-run airports typically are managed by state departments of transportation. Either general obligation or revenue bonding may be used to raise investment capital, and state taxes on aviation fuel may be applied to

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1. See Chapter IV for detailed discussion of the various tax-exempt municipal bonds used for airport financing.

capital improvement projects. Although several states run their own commercial airports, only a handful of the nation's large to medium-sized commercial airports are operated in this way--those in Alaska, Connecticut, Hawaii, and Maryland.

The federal government owns and operates two commercial airports serving the District of Columbia and environs--Washington National and Dulles International. The Federal Aviation Administration manages these two facilities, with capital development financed through Congressional appropriations and project costs recouped by airport landing fees and terminal charges. The federal government also levies user taxes and disburses funds for the capital development of other airports through the FAA's Airport Improvement Program, as discussed in Chapter I.

Of the nation's 2,643 general aviation airports, 176 FAA-designated relievers and 2,249 other general aviation airports are publicly owned. These airports are managed either by public operators--municipalities, counties, states, or independent authorities--or by private operators that charge for their services and remit a portion of their receipts to the airport owners. Many reliever airports are run as part of local or regional multi-airport systems.

APPROACHES TO FINANCIAL MANAGEMENT

At most commercial airports, the financial and operational relationship between an airport and the airlines it serves is defined in legally binding agreements that specify how the risks and responsibilities of airport operation are to be shared between the two parties. These contracts, commonly termed "airport use agreements," establish the terms and conditions governing the airlines' use of an airport. 2/ They also specify the methods for calculating rates airlines must pay for use of airport facilities and services, and they identify the airlines' rights and privileges, sometimes including the right to approve or disapprove any major proposed airport capital development projects.

Although financial management practices differ greatly among commercial airports, the airport/airline relationship at the nation's major

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

commercial airports typically is based on one of two very different approaches with important implications for airport pricing and investment practices:

- **The residual cost approach,** under which the airlines collectively assume significant financial risk by agreeing to pay any costs of running the airport that are not allocated to other users or covered by non-airline sources of revenue; and

- **The compensatory approach,** under which the airport operator assumes the major financial risk of running the airport and charges the airlines fees and rental rates set so as to recover the actual costs of the facilities and services that they use.

The Residual Cost Approach

A majority of the nation's major commercial airports surveyed by CBO--14 out of 24 large airports (58 percent) and 21 of 36 medium-sized airports (57 percent)--have some form of residual cost approach to airport financial management (see Table 4). Under this approach, the airlines

TABLE 4. BREAKDOWN OF LARGE AND MEDIUM-SIZED COMMERCIAL AIRPORTS BY FINANCIAL MANAGEMENT APPROACH, 1983 (In numbers and percents)

Approach	Large		Medium-sized	
	Number	Percent	Number	Percent
Residual Cost a/	14	58	21	58
Compensatory b/	10	42	15	42
Total	24	100	36	100

SOURCE: Congressional Budget Office 1983 survey.

NOTE: Data include all large airports and 77 percent of medium-sized commercial airports. Data for small airports not available.

a. Includes one airport that takes a noncompensatory approach but that does not calculate airline fees and charges on a residual cost basis.

b. Includes airports that use a "cost of services" approach, which is sometimes classified as a distinct approach based on differences in the way airport terminal rental rates are calculated.

collectively assume significant financial risk. They agree to keep the airport financially self-sustaining by making up any deficit--the residual cost--remaining after the costs identified for all airport users have been offset by non-airline sources of revenue (automobile parking operations and terminal concessions such as restaurants, newsstands, snack bars and the like).

Although individual airports' applications of the residual cost approach vary widely, a simplified example can illustrate the basic approach (see Table 5). Most airports are composed of a number of different cost centers, such as terminal buildings, airfields, roads and grounds, and air freight areas. At a residual cost airport, the total annual costs--including administration, maintenance, operations, and debt service (including coverage)--could be calculated for each cost center and offset by all non-airline revenues anticipated for that center. 3/ The residual between costs and revenues would then provide the basis for calculating the rates charged the airlines for their use of facilities within the cost center. Any surplus revenues would be credited to the airlines and any deficit charged to them in calculating airline landing fees or other rates for the following year. 4/ Under this arrangement, the costs paid by the airlines would likely be either less or greater than the actual costs of the facilities and services they use.

The Compensatory Approach

Under a compensatory approach, the airport operator assumes the financial risk of airport operation and the airlines pay rates and charges equal to the costs of the facilities they use, as determined by cost accounting. In contrast to the situation at residual cost airports, the airlines at a compensatory airport provide no guarantee that fees and rents will suffice to allow the airport to meet its annual operating and debt service requirements. A compensatory approach is currently in use at 10 (42

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3. 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 payments) for revenue bond issues. The coverage required is generally from 1.25 to 1.40 times debt service, providing a substantial cushion that enhances the security of the bonds (see Chapter IV).

4. See Harold B. Kluckhohn, "Security for Tax-Exempt Airport Revenue Bonds," summary of Remarks Presented at the *New York Law Journal's* Seminar on Tax-exempt Financing for Airports, 1980.

TABLE 5. ILLUSTRATIVE CALCULATION OF TERMINAL RENTAL RATES AND LANDING FEES FOR AIRLINES UNDER RESIDUAL COST AND COMPENSATORY APPROACHES (In dollars except as specified)

Requirement	Residual Cost		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
Total Requirement	100,000	100,000	100,000	100,000
Cost Center Revenue from Non-airline Sources (-)	-50,000	-50,000	N/A	N/A
Airline Share (in percent)	N/A	N/A	65	75
Residual Cost	50,000	50,000	N/A	N/A
Activity Level	6,500 square feet	100,000 pounds gross landing weight	6,500 square feet	100,000 pounds gross landing weight
Rental Rate (Per square foot)	7.69	N/A	10.00	N/A
Landing Fee Rate (Per 1,000 pounds gross landing weight)	N/A	0.50	N/A	0.75

SOURCE: Congressional Budget Office, adapted from Kluckhohn, "Security for Tax-Exempt Airport Revenue Bonds."

NOTES: This is not a comparison of actual rate calculations but a simplified illustration. Rates are not necessarily higher under either approach but differ according to the volume of traffic, amount of debt, and other factors. N/A = Not applicable.

percent) of the nation's 24 large commercial airports and 15 (42 percent) of the 36 medium-sized airports surveyed by CBO (see Table 4).

Although individual airports have adopted many versions of the compensatory approach, the simplified example set out in Table 5 displays the basics. First, for each cost center, a calculation would be made of the total annual expense of running the center, including administration, maintenance, operations, and debt service including coverage. The airlines' shares of these costs would then be based on the extent of their actual use of facilities within each cost center. The airlines would not be charged for the costs of public space, such as terminal lobbies. Nor would they receive any credit for non-airline revenues, which offset expenses in the residual cost approach but under a compensatory approach are disregarded in calculating rates and charges to the airlines.

Comparison of Residual Cost and Compensatory Approaches

These two approaches to the financial management of major commercial airports have significantly different implications for pricing and investment practices. In particular, they help determine three factors:

- An airport's potential for accumulating **retained earnings** usable for capital development;
- The nature and extent of the airlines' role in making airport capital investment decisions, which may be formally defined in **majority-in-interest** clauses included in airport use agreements with the airlines; and
- The **length of term** of the use agreement between the airlines and the airport operator.

These differences, examined below, can have an important bearing on an airport's performance in the municipal bond market, as discussed in Chapters III and IV.

Retention of Earnings. Although large and medium-sized commercial airports generally must rely on the issuance of debt to finance major capital development projects, the availability of substantial revenues generated in excess of costs can strengthen an airport's performance in the municipal bond market. It can also provide an alternative to issuing debt to finance some portion of capital development. Residual cost financing guarantees that an airport will always break even--thus assuring service without resort

to supplemental local tax support--but it precludes an airport's generating substantial earnings in excess of costs. 5/

By contrast, an airport managed under a compensatory approach lacks the built-in security afforded by the airlines' guarantee that an airport will break even every year. The public operator undertakes the risk that revenues generated by airport fees and charges may not be adequate to allow the airport to meet its annual operating costs and debt service obligations. On the other hand, because total revenues are not constrained to the amount needed to break even, and because surplus revenues are not used to reduce airline rates and charges, compensatory airports may earn and retain a substantial surplus, which can later be used for capital development. Since the pricing of airport concessions and consumer services need not be limited to recovery of actual costs, the extent of such retained earnings generally depends on the magnitude of the airport's non-airline revenues. 6/

Predictably, because the residual cost approach is not designed to yield substantial revenues in excess of costs, residual cost airports as a group tend to retain considerably smaller percentages of their gross revenues than do compensatory airports (see Chapter III). A few residual cost airports, however, have modified the approach to permit accumulation of sizable retained earnings usable for capital development. At Miami and Reno International airports, for example, certain airport-generated revenues are excluded from the revenue base used in calculating the residual cost payable by the airlines; the revenues flow instead into a discretionary fund that can finance capital development projects.

Majority-in-Interest. In exchange for the guarantee of solvency, airlines that are signatories to a residual cost use agreement often exercise

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5. See Peat, Marwick, Mitchell & Co., *Comparative Rate Analysis: Dade County Aviation and Seaport Departments* (August 1982), p. 3. Considerable controversy surrounds the issue of how much retained earnings a publicly owned airport should accrue. For example, a case currently before the U.S. Circuit Court of Appeals, Seventh Circuit (Indianapolis Airport Authority *v.* American Airlines, Inc., *et al.)* questions the right of airport operators to retain sizable concession and other airport-generated revenues to provide advance funding for possible future capital development.

6. Market pricing of concessions and other non-airline sources of revenue is a feature of both residual cost and compensatory airports; see the section on Pricing (below) for further details.

32-938 O - 84 - 4

a significant measure of control over airport investment decisions and related pricing policy. These powers are embodied in so-called majority-in-interest clauses, which are a much more common feature of airport use agreements at residual cost airports than at airports using a compensatory approach (see Table 6). At present, more than three-quarters of the large

TABLE 6. AIRLINES' ROLE IN APPROVING CAPITAL DEVELOPMENT PROJECTS, BY FINANCIAL MANAGEMENT APPROACH, LARGE AND MEDIUM-SIZED COMMERCIAL AIRPORTS, 1983 (In numbers and percents)

Airlines' Role	Large		Medium-sized	
	Number	Percent	Number	Percent
RESIDUAL COST				
Majority-in-Interest Clause	11	79	14	67
No Formal Requirement of Airline Approval	3	21	7	33
Total	14	100	21	100
COMPENSATORY				
Majority-in-Interest Clause	1	10	5	33
No Formal Requirement of Airline Approval	9	90	10	67
Total	10	100	15	100
Grand Total	24	--	36	--

SOURCE: Congressional Budget Office, 1983 Survey.

NOTE: Data include all large commercial airports and 77 percent of medium-sized airports. Data for small airports were not available.

commercial airports using a residual cost approach have some form of majority-in-interest clause in their use agreements with the airlines, and two-thirds of the medium-sized residual cost airports have such clauses. Only one-tenth of the large commercial and one-third of medium-sized airports surveyed that use a compensatory approach to financial management have majority-in-interest clauses in their use agreements.

Majority-in-interest clauses give the airlines accounting for a majority of an airport's traffic the opportunity to review and approve or veto capital projects that would entail significant increases in the rates and fees airlines pay for the use of airport facilities. 7/ This arrangement provides protection for the airlines that have assumed significant financial risk under a residual cost agreement by guaranteeing payment of all airport costs not covered by non-airline sources of revenue. For instance, without some form of majority-in-interest clause, the airlines at a residual cost airport could be obligating themselves to pay the costs of as-yet-undefined facilities that might be proposed in the fifteenth or twentieth year of a 30-year use agreement. Under a compensatory approach, by contrast, since it is the airport operator that assumes the major financial risk of running the facility, the operator generally is freer to undertake capital development projects without consent of the airlines accounting for a majority of the traffic. Even so, airport operators rarely embark on major projects without consulting the airlines that serve the airport. Potential investors in airport revenue bonds would be very wary of a bond issue for a project lacking the airlines' approval.

Specific provisions of majority-in-interest clauses vary considerably. At some airports, the airlines that account for a majority of traffic can approve or disapprove all major capital development projects--for example, any project costing more than $100,000. At others, projects can only be deferred for a certain period of time (generally six months to two years). Although most airports have at least a small discretionary fund for capital improvements that is not subject to majority-in-interest approval, the effect of majority-in-interest provisions generally is to limit public airport owners' ability to proceed with any major projects opposed by the commercial airlines handling a majority of airport traffic. Sometimes, just two or three major carriers together can exercise such control.

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7. The combination of airlines that can exercise majority-in-interest powers varies. A typical formulation would give majority-in-interest powers to any combination of "more than 50 percent of the scheduled airlines that landed more than 50 percent of the aggregate revenue aircraft weight during the preceding fiscal year" (standard document wording).

Term of Use Agreement. At the airports examined for this study, residual cost airports typically have longer-term use agreements than do compensatory airports. This is because residual cost agreements historically have been designed to provide security for long-term airport revenue bond issues; and the term of the use agreement, with its airline guarantee of debt service, generally has coincided with the term of the revenue bonds. More than 90 percent of the large and 75 percent of the medium-sized residual cost airports surveyed by CBO have use agreements with terms of 20 years or more (see Table 7). Terms of 30 years or longer are not uncommon. By contrast, about 60 percent of the large and 40 percent of the medium-sized compensatory airports surveyed have use agreements running for 20 years or longer. Four of the compensatory airports surveyed have no contractual agreements whatever with the airlines. At these airports, rates and charges are established by local ordinance or resolution. This arrangement gives airport operators maximum flexibility to adjust their pricing and investment practices unilaterally, without the constraints imposed by a formal agreement negotiated with the airlines; but it lacks the security provided by contractual agreements.

PRICING OF AIRPORT FACILITIES AND SERVICES

The nation's major commercial airports are diversified enterprises that provide their users with a wide range of facilities and services for which fees, rents, or other user charges generally are assessed. Most commercial airports, regardless of size, type, or locale, offer four major types of facilities and services:

- Airfield facilities including runways, taxiways, aprons, and parking ramps for use by commercial and general aviation aircraft;

- Terminal area facilities and services provided to concessionaires and consumers, including auto parking and ground transportation, restaurants and snack bars, specialty stores (such as newsstands and duty-free shops), car rental companies, passenger convenience facilities (such as porter service, bathrooms, telephones, vending machines), personal services (such as barber shops and valet services), game rooms and amusement facilities, office space, and hotels;

- Airline leased areas in the terminal and elsewhere, including ticket counters, gate space, passenger waiting rooms, baggage

TABLE 7. TERM OF AIRPORT USE AGREEMENTS BY FINANCIAL MANAGEMENT APPROACH, LARGE AND MEDIUM-SIZED AIRPORTS, 1983 (In numbers and percents)

Length of Term	Large		Medium-sized	
	Number	Percent	Number	Percent
RESIDUAL COST				
20 years or more	13	93	16	76
11-19 years	0	0	2	10
Six-ten years	0	0	1	5
Five years or less	1	7	0	0
Negotiations in Process	0	0	2	10
Total	14	100	21	100
COMPENSATORY				
20 years or more	6	60	6	40
11-19 years	0	0	2	13
Six-ten years	1	10	2	13
Five years or less	0	0	3	20
No use agreements	3	30	1	7
Negotiations in Process	0	0	1	7
Total	10	100	15	100
Grand Total	24 a/	--	36 b/	--

SOURCE: Congressional Budget Office 1983 survey.

NOTE: Details in percent columns may not add because of rounding.

a. All large commercial airports.

b. 77 percent of medium-sized commercial airports.

handling areas, office space, operations and maintenance areas, hangars, cargo terminals and aprons, and ground rentals; 8/ and

- o Other airport facilities leased to non-airline tenants and related services, including cargo terminals, ground rentals, fixed base operations, 9/ industrial areas, fuel and servicing of aircraft, agricultural land, warehouses, and other buildings and grounds.

At major commercial airports, the facilities and services provided to users generate the revenues necessary to operate the airport and support the financing of the airport's capital development. Smaller commercial airports and general aviation airports typically offer a much narrower range of facilities and services to their users. Revenue bases shrink as airports decrease in size, and many of the smallest airports do not generate sufficient revenue to cover even their operating costs. Among general aviation airports, those that lease land or facilities for industrial use generally have a better chance of covering their operating costs than do others providing services and facilities that are all aviation-related. 10/

The combination of public management and private enterprise uniquely characteristic of the financial operation of commercial airports is reflected in the divergent pricing of an airport's facilities and services. The private-enterprise aspects of an airport's operation--the services and facilities furnished for non-aeronautical use--are generally priced on a market pricing basis. By contrast, the pricing of facilities and services provided to the airlines and for other aeronautical uses is on a cost-recovery basis, whether it is based on recovery of the actual costs of the facilities and services provided (the compensatory approach) or on recovery of the residual costs of airport operation not covered by non-airline sources of revenue. This mix of market pricing and cost recovery pricing has important implications for airport financing, especially with regard to the

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8. Ground rentals are leases of land in which the lessee pays the costs of constructing any facilities, such as terminals, built on it.

9. Fixed-base operators are private concerns located at airports that lease aircraft and offer a variety of aviation services, such as fuel sales, flight instruction, and aircraft maintenance.

10. See Joel R. Crenshaw and Edmund J. Dickinson, *Investment Needs and Self-Financing Capabilities: U.S. Airports, Fiscal Years 1981-1990,* Report prepared for the U.S. Department of Transportation (July 1978), pp. 12, 45; and Laurence E. Gesell, *The Administration of Public Airports,* Coast Aire Publications (1981), pp. VI-6-13.

structure and control of airport charges and the distribution of resulting operating revenues.

Structure and Control of Airport Charges

At major commercial airports, the structure and control of fees, rents, and other charges for facilities and services are governed largely by a variety of long- and short-term contracts, including airport use agreements with the airlines, leases, and concession and management contracts. For each of the four major groups of facilities and services outlined above, the basic kinds of charges assessed at residual cost and compensatory airports can be compared in terms of their:

- Method of calculation;
- Term of agreement; and
- Frequency of adjustment.

Where relevant, comparisons are made to charges assessed by general aviation airports.

Airfield Area. The major fees assessed for use of airfield facilities are landing or flight fees for both commercial and general aviation aircraft. Some airports also levy other airfield fees, such as charges for the use of aircraft parking ramps or aprons. In lieu of landing fees, many smaller airports, especially general aviation airports, collect fuel "flowage" fees, which are levied per gallon of aviation gasoline and jet fuel obtained at the airport.

At a residual cost airport, the landing fee for the airlines is typically the item that balances the airport's budget, making up the projected difference between all other anticipated revenues and total annual costs, including administration, operations and maintenance, and debt service (including coverage). Landing fees differ widely among residual cost airports, depending on the extent of the revenues derived from airline terminal rentals and from market-priced concessions such as restaurants, car rental companies, and automobile parking lots. If the non-airline revenues are high in a given year, the landing fee for the airlines may be quite low. In recent years, several airports--including Los Angeles and Honolulu International--have approached a "negative" landing fee. At some residual cost airports, the landing fee is the budget-balancing item for the airfield cost center only; at such airports, the surplus or deficit in the terminal cost center has no influence on airline landing fees, and terminal

rental rates for the airlines may be set on a residual cost or a compensatory basis. (The illustrative example in Table 5 shows separate residual cost calculations for the airfield and terminal cost centers.)

The method of calculating airline landing fees at residual cost airports is established in the airport use agreements and continues for the full term of each agreement. To reflect changes in operating costs or revenues, landing fees typically are adjusted at specified intervals ranging from six months to three years; at some airports, fees may be adjusted more often if revenues are significantly lower or higher than anticipated. Often, the nonsignatory airlines (those not party to the basic use agreement) pay higher landing fees than those paid by the signatory carriers. General aviation landing fees vary greatly from airport to airport, ranging from levies equal to those paid by the commercial airlines to no fees at all. Most landing charges are assessed as a set charge per 1,000 pounds of maximum certificated gross landing weight.

At compensatory airports, airline landing fees are based on a calculation of the average actual costs of airfield facilities used by the airlines (see Table 8). As in the case at residual cost airports, each airline's share of these costs is based on its share of total projected airline gross landing (or in a few cases, gross takeoff) weights. In addition to collecting fees determined by this weight-based measure, three compensatory airports--Boston's Logan International and New York's John F. Kennedy and La Guardia airports--assess a surcharge on general aviation aircraft during hours of peak demand. To date, however, no major airports have imposed such peak-hour surcharges on the commercial airlines to help ease congestion problems. 11/

Landing fees at compensatory airports are either established in airport use agreements with the airlines or set by local ordinance or resolution. The frequency of adjustment of the fees is comparable to that at residual cost airports.

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11. Peak-hour surcharges could reduce congestion by giving airlines and other providers of air transportation services the opportunity to save money (and offer lower passenger fares) by flying during uncongested periods. If peak-period demand continued to cause congestion, the increased revenue generated by the surcharges could help finance the expansion necessary to accommodate peak-hour traffic. See Congressional Budget Office, *Public Works Infrastructure* (April 1983), Chapter VII, and *Charging for Federal Services*, Chapter V. See also Chapter V of this study.

TABLE 8. PROFILE OF LANDING FEES AT FOUR MAJOR COMMERCIAL AIRPORTS, 1982

Airline Landing Fee				
Basis of Fee	Method of Calculation	Fee	b/	General Aviation Landing Fee
	BOSTON LOGAN INTERNATIONAL			
Compensatory; based on recovery of all costs of providing and operating "public aircraft facilities" a/	Fee = public aircraft facilities costs divided by total projected scheduled airline landing weights; adjusted annually	$1.24		$1.24 per 1,000 pounds of maximum gross landing weights, subject to $50 minimum during peak periods and $20 in off-peak periods
	DENVER STAPLETON INTERNATIONAL			
Compensatory; based on recovery of maintenance, operations, and debt service costs for airfield area	Fee = airfield cost center expenses divided by total projected airline landing weights; adjusted annually	$0.34		$0.34 per 1,000 pounds of maximum gross landing weights, subject to $3 minimum with fuel flowage fees credited against minimum
	LOS ANGELES INTERNATIONAL			
Residual cost; based on recovery of all costs (maintenance, operations, and debt service), net of all revenues other than landing fees	Fee = residual cost divided by estimated total landing weights of all airlines; adjusted semi-annually	$0.75	c/	$0.80 per 1,000 pounds of maximum gross landing weights, subject to $10 minimum for aircraft under 12,500 pounds and $15 minimum for aircraft from 12,500 to 25,000 pounds
	NEW ORLEANS INTERNATIONAL			
Residual cost; based on recovery of all costs (maintenance, operations, and debt service), net of all revenues other than landing fees	Fee = residual cost divided by estimated total landing weights of all airlines; adjusted every three years	$0.23		$0.40 per 1,000 pounds of maximum gross landing weights

SOURCE: Congressional Budget Office, updated and adapted from Peat, Marwick, Mitchell & Co., *Comparative Rate Analysis: Dade County Aviation and Seaport Departments* (August 1982).

a. Defined as including the capital costs of public aircraft facilities; cost of equipment; replenishment of Maintenance Reserve Fund; administration, operations, and maintenance costs; and allocated portions of payments in lieu of taxes.

b. Fee per 1,000 pounds of maximum gross landing weights. A typical commercial jet airliner (727-200) weighs about 200,000 pounds; a typical general aviation jet (Lear 25D) weighs 15,000 pounds.

c. $0.80 for nonsignatory carriers.

Terminal Area. The structure of terminal concession and service contract fees is similar under both financing approaches. Concession contracts typically provide the airport operator with a guaranteed annual minimum payment or a specified percentage of the concessionaire's gross revenues, whichever is greater. Restaurants, snack bars, gift shops, newsstands, duty-free shops, hotels, and rental car operations usually have contracts of this type. Terminal concession contracts often are competitively bid, and they range in term from month-to-month agreements to contracts of ten to 15 years' duration. (Hotel agreements generally have much longer terms, often running for 40 years or longer.) Automobile parking facilities may be operated as concessions; they may be run by the airports directly; or they may be managed by a contractor for either a flat or percentage-based fee.

Airline Leased Areas. For the right to occupy various facilities (including terminal space, hangars, cargo terminals, and land), the airlines pay rent to the airport operator at both residual cost and compensatory airports. Rental rates are established in airport use agreements, in separate leases, or by local ordinances or resolutions. Terminal space may be assigned on an exclusive-use basis (to a single airline), a preferential-use basis (if a certain level of activity is not maintained, the airline must share the space), or on a joint-use basis (space used in common by several airlines). Most major commercial airports use a combination of these methods. In addition, airports may charge the airlines fees for their use of any airport-controlled gate space and for the provision of federal inspection facilities required at airports serving international traffic. Some airports have long-term ground leases with individual airlines that allow the airlines to finance and construct their own passenger terminal facilities on land leased from the airport.

Among residual cost airports, the method of calculating airline terminal rental rates varies considerably. If airline fees and charges are calculated on a residual cost basis within each cost center, the method of calculating rental rates for the airlines resembles the simplified example shown in Table 5. To arrive at the airline requirement, total non-airline revenues generated within the terminal cost center are subtracted from the center's total costs (including administration, operations, maintenance, and debt service, including coverage). Each airline's share of this requirement is based on the square footage it occupies, with prorated shares for shared space.

On the other hand, at residual cost airports at which receipts from the airline landing fees alone are used to balance the airport's budget, the terminal rental rates for the airlines may be set in various ways--on a compensatory basis (recovering the average actual costs of the facilities

used), on the basis of an outside appraisal of the property value, or on the basis of negotiation with the airlines. In all of these cases, each airline's share of costs is based on its proportionate use of the facilities. Rental rates may be uniform for all types of space leased to the airlines, or they may differ according to the type of space provided--for example, they may be significantly higher for leases of ticket counters or office space than for rental of gate or baggage claim areas.

At residual cost airports, the rental term for airline leased areas generally coincides with the term of the airport use agreements. The frequency of adjustment of terminal rental rates ranges considerably, from annually at many airports to three- to five-year intervals at others.

At compensatory airports, the method of calculating terminal rental rates for the airlines is based on recovery of the average actual costs (including administration, maintenance, operations, and debt service including coverage) of the space occupied. Each airline's share of the total costs is based on the square footage it leases; typically, rates differ according to the type of space leased and according to whether it is leased on an exclusive, preferential, or joint-use basis. The rental term for airline leased areas often coincides with that of the airport use agreement, or it is set by ordinance at airports that operate without agreements. Rates are typically adjusted annually at compensatory airports, although some airports adjust rental rates less often.

Other Leased Areas. A wide variety of leasing arrangements covers the array of other leased areas, which may include agricultural land, fixed-base operations, cargo terminals, and industrial park areas. The methods of calculating rental rates for these areas, the terms of leases, and the frequency of adjustments to rates differ according to the type of facility and the nature of its use. What these disparate rentals have in common is that, like terminal concessions and services, they are generally priced on a market basis, and airport managers have considerable flexibility in setting rates and charges in the context of market constraints and their own policy objectives.

Together, the various fees, rates, and charges described above make up the bulk of an airport's operating revenues. While the adequacy of these combined revenues to meet an airport's annual financial obligations is a first concern for would-be investors in revenue-backed airport bonds, the distribution of these different revenues among the major revenue-producing areas also has importance for an airport's financial performance.

Variation in the Source of Airport Operating Revenues

In general, revenue diversification can enhance an airport's financial stability. In addition, the specific mix of revenues may influence year-to-year financial performance, since some of the major sources of airport revenue--including landing fees and terminal concessions--are affected by changes in the volume of air passenger traffic, while others--such as airline terminal rentals and ground leases--are essentially static despite fluctuations in air traffic.

The distribution of airport operating revenues differs widely according to a number of factors, including the airport's size (measured in numbers of passenger boardings), the nature of the market served, and the specific objectives and features of the airport's approach to pricing and financial management. Airport size generally has a strong influence on the distribution of revenues. The larger commercial airports typically have a more diversified base of revenues than do smaller ones; for example, they tend to offer a wider array of income-producing facilities and services in their passenger terminal complexes. In general, terminal concessions can be expected to generate a greater percentage of total airport operating revenues as passenger boardings increase. On average, concessions account for at least one-third of total operating revenues at large, medium-sized, and small commercial airports, compared to about one-fifth at the other commercial airports often referred to as "nonhubs" and a much smaller fraction of operating revenues at general aviation airports (see Table 9).

Factors other than airport size also affect the distribution of airport operating revenues. At commercial airports, for example, parking facilities generally provide the largest single source of non-airline revenues in the terminal area. Airports that have a high proportion of connecting traffic, however, may derive a smaller percentage of their operating incomes from parking revenues than do so-called "origin and destination" airports. Other factors that may affect parking revenues include availability of space for parking, volume of air passenger traffic, airport's pricing policy, availability and cost of alternatives to driving to the airport (such as public transit and taxicab service), and the presence of private competitors providing parking facilities nearby.

An airport's approach to financial management, because it governs the pricing of facilities and services provided to the airlines, significantly affects the distribution of operating revenues. Since so many other factors play an important role in determining revenue distribution, however, an airport's mix of operating revenues cannot be predicted on the basis of whether the airport takes the residual cost or compensatory approach. The mix of revenues varies widely among residual cost airports. With the airline

TABLE 9. AVERAGE OPERATING AIRPORT REVENUES BY REVENUE SOURCE, COMMERCIAL AND GENERAL AVIATION AIRPORTS, 1975-1976 (In percents)

Airports by Size and Category	Sources of Revenues					
	Airfield Area a/	Terminal Area Concessions b/	Airline Terminal Leased Areas c/	Hangar and Building Area d/	Other e/	Total
			COMMERCIAL			
Large	36	33	16	11	4	100
Medium-Sized	33	38	14	11	4	100
Small f/	30	36	15	12	8	100
Nonhub	37	21	10	26	8	100
			GENERAL AVIATION			
Large	23	12	5	47	13	100
Medium-Sized	22	9	9	57	4	100
Small	28	4	--	60	8	100

SOURCE: Congressional Budget Office from survey data provided by Aerospace Systems, Inc., *Terminal Area Financial Data Study*, prepared for U.S. Department of Transportation (January 1978).

NOTE: Details in percent columns may not add to totals because of rounding.

a. Includes fees for landings, fuel and oil flowage, airline catering, and aircraft parking.

b. Includes auto parking income, auto rental fees, restaurant and lounge fees, shop lease income, advertising, hotel and motel revenues, ground transportation, and miscellaneous concession revenues.

c. Includes airline terminal rentals, government leases, and miscellaneous terminal rental income.

d. Includes hangar rentals, ground leases, commercial and industrial lease revenues, government leases, and airport revenues from fixed base operations (FBOs).

e. Includes utility fees and other systems and services revenues.

f. Excludes nonhub and commuter airports.

landing fee characteristically picking up the difference between airport costs and other revenues at residual cost airports, airfield area income differs markedly according to extent of the airport's financial obligations, magnitude of terminal concession income and other non-airline revenues, and volume of air traffic. In 1982, for example, airfield area revenues provided anywhere from 10 percent (Tampa) to more than 50 percent (Chicago-O'Hare) of total operating revenues at residual cost airports. By contrast, compensatory airports show a considerably smaller range of variation in the distribution of revenues.

TRENDS IN AIRPORT MANAGEMENT SINCE FEDERAL DEREGULATION OF THE AIRLINES

Federal deregulation of the airline industry has radically changed the market climate in which airlines--and airports--operate. Once subject to strict regulation of routes and fares, commercial air carriers are now free to revise routes, adjust fares, and introduce or terminate service to particular airports as market conditions seem to warrant. This new freedom from federal intervention has had pronounced effects on the airline industry. It has spurred intense competition and even price wars among the airlines, resulted in a reconfigured route system, and encouraged the start-up of new carriers. For some of the established airlines, serious financial difficulties have ensued. Although deregulation has not caused radical changes in the financial management of airports, recent trends do reflect uncertainties of a new, open market. They also show signs of shifts in management policy and practice that were under way before deregulation began.

Since the early days of commercial air travel, would-be investors in airport revenue bonds have held long-term use agreements in high regard, considering them evidence of the airlines' commitment to serve an airport for long periods--spans usually coincident with the terms of bond issues. As the industry has matured, however, investors and analysts have increasingly recognized that an airport's financial stability--hence its capacity to generate a stream of revenues adequate to secure revenue bond issues--depends more on the underlying strength of the local air traffic market than on long-term use agreements.

Deregulation has reinforced this shift in attitude, as the strength of the airlines' financial commitment to an airport is significantly diluted by their new flexibility to withdraw from a market virtually at will. Confidence has also been shaken by the financial problems now plaguing many airlines. Though conditions vary considerably from airport to airport, and changes in airport financial management occur very slowly (many standing use agreements run through the 1990s or later), the trends

now emerging at the nation's major commercial airports reflect and encourage this shift.

Three important trends in airport financial management are emerging:

- **Shorter-term contracts**--Shorter terms for airport use agreements, non-airline leases, and concessionaires' contracts, and more frequent adjustment of rates and charges;

- **Modification of residual cost approach**--Modification of residual cost ratemaking approaches and majority-in-interest provisions, with movement in the direction of more compensatory approaches to financial management; and

- **Maximization of revenues**--Concerted effort by airport managers to maximize revenues by means of a variety of strategies intended to strengthen and diversify an airport's revenue base.

Shorter-Term Contracts

Deregulation appears to have hastened a trend toward shorter-term airport use agreements at major commercial airports that was already under way prior to 1978. Shorter-term contracts give airport operators greater flexibility to adjust pricing, investment policies, and space allocation to meet shifting needs in a deregulated environment. For example, a sizable number of airports with long-term use agreements in force have given much shorter-term contracts to air carriers that have begun serving the airport since 1978. Contracts for such recent entrants often run for five years or less, and they may take the form of one-year or even month-to-month operating agreements (similar to those often used for air taxi and commuter operators). At least 15 percent of the large and medium-sized airports surveyed by CBO have granted new carriers such relatively short-term terminal leases and/or use agreements. Moreover, as existing long-term use agreements expire, many airport operators indicate an intention to negotiate shorter-term use agreements with all carriers serving the airport. At least a dozen of the airports surveyed by CBO either have recently done so or anticipate that their new use agreements (planned or in negotiation) will be significantly shorter than ones now standing. 12/

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12. In part, this reflects the fact that many post-deregulation agreements have not involved major capital development programs requiring long-term bond financing.

Many airports also report that, as old contracts expire, they are routinely shortening the terms of non-airline leases and contracts with concessionaires. Some are also moving to more frequent adjustment of rates and charges under existing agreements to meet the escalating costs of airport operation.

Modifications of Residual Cost Approach

Some residual cost airports appear to be modifying their approaches to financial management. In recent years, several airports have introduced changes to the residual cost approach, such as more compensatory methods of calculating airline fees and charges, weakening or elimination of majority-in-interest clauses, and provisions allowing for greater retention of earnings usable for capital development. 13/ Many more airports with use agreements expiring over the next several years have indicated a desire or intent to move toward a more compensatory approach to financial management. 14/ In general, the compensatory approach becomes attractive as airports develop strong markets and thus increase their revenue-generating potential. Such airports are better able to assume the financial risks of airport operation without relying on "break-even" guarantees by the airlines, and they may maximize revenues by adopting a compensatory approach.

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13. See also J. J. Corbett, *Analysis of Trends in Airport Lease/Use Agreements Executed with Airlines Since Deregulation,* Presentation before the Joint Meeting of the Airport Operators Council International Legal Standing and Economic Standing Committees, Vancouver, British Columbia, Canada, October 17, 1983.

14. This trend could be affected by the outcome of the Indianapolis Airport Authority's case currently before the U.S. Circuit Court of Appeals, Seventh Circuit. The original District Court decision in the case questioned not only the airport's right to accumulate sizable revenues for the purpose of future development, but also the airport's right to use a financial management approach that does not apply non-airline revenues as an offset against airline costs. If this component of the original decision is upheld on appeal, it could encourage future litigation against other airports attempting to employ or switch to a compensatory approach, even though a legal precedent on the facts of the Indianapolis case would be established only for states within the Seventh Circuit (Illinois, Indiana, and Wisconsin).

Maximization of Revenues

No matter how they approach financial management, many commercial airports are now seeking to increase and diversify their revenues by a variety of strategies. These include raising existing fees and rental rates and allowing for more frequent adjustment of charges, using competitive bidding for concessionaires' contracts and increasing the airport's percentage of gross profits, and exploiting new or untapped sources of revenue such as video-game rooms, industrial park development, and leasing of unused airport property. Some airports are looking to future possibilities, as well; for example, two large airports that recently renegotiated airport use agreements--Chicago-O'Hare and Greater Pittsburgh International--included clauses in the new contracts protecting the airport's right to levy a passenger facility charge (or "head tax") if and when federal law permits. (Head taxes for passengers' use of airport facilities are now prohibited by federal law. See Chapter V of this study.) In general, this effort to diversify and expand revenue sources reflects the paramount importance of a guaranteed stream of income to assure an airport's financial success.

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CHAPTER III. FINANCIAL CONDITION AND PERFORMANCE OF THE NATION'S MAJOR COMMERCIAL AIRPORTS

As in any enterprise, an airport's ability to survive without public support hinges foremost on its financial strength. This chapter gauges recent trends in the financial performance of the nation's major commercial airports--those with earning power sufficient to issue revenue-backed bonds. It also compares these airports' performance with that of the other municipal enterprises against which airports compete in the capital markets--electric utilities, water supply and wastewater treatment projects, and turnpike, bridge, tunnel, and expressway authorities. 1/ The chapter also assesses how the shifts resulting from federal deregulation of the airlines might be affecting the financial condition of smaller airports compared with larger ones.

TRENDS IN FINANCIAL PERFORMANCE

Analysis of key financial ratios is a widely accepted method of evaluating the financial condition and performance of a single enterprise or an entire industry. 2/ Many different financial ratios can be constructed, each revealing a particular aspect of business performance.

Measures of Performance

Four indicators often used by investment advisors to judge the value of a municipal enterprise to potential bondholders are examined here: operating ratio, net take-down ratio, debt-to-asset ratio, and debt service safety margin. The first two indicators measure the availability of revenues beyond those needed to pay regular operating expenses:

- **Operating Ratio**--Derived by dividing operating and maintenance expenses by operating revenue, this ratio measures the share of

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1. The data used in this chapter, including information from airports' balance sheets and income statements, were provided by Moody's Investors Service Inc. and by the Public Securities Association. The Congressional Budget Office is alone responsible for the analysis and interpretation of these data.

2. See J. F. Weston and E. F. Brigham, *Managerial Finance*, 5th ed. Dryden (1975), pp. 19-53.

revenues absorbed by operating and maintenance costs. A relatively low operating ratio indicates financial strength by signifying that only a small share of revenue is required to satisfy operating requirements. A high ratio (close to one) indicates that relatively little additional revenue is available for capital spending.

- **Net Take-Down Ratio**--Calculated as total revenue minus operating and maintenance expenses, divided by gross revenues, the net take-down is similar to the operating ratio, but it also includes non-operating revenues (such as interest income). It is a slightly broader measure of the share of airport revenues that remain after payment of operating expenses.

The second two ratios measure an airport's ability to support existing and new borrowing for capital investment:

- **Debt-to-Asset Ratio**--Calculated as gross debt minus bond principal reserves, divided by net fixed assets plus working capital, an enterprise's debt-to-asset ratio measures the fraction of total assets provided by creditors. Creditors prefer low debt ratios because each dollar of debt is secured by more dollars of assets. This can be important if assets have to be sold to pay off bondholders.

- **Debt Service Safety Margin**--Defined as gross revenues less operating and maintenance expenses and annual debt service, divided by gross revenues, this ratio measures both the percentage of revenues available to service an airport's new debt, and the financial cushion in the event of an airport's achieving unexpectedly low revenues.

Recent Trends in Airports' Financial Strength

Overall, examination of these measures shows a trend toward improved strength in the finances of major commercial airports. Compared to the 1975-1978 period, when the **operating ratio** for these airports averaged 55 percent, this measure improved significantly over the subsequent four years, declining to 50 percent (see Table 10). 3/ The **net**

3. Although most credit analysts (including Moody's) use medians rather than averages in analyzing industry groups, the CBO has found that averages give an equally meaningful measure of relative performance.

TABLE 10. FINANCIAL PERFORMANCE OF COMMERCIAL AIRPORTS ACCORDING TO FOUR MEASURES, 1975-1982 (In percents)

Years	Operating Ratio	Net Take-Down Ratio	Debt-to-Asset Ratio	Debt Service Safety Margin
1975	51.3	55.8	25.9	18.0
1976	56.4	45.1	41.8	14.7
1977	53.7	48.8	37.7	20.9
1978	55.1	48.5	40.5	23.3
1979	51.9	52.5	47.5	30.0
1980	52.8	52.4	49.6	34.1
1981	46.9	57.1	47.6	33.6
1982	35.5	63.2	41.7	23.6
		PERIOD AVERAGES		
1975-1978	54.5	48.5	39.0	19.9
1979-1982	50.2	54.2	48.1	31.6

SOURCE: Congressional Budget Office, based on financial performance data from Moody's Investors Services, Inc., for 13 large, ten medium-sized, and two small commercial airports.

NOTES: Methods of calculating performance measures are outlined near the beginning of Chapter III. Data reflect averages of all commercial airports represented.

take-down ratio has also improved, increasing from 48 percent to 54 percent; this indicates a steady increase in the ability of commercial airports to service new debt from available net revenues. Indeed, the nation's major commercial airports today appear to perform on a par with other financially self-sufficient municipal enterprises, such as electric utilities, water supply systems, and sewage treatment authorities (see Text Box on opposite page).

Purchasers of airport revenue bonds look for assurances that an airport can generate net revenue (that is, gross revenues net of operating and maintenance costs and debt service requirements) sufficient to pay interest over the term of the bonds and to repay the principal. Though compared to other financially mature municipal enterprises, airports appear to carry high levels of debt relative to the value of their assets, net airport revenues appear comparatively strong. Indeed, as shown in Table 10, the **debt service safety margin** for major commercial airports has grown substantially since 1978, despite the increase in debt-to-asset ratios. Thus, while only 20 percent of airport revenues were available to cover the cost of new investment over the 1975-1978 period, the safety margin grew to 32 percent over the years 1979-1982. Moreover, in 1982, airports had a substantially higher debt service safety margin than other major municipal enterprises except perhaps highway toll facilities, for which no information is available.

EFFECTS OF DIFFERENT AIRPORT CHARACTERISTICS

Although the nation's major commercial airports as a group appear financially strong, important differences among individual airports are apparent. These variations depend on:

- An airport's approach to financial management,
- Its size and the economic base of its service area, and
- The type of traffic it serves.

This conclusion is based on an analysis of the statistical distribution of each financial ratio across individual airports; in statistical jargon, these distributions are "normal" for the industry as a whole and for different airport size categories, indicating that financial averages represent a meaningful basis for intra- and inter-industry comparisons. See also M.H. Ledford and P.K. Sugrue, "Ratio Analysis: Application to U.S. Motor Common Carriers," *Business Economics*, vol. 18, no. 4 (September 1983), pp. 46-54.

FINANCIAL PERFORMANCE OF MAJOR PUBLIC ENTERPRISES

Operating Ratio and Net Take-Down Ratio. Major commercial airports typically use a smaller share of revenue to cover operating costs than either electric utilities or water supply and wastewater treatment authorities. They appear to operate with smaller operating margins than highway toll facilities, however.

Debt-to-Asset Ratio. Airports carry a high level of debt relative to their total assets compared with power and water.

Debt Service Safety Margin. Despite their relatively high debt ratios, airports appear able to service more new debt than both electric utilities and water authorities, largely because of their lower operating and maintenance costs. Also, they have a substantially greater cushion against unforeseen shortfalls in revenue.

MEDIAN RATIOS FOR SEVEN SERVICES IN 1982 (In percents)

Service	Operating Ratio	Net Take-Down Ratio	Debt-to-Asset Ratio	Debt Service Safety Margin
Airports	56.3	48.2	48.8	28.9
Electricity Generation and Transmission	76.8	26.0	56.5	15.9
Electricity Distribution	79.2	23.2	35.4	14.7
Water Supply	68.2	38.7	27.6	21.7
Wastewater Treatment	68.3	39.3	25.0	21.2
Bridges, Tunnels, Expressways	47.5	64.5	N/A	N/A
Turnpikes	38.8	62.0	N/A	N/A

SOURCE: Adapted by CBO with the permission of Moody's.

NOTE: This table reports medians because averages, as used in the body of this chapter, are not available for enterprises other than airports. Also, the airport data are drawn from a sample somewhat different from that used elsewhere in this report.

Financial Management

Differences in earning power may hinge on whether an airport uses a compensatory or a residual cost approach to financial management. While gross revenue at a compensatory airport depends largely on its volume of passenger traffic, gross revenue at a residual cost airport may be constrained to the minimum amount needed for operations, debt service, and reserve funds established in the airport's bond resolutions (see Chapter IV). In fact, the three ratios that reflect gross revenues--operating ratio, net take-down ratio, and debt service safety margin--all show substantial differences between airports using a residual cost approach and those with a compensatory approach.

Operating and net take-down ratios are substantially stronger at airports using the compensatory approach (see Table 11). Over the

TABLE 11. FINANCIAL PERFORMANCE OF COMMERCIAL AIRPORTS COMPARED BY MANAGEMENT APPROACH, 1975-1982

Performance Measure	Averages of All Airports in Category (In percents)					
	Residual Cost		Compensatory		All Airports a/	
	1975-1978	1979-1982	1975-1978	1979-1982	1975-1978	1979-1982
Operating Ratio	56.2	52.9	52.5	44.3	54.5	50.2
Net Take-Down Ratio	46.5	51.5	53.2	60.8	48.5	54.2
Debt-to-Asset Ratio	40.4	55.3	47.3	40.5	39.0	48.1
Debt Service Safety Margin	16.0	24.6	33.1	48.3	19.9	31.6

SOURCE: Congressional Budget Office, based on financial performance data provided by Moody's Investors Service, Inc., for 13 large, ten medium-sized, and two small commercial airports.

NOTE: Methods of calculating performance measures are outlined near the beginning of Chapter III.

a. Includes airports for which the management approach is unknown.

1979-1982 period, for example, operating and maintenance costs at compensatory airports absorbed only 44 percent of operating revenues, while residual cost airports needed more than half their gross revenues just to cover such expenses. Net take-down ratios reflect the same pattern; residual cost airports retained roughly half of their gross revenues after paying operating and maintenance costs, while compensatory airports retained 61 percent. Compensatory airports also exhibited substantially higher debt service safety margins--48 percent, as opposed to only 25 percent for residual cost airports. This indicates that compensatory airports have comparatively greater ability to finance development with retained earnings or through bond sales.

Airport Size

An airport's size (as measured in passenger boardings, see Text Box on page 2) has historically been an important determinant of its financial performance. Larger airports show relatively stronger performance than do smaller ones; operating ratios at large airports were 15 percentage points better than those at medium-sized airports during the 1975-1978 period and 18 percentage points better over the 1979-1982 period (see Table 12). Net take-down ratios and debt service safety margins reflect the same spread, while debt-to-asset ratios are better at medium-sized airports.

EFFECTS OF AIRLINE DEREGULATION ON AIRPORTS' FINANCIAL PERFORMANCE

Since federal deregulation of the airlines began in 1978, the performance of large and medium-sized airports on all four ratios has improved (see Table 12). Indeed, except for the debt-to-asset ratio at medium-sized airports, large and medium-sized airports show improvement on all four ratios. One plausible explanation is that many major airlines curtailed service to smaller cities, electing instead to concentrate operations on the more profitable routes serving large and medium-sized airports. On balance, each 10 percent increase in an airport's traffic volume translates into a 2 percent improvement in its operating and net take-down ratios and debt service safety margin (see Appendix B). Increased traffic volume at many large and medium-sized airports since deregulation appears therefore to have improved gross revenues, yielding improved financial results in those indicators that turn on changes in gross revenue.

Prospective investors in airport revenue bonds look beyond financial indicators based on gross revenues, however, and in particular they seek low debt-to-asset ratios as good cushions against possible defaults. Though gross

TABLE 12. FINANCIAL PERFORMANCE OF COMMERCIAL AIRPORTS BY AIRPORT SIZE, 1975-1978 AND 1979-1982

Performance Measure	Averages of All Airports in Category (In percents) 1975-1978 Before Airline Deregulation	1979-1982 After Airline Deregulation
LARGE AIRPORTS a/		
Operating ratio	48.0	43.3
Net take-down ratio	54.6	60.7
Debt-to-asset ratio	56.9	54.0
Debt service safety margin	20.9	34.8
MEDIUM-SIZED AIRPORTS b/		
Operating ratio	63.3	61.7
Net take-down ratio	40.9	43.2
Debt-to-asset ratio	29.7	44.1
Debt service safety margin	17.0	25.3
ALL COMMERCIAL AIRPORTS c/		
Operating ratio	54.5	50.2
Net take-down ratio	48.5	54.2
Debt-to-asset ratio	39.0	48.1
Debt service safety margin	19.9	31.6

SOURCE: Congressional Budget Office based on data provided by Moody's Investors Service.

NOTE: Methods of calculating performance measures are outlined near the beginning of Chapter III.

a. Includes data on 13 airports.

b. Includes data on ten airports.

c. Includes two small airports for which financial performance measures were available only for the years 1977-1980. These airports have substantially better financial ratios than do the large and medium-sized airports. As with the other airports, they also show some improvement between the two time periods.

revenues grow with increased business, so sometimes do capital needs: airports may need to expand terminals and other facilities to handle additional passengers and aircraft. Some airports, of course, have sufficient capacity to absorb significant increases in traffic with no expansion. At medium-sized airports, however, debt-to-asset ratios have indeed increased by more than 14 percentage points between the 1975-1978 and 1979-1982 periods. As a result, the difference between the debt-to-asset ratios at large and medium-sized airports has declined from 27 percentage points during the 1975-1978 period to 10 percentage points between 1979 and 1982. At the same time, the debt-to-asset ratio at large airports actually improved somewhat, from 57 percent (1975-1978) to 54 percent (1979-1982). Although the debt-to-asset ratio of medium-sized airports is still better than the ratio at large airports, investors tend to be wary of worsening conditions because of the speculative element that these can introduce into a prospective investment. Whether these trends have actually diminished the investment value of medium-sized airports is dealt with more closely in Chapter IV.

The depiction of small airports' performance is extremely uncertain, however. The CBO analysis deals with only two small airports, and performance indicators for these are available only for the 1977-1980 span, rather than for the full 1975-1982 period applied elsewhere. On the other hand, the two small airports are close in size to some medium-sized airports, indicating that they probably represent the financially stronger airports in their class. Indeed, their financial ratios are better than for the average medium-sized airport--perhaps an indication that smaller airports require better finances to offset the greater risks associated with their size.

While financial ratios are unavailable for the remaining 489 small commercial airports and for publicly owned general aviation airports, in general, the income of these airports is inadequate to support the issuance of revenue-backed airport bonds. Instead, to help finance capital development, many of these airports depend on government-issued general obligation bonds, local taxpayer support, and federal grants. Indeed, some of the smaller airports' revenues fail to cover even their operating costs. On the other hand, some of these airports--especially general aviation airports with current low or nonexistent landing fees and aircraft parking charges--have an opportunity to strengthen their financial performance by introducing new or increased charges for the use of airport facilities. 4/

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4. See Congressional Budget Office, *Public Works Infrastructure*, Chapter VII. See also Chapter V of this study.

CHAPTER IV. AIRPORTS IN THE MUNICIPAL BOND MARKET

Perhaps the stiffest test of an airport's financial strength is its success in competing for private investment capital. In reviewing the airports' ability to obtain capital funds through the sale of bonds--the most common source of private investment capital for municipal enterprises--this chapter focuses on two points:

- The role of the bond market in overall airport investment, and
- The competitiveness of airports in selling municipal bonds.

The analysis points to two conclusions. First, while the financially stronger airports are the ones most active in the bond market, even financially weaker airports can attract private capital--though often by using the taxing power of the local community as security for a bond financing program. Second, investors generally view airports as good investments. This conclusion emerges in comparing the airports' cost of capital (the interest they must pay to attract bond buyers) with that of the other public enterprises with which airports compete in bond markets.

ROLE OF THE MUNICIPAL BOND MARKET IN AIRPORT DEVELOPMENT

Between 1978 and 1982, airports raised a total of $5 billion (in 1982 dollars) in new bond financing to pay for capital improvements (see Table 13). 1/ A key feature of most municipal bonds is their exemption from federal income tax, a trait that makes this financing less expensive than most other sources of private money. Predictably, therefore, the vast majority of airport debt capital is raised in the tax-exempt bond market. In 1982 alone, airports raised $1.4 billion in tax-exempt bond sales, or 1.8 percent of the total volume ($79.1 billion) of long-term tax-exempt securities sold in that year.

1. Data in this report refer only to new bond issues; refinancing issues are excluded.

Types of Issuers

Of the 235 bond issues sold partly or wholly for airport development between 1975 and 1982, the majority are divided more or less equally

TABLE 13. BOND ISSUES FOR AIRPORT IMPROVEMENT, BY AIRPORT TYPE AND SIZE, 1978-1982 (In millions of 1982 dollars)

Airports by Size and Category	1978	1979	1980	1981	1982	1978-1982	Percent of Total
				COMMERCIAL AIRPORTS			
Large	955.3	672.0	185.7	547.4	1,036.1	3,396.6	67.3
Medium-sized	279.8	109.3	245.7	187.5	295.5	1,117.7	22.2
Small	25.3	134.2	172.1	70.1	62.6	464.2	9.2
Subtotal	1,260.4	915.5	603.4	805.0	1,394.1	4,978.4	98.6
				GENERAL AVIATION AIRPORTS			
Reliever	16.7	1.2	12.8	0.0	8.0	38.7	0.8
Other	2.6	4.5	1.8	14.1	6.6	29.7	0.6
Subtotal	19.3	5.7	14.6	14.1	14.6	68.4	1.4
				ALL AIRPORTS			
Total	1,279.6	921.2	618.1	819.1	1,408.8	5,046.8	100.0

SOURCE: Congressional Budget Office.

NOTES: Excludes refunding issues. Details may not add to totals because of rounding.

between county and municipal governments (45 percent) and port or airport authorities (43 percent) (see Table 14). Only a small proportion (about 6

TABLE 14. NUMBER OF AIRPORT BONDS ISSUED BY TYPE OF ISSUER AND TYPE OF SECURITY, 1978-1982 (Percents in parentheses)

Type of Issuer	General Obligation Bonds a/	Revenue Bonds b/	Total Issues	As Percentage of Total Issues
Municipality or County	60 (56.6)	46 (43.4)	106 (100)	(45.1)
Port or Airport Authority	19 (18.6)	83 (81.4)	102 (100)	(43.4)
State	11 (84.6)	2 (15.4)	13 (100)	(5.5)
Other c/	9 (64.3)	5 (35.7)	14 (100)	(6.0)
Total	99	136	235	---

SOURCE: Congressional Budget Office.

a. Underlying security provided by full taxing authority of governmental unit, by full taxing authority with regard to a single revenue source, or by a single or specified tax.

b. Underlying security provided by revenues from all airport sources, by revenues from the lessee of the proposed airport facility, or by anticipated revenues from future bond sales or grants.

c. Special districts and other special-purpose jurisdictions.

percent) of all bonds sold were issued by state governments, and about 6 percent (14 issues) were sold by special districts and other jurisdictions.

Role of the Bond Market by Airport Size and Type of Traffic

Although airports of all sizes and types participate in the bond market, larger airports do so to a greater extent than smaller ones. Among the large and medium-sized commercial airports--together serving about nine-tenths of all passenger traffic--fully 41 (58 percent) used bond financing for capital development over the 1978-1982 period (see Table 15). Moreover, according to Moody's Investors Service, all large and medium-sized airports have issued bonds at some time in the past. Although many small commercial airports use bond financing as well (indeed, more small commercial airports used bond finance over the 1978-1982 period than did large and medium-sized airports), such airports as a group participate in only a small way, with just 50 of 489 airports (10 percent) using bond finance over the past five years. The same is true of general aviation airports; although 43 used bond financing over the past five years, this represents only 2 percent of all facilities in this class. General aviation "reliever" airports, however--meaning those identified by the FAA as having considerable importance in relieving congestion at major commercial airports--appear more likely to draw on the debt markets to finance capital improvements than do other general aviation airports.

In terms of total dollar volume of bond sales, large airports are far more prominent in the bond market than smaller ones. Of the total amount of municipal debt sold for airport purposes over the 1978-1982 period, 89.5 percent was for large and medium-sized airports, in contrast to only 9.2 percent for small commercial airports; general aviation airports used little more than 1 percent of total airport bond sales (see Table 13).

The role of bond finance in overall investment also varies greatly according to an airport's size and the type of air traffic it serves. Over the 1978-1982 period, airport investment dollars raised through the bond market exceeded federal grants to large airports by 340 percent, while at small airports, federal grants were more than double bond proceeds (see Table 16). Not surprisingly, debt finance plays the smallest role at general aviation airports, where it has accounted for only about 10 percent of total federal-plus-private investment over the past five years. 2/

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2. Excludes state or local grants and the fraction of airport investments covered by retained earnings.

TABLE 15. AIRPORT USE OF BOND MARKET TO RAISE CAPITAL, BY AIRPORT TYPE AND SIZE, 1978-1982

Airports by Size and Category	Number of Airports: Total Existing	Number of Airports: Issuing Bonds 1978-1982	Percent Issuing Bonds 1978-1982
COMMERCIAL AIRPORTS			
Large	24	19	79
Medium-sized	47	22	47
Small	489	50	10
Subtotal	560	91	16
GENERAL AVIATION AIRPORTS			
Reliever	219	9	4
Other	2,424	34	1
Subtotal	2,643	43	2
Total	3,203	134	4

SOURCES: Bond data adapted by CBO from Public Securities Association, Long-Term Municipal Bond File. The numbers of existing airports by size from the FAA as of February 1984.

Although smaller commercial airports rely more heavily than do larger ones on federal grants, they nonetheless undertake a sizable amount of investment through the bond market. For example, while federal matching grants to small commercial airports totaled about $1 billion (in 1982 dollars) between 1978 and 1982--requiring $100 million in local matching funds--small airports issued more than $460 million in tax-exempt bonds during the same period (see Table 13), more than four times the amount

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TABLE 16. RELATIVE CONTRIBUTION OF FEDERAL GRANTS AND BOND ISSUES TO AIRPORT INVESTMENT, BY AIRPORT TYPE AND SIZE, 1978-1982 (In percents)

Airports by Size and Category	Federal Grants	Bond Issues	Total
	COMMERCIAL AIRPORTS		
Large	18.5	81.5	100
Medium-sized	27.1	73.0	100
Small	68.9	31.1	100
Subtotal	30.8	69.2	100
	GENERAL AVIATION AIRPORTS		
Reliever	80.1	19.9	100
Other	91.5	8.5	100
Subtotal	87.4	12.6	100
	ALL AIRPORTS		
Total	34.8	65.3	100

SOURCE: Congressional Budget Office.

NOTE: Details may not add to totals because of rounding.

necessary to match federal grants. This means that small airports as a group used more than three-quarters of their bond proceeds for investments with no federal financial involvement. On the other hand, general aviation airports as a group appear to raise only enough debt capital such that, when it is combined with monies from nonfederal sources, they can meet their federal matching requirement.

Underlying Security of Airport Bonds

For most municipal bonds, including bonds for airport development, the bond issuer's pledge to pay interest and to repay principal is generally provided under one of two approaches:

- o **General obligation bonds** pledge the unlimited taxing power and the full faith and credit of the state, municipality, or other general-purpose government, while
- o **Revenue bonds** pledge the user fee or lessee revenues generated by the actual facility to be developed.

General obligation bonds are issued only by states and other general-purpose governments; most states limit the amount of general obligation debt that a municipality may issue to a specified fraction of the taxable value of all property within its jurisdiction. In addition, many states require voters' approval before issuing general obligation debt. By contrast, the volume of debt issued through revenue bonds is not included in the amount of total indebtedness subject to state debt limits, and voters' approval is usually not required. Revenue bonds generally have higher interest costs than general obligation bonds, because they are not backed by the full faith, credit, and taxing power of a governmental unit, and because the receipts from user charges are subject to greater uncertainty than are tax revenues.

In recent years, there has been a dramatic increase in the use of tax-exempt revenue bond financing. In 1982, for example, revenue bonds accounted for 73 percent of all tax-exempt bond sales, as compared to 34 percent in 1970. With the increasing financial pressures on local governments to reserve general obligation funding for non-revenue-producing facilities, revenue bonds represented the vast majority--nearly 92 percent--of the total dollar volume of airport bond sales over the 1978-1982 period (see Table 17). During this period, the use of general obligation bonds for airport development was most prominent among municipalities and counties, accounting for 55 percent of their airport development issues--though a much smaller fraction of total proceeds. Revenue bonds predominated, however, accounting for nearly 60 percent of all bonds sold for airport development during this period (see Table 14).

In addition to the two general categories of bondholder security outlined above, a few bond issues combine sources of security to produce a

TABLE 17. BOND ISSUES FOR AIRPORTS BY TYPE OF SECURITY, BY AIRPORT TYPE AND SIZE, 1978–1982 (In millions of 1982 dollars)

Airports by Category and Bond Type	1978	1979	1980	1981	1982	1978–1982	Percent of Total
COMMERCIAL AIRPORTS							
Large							
General Obligation	30.1	0.0	33.4	9.5	2.3	75.2	2.2
Revenue	925.2	672.0	152.4	537.9	1,033.8	3,321.3	97.8
Subtotal	955.3	672.0	185.7	547.4	1,036.1	3,396.6	100.0
Medium-Sized							
General Obligation	34.3	6.8	55.4	55.5	5.1	157.2	14.1
Revenue	245.5	102.5	190.2	132.0	290.4	960.6	85.9
Subtotal	279.8	109.3	245.7	187.5	295.5	1,117.7	100.0
Small							
General Obligation	11.3	38.4	41.6	15.7	30.1	137.1	29.5
Revenue	14.0	95.8	130.5	54.4	82.4	327.1	70.5
Subtotal	25.3	134.2	172.1	70.1	62.6	464.2	100.0
All							
General Obligation	75.6	45.3	130.4	80.7	37.5	369.5	7.4
Revenue	1,184.7	870.3	473.1	724.3	1,356.6	4,609.0	92.6
Total	1,260.4	915.5	603.4	805.0	1,394.1	4,978.4	100.0

(Continued)

NOTE: Details may not add to totals because of rounding.

TABLE 17. Continued

Airports by Category and Bond Type	1978	1979	1980	1981	1982	1978-1982	Percent of Total
GENERAL AVIATION AIRPORTS							
Reliever							
General Obligation	7.5	1.0	3.8	0.0	6.4	18.8	48.6
Revenue	9.2	0.2	9.0	0.0	1.6	20.0	51.7
Subtotal	16.7	1.2	12.8	0.0	8.0	38.7	100.0
Other							
General Obligation	2.4	4.4	1.4	13.1	3.5	24.8	83.5
Revenue	0.1	0.1	0.4	1.1	3.1	4.9	16.5
Subtotal	2.6	4.5	1.8	14.1	6.6	29.7	100.0
All							
General Obligation	9.9	5.4	5.2	13.1	9.9	43.6	63.7
Revenue	9.3	0.3	9.4	1.1	4.7	24.9	36.4
Total	19.3	5.7	14.6	14.1	14.6	68.4	100.0
ALL AIRPORTS							
General Obligation	85.6	50.7	135.6	93.7	47.4	413.0	8.2
Revenue	1,194.0	870.5	482.5	725.4	1,361.4	4,633.8	91.8
GRAND TOTAL	1,279.6	921.2	618.1	819.1	1,408.8	5,046.8	100.0

SOURCE: Congressional Budget Office.

hybrid bond. This device offers certain advantages, such as improved ratings and interest costs, without placing undue pressure on a municipality's debt ceiling. In Florida, for example, the City of Tampa and Hillsborough County lent their credit to the revenue bond program that financed the new terminal at Tampa International Airport by executing standby agreements with the Hillsborough County Aviation Authority. These pledged tax revenues to replenish the debt service reserve fund in the event it had to be drawn down for any reason. As a further example, the cities of Charlotte (North Carolina) and Austin (Texas) built or expanded terminal facilities with general obligation bonds secured by the full faith and credit of the cities but serviced from airport revenues--so-called "self-liquidating general obligation bonds." 3/

Airport size appears to have considerable influence on the type of security used to back bonds. In general, the larger the airport, the less likely it is to use general obligation financing. Over the 1978-1982 period, general obligation debt accounted for only 2 percent of total bond financing at the largest commercial airports, 14 percent at medium-sized commercial airports, and 30 percent at small commercial airports. Among general aviation reliever airports, by contrast, some 49 percent of all tax-exempt debt capital has general obligation backing. And at other general aviation airports, more than 83 percent of debt finance is secured in this way (see Table 17).

The larger airports use relatively little general obligation financing, because local governments tend to reserve such bonds for public services and facilities that cannot generate sufficient revenues to cover the costs of debt capital. Similarly, since a substantial general obligation bond issue can place enormous pressure on a municipality's debt limit and ultimately, on its credit rating, airport operators generally must rely on revenue bonds to finance large-scale airport improvements. During the 1978-1982 period, the average size of bond issued by a large commercial airport was $49 million, as compared to $26 million at medium-sized airports, $6 million at small commercial airports, $2.8 million at general aviation reliever airports, and $0.9 million at other general aviation airports (see Table 18). Over the same period, the average size of a revenue bond issued by a commercial airport was three to five times greater than the average proceeds of a general obligation bond used for a commercial airport of the same size category. Thus, revenue bonds are the dominant form of debt financing where

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3. See Roger H. Bates, Airport Financing: Whither (or Wither?) the Market?" presented at Airport Operators Council International Economic Specialty Conference, Sacramento, California, March 31, 1982.

investments are large and where revenues from airport fees and charges are sufficient to cover debt service requirements. On the other hand, at general aviation airports, where the average size of a bond issue is quite small

TABLE 18. AVERAGE SIZE OF AIRPORT BOND ISSUES BY BOND TYPE AND AIRPORT CATEGORY AND SIZE, 1978-1982 (In millions of 1982 dollars)

Airports by Size and Category	General Obligation Bonds a/	Revenue Bonds	Total Bonds
	COMMERCIAL AIRPORTS		
Large	10.7	53.6	49.2
Medium-sized	12.1	32.0	26.0
Small	3.2	9.3	6.0
Category Average	5.9	36.3	26.2
	GENERAL AVIATION AIRPORTS		
Reliever	3.8	2.2	2.8
Other	1.0	0.5	0.9
Category Average	1.5	1.3	1.4
	ALL AIRPORTS		
All-Airport Average	4.5	31.7	21.2

SOURCE: Congressional Budget Office.

a. Amounts represent the proceeds of general obligation bonds used for airport purposes. In most instances, such proceeds account for less than the full amount of the bond issue, the balance going for other public investment purposes.

(about $1 million), general obligation bonds outweigh revenue bonds as a means of financing airport improvements.

THE MARKET FOR AIRPORT BONDS

The competitiveness of airports in the municipal bond market can be gauged by three conventional indicators of investment quality:

- o **Bond ratings**--a simple system used by major investor services to grade bonds according to investment quality (see Text Box opposite);
- o **Interest costs**--the interest paid by airports to attract investors relative to what other municipal enterprises pay; and
- o **Defaults**--the frequency with which a given type of enterprise has defaulted on a bond issue.

Bond Ratings

For the 134 airports for which new airport bonds were issued over the past five years (including general obligation bonds that have been used at least in part for airport development), every rated bond has received an "investment grade" from the two major U.S. investment rating services, Moody's Investors Service, Inc. and Standard & Poor's Corporation (see Table 19 for ratings of the airports' most recent issues). 4/ One explanation for these consistently good ratings is that airports that expect poor ratings do not enter the bond market.

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4. Note that not all traded bonds receive bond ratings. Of the 235 bonds used for airport purposes over the 1978-1982 period, 149 were rated and 86 were unrated. However, rated bonds accounted for more than 90 percent of the dollar volume of all airport bonds issued over the past two years. Rating services grade new bond issues only at the request of the issuer, and issuers sometimes choose not to seek ratings. In particular, airport bonds for relatively small investments are often sold as so-called "direct private placements," which means that the airport or municipality sells directly to an investor, usually a commercial bank or insurance company that buys the bonds for its own portfolio. Although a private placement usually incurs a higher interest cost, this approach can prove worthwhile for small issues because of the high transaction costs associated with selling in the open market. (Moody's, for example, charges from $850 to $45,000 to

WHAT INVESTMENT-GRADE BOND RATINGS MEAN

Best Grade	High Grade
Bonds rated Aaa (by Moody's) **or AAA** (by Standard & Poor's) are graded best. Their exceptionally strong capacity to pay interest and repay principal offers the lowest degree of risk to investors in bonds.	**Bonds rated Aa1 or Aa** (by Moody's) **or AA+ or AA** (by Standard & Poor's) have very strong ability to pay interest and repay principal, but they are judged to be slightly less secure than best-grade bonds. Their margins of protection may not be quite so great, or the protective elements may be more subject to fluctuation.
Upper-Medium Grade	**Medium Grade**
Bonds rated A1 or A (by Moody's) **or A+, A, or A-** (by Standard & Poor's) are well protected, but the factors giving security to interest and principal are deemed more susceptible to adverse changes in economic conditions or other future impairments than for bonds in the best- and high-grade categories.	**Bonds rated Baa1 or Baa** (by Moody's) **or BBB+, BBB, or BBB-** (by Standard & Poor's) lack outstanding investment characteristics. Although their protection is deemed adequate at the time of rating, the presence of speculative elements may impair their capacity to pay interest and repay principal in the event of adverse economic conditions or other changes.

SOURCE: Based on Moody's Bond Record (September 1982) p. 144 and Standard & Poor's Ratings Guide, McGraw-Hill (1979) pp. 327-328.

NOTES: Except for the best-graded category of bonds, those bonds in each category that Moody's and Standard & Poor's believe to possess the strongest investment attributes are designated by the symbols 1 and +, respectively. The symbol - designates weaker investment characteristics in a given category.

Standard & Poor's assigns AA ratings to new issues of municipal bonds insured by the American Municipal Bond Assurance Corporation and AAA ratings to new issues insured by the Municipal Bond Insurance Association. Moody's ratings do not reflect the presence or absence of bond insurance.

Although investors today clearly have considerable confidence in airport bonds, ratings do vary between the top and medium grades. A medium grade means that rating firms see the investment as carrying a measure of speculative risk. As shown in Table 19, general obligation bonds draw the best ratings. Under this form of security, ratings are determined by the economic vigor of an entire state or municipality, and airports have little or no influence on the rating. Revenue bonds, on the other hand, draw ratings according to the fiscal vitality of the airport itself. Since more than 90 percent of all airport bonds (in terms of dollar volume) are secured with airport revenues, the criteria investor services use to rate such bonds are central to such bonds' marketability.

Credit analysts at the major investor services rate an airport revenue bond according to a variety of factors, including the financial performance of the airport, the strength of passenger demand, and use agreements with the airlines serving the airport. 5/ Financial strength is viewed as a direct function of passenger demand at the airport, and credit analysts review both

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rate a bond issue). Over the 1978-1982 period, only 8 percent of all revenue bonds issued by large airports and 13 percent of those issued by medium-sized commercial airports were unrated. In contrast, 66 percent of all revenue bonds issued by the nation's small commercial airports were not rated, while all non-reliever general aviation airport revenue bonds were sold privately and without ratings. This is a reflection of the smaller average size of bond issues for small airports; for such airports, rating costs represent a greater percentage of the total bond sale (see Table 18).

5. Credit analysts also examine rate covenants and bond resolutions. The **rate covenant** is the airport's promise to establish rates, fees, and charges for the use of airport facilities, and to adjust such rates, fees, and charges from time to time so that the total airport revenue will be sufficient to meet all obligations and produce a margin of safety. The rate covenant typically requires the airport to establish rates, fees, and charges so as to provide net revenues (gross revenues less operating and maintenance expenses) at least equal to 1.25 to 1.40 times annual debt service. In other words, the airport promises the bondholder to establish a schedule of fees that provides a cushion over and above what will be required to pay operating costs and debt service. The **bond resolution** establishes a number of special funds and accounts to facilitate the management of bond proceeds and revenue.

TABLE 19. AIRPORTS' BOND RATINGS (AS REPORTED BY MOODY'S INVESTORS SERVICE), 1978-1982 (In percents)

Airports by Size and Category, and Bond Type	Best Grade (Aaa)	High Grade (Aa1/Aa)	Upper Medium Grade (A1/A)	Medium Grade (Baa1/Baa)	Not Rated
			COMMERCIAL AIRPORTS		
Large					
General obligation	33	67	0	0	0
Revenue	0	6	89	0	6
Medium-sized					
General obligation	50	0	50	0	0
Revenue	0	0	65	18	18
Small					
General obligation	11	36	21	7	25
Revenue	0	4	14	7	75
All					
General obligation	19	32	24	5	19
Revenue	0	3	49	8	40
			GENERAL AVIATION AIRPORTS		
Reliever					
General obligation	0	20	20	0	60
Revenue	0	0	20	0	80
Other					
General obligation	0	8	25	4	63
Revenue	0	0	0	0	100
All					
General obligation	0	10	24	3	62
Revenue	0	0	7	0	93

SOURCE: Congressional Budget Office.

NOTE: Data reflect ratings of the most recent issue of each bond type by all airports represented. The few airports that used both types in this period appear twice. No airport bonds rated below Baa by Moody's Investors Service were issued during 1978-1982.

financial indicators (analyzed in Chapter III) and underlying pattern of passenger traffic.6/

Airline deregulation, which has freed air carriers from virtually all obligations to serve particular airports, has caused some shift in the relative weight credit analysts give to these different factors. In response to deregulation, the investor services today place greater emphasis on the strength of local economic conditions than on use agreements and the financial stability of the airlines serving an airport. The rationale is that, if one airline withdraws service, a strong local economy would simply attract other airlines to pick up the travel business.

Effect of Airport Size on Bond Ratings. Not surprisingly in view of the methods adopted by the investor services, large airports--with their comparatively stronger financial showings--tend to draw the best revenue bond ratings. Over the 1978-1982 period, credit analysts were far more likely to assign medium-grade revenue bond ratings to issues for medium-sized and small airports than for large airports; in fact, over that period, not a single large airport that issued debt was rated below the upper-medium category (see Table 19).

Impact of Airline Deregulation on Bond Ratings. Since deregulation, as noted above, bond rating organizations have emphasized that passengers are an airport's true customers, and that sufficient passenger demand will sustain financial incentives for some airline to provide service over the long term. In particular, for "origin-destination" airports (those at which most passengers either begin or end their journeys) in strong travel markets, the financial failure of one carrier might have no influence on the airport's bond rating. For example, when Dallas-Fort Worth Airport sold $157 million of revenue bonds in November 1982, it retained its A rating from both Moody's and Standard & Poor's, despite the collapse of Braniff Airways earlier that year. Braniff has held a significant share of the Dallas-Fort Worth market and, under Dallas-Fort Worth's residual cost use agreement, had agreed to pay a substantial portion of the total airline bill. The Moody's municipal credit report on the issue cited the bond's security provisions, the adequacy

6. In considering a particular airport project, credit analysts pay special attention to past and anticipated growth in air traffic, diversity of revenue sources, levels of service, numbers of air carriers, and air carrier market shares. Growth is considered a critical factor because, unless capital projects are accompanied by growth in airport use, the project will dilute the airport's ability to pay principal and interest on its outstanding bonds. A diversity of revenue sources is also thought to add stability to the airport's income stream.

and diversity of pledged revenues, and the airport's role as one of the nation's major facilities serving a strong southwestern economy. The report concluded that this "combination of the sufficient revenues for all requirements and increases in scheduled commercial airline service offset the potentially adverse effects following cessation of operations this past spring of the former dominant airline serving the area." 7/

For the so-called hub airports serving large numbers of connecting flights, however, a major airline's poor financial outlook could mean a permanent loss of patronage, with important implications for bond ratings. In May 1983, for example, Moody's revised Atlanta-Hartsfield's rating on approximately $86 million "third-lien" revenue bonds downward from A to Baa1, citing as the primary reasons Eastern Airlines' financial problems (reflected in a net loss of $115.8 million in fiscal year 1982) along with a trend of declining traffic and reduced debt service coverage. Likewise, for the Salt Lake City Airport, Moody's downgraded its rating in connection with the sale of $26 million in revenue bonds, stating that the bonds' long-term security must be viewed with uncertainty in light of the airport's growing reliance on connecting passengers on the financially troubled Western Airlines. 8/ In addition, while the major airlines' strengthening and expansion of hub-and-spoke networks since deregulation has improved gross revenues at some airports, the added volume of connecting traffic has also prompted the need for large airport expansion programs.

In the view of the bond rating analysts, the financial picture has not improved significantly for those airports that have experienced the greatest operational growth--and dramatic increases in debt financing requirements--since deregulation. 9/ For example, Standard & Poor's published credit rating on Denver-Stapleton's December 1982 issue of $185 million of revenue bonds stated that the issue is not rated higher than A

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7. Moody's Investors Service, Inc., *Municipal Credit Report* for Dallas/Fort Worth Regional Airport, Texas (November 10, 1982).

8. Moody's Investors Service, Inc., *Municipal Credit Report* for Salt Lake City, Utah, Airport System, May 23, 1984. Moody's also cited the uncertainty caused by a dispute among carriers serving Salt Lake City concerning the allocation of costs for new terminal facilities at the airport--a dispute that now appears settled.

9. Cited by Ann Sowder, Smith Barney Harris Upham & Co. (formerly with Standard & Poor's), presentation at the 55th Annual Conference of the American Association of Airport Executives, Orlando, Florida, June 1983.

". . .because of current uncertainties surrounding future airport expansion and the substantial cost associated with whichever alternative is pursued." Similarly, Standard & Poor's published report on Chicago-O'Hare's recent sale of $175 million revenue bonds stated that ". . .the primary concern is the magnitude of the capital program being undertaken at the airport, which is expected to cost $1.2 billion by 1990." For this reason, the Chicago-O'Hare bond issue was also denied better than an A rating. 10/

Interest Costs

The difference between interest costs paid by airports and by other public enterprises indicates that airports generally hold a strongly competitive position in the municipal bond market. As shown in Table 20, airport interest costs for revenue bonds over the 1978-1982 period were 70 "basis points" below the interest cost index for all revenue bonds (a basis point equals one one-hundredth of a percentage point). Even general obligation bonds issued in whole or in part for airport development fetched below-average interest costs over that period--perhaps reflecting that municipalities with airports tend to be economically stronger than other places. 11/

Like municipal bonds in general, airport bonds are sold and traded at prices that reflect both general economic conditions and the credit quality of the airport enterprise (or in the case of general obligation bonds, the

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10. Another factor in the revision of Chicago's rating was evidently the reduced level of coverage on the new bonds as compared to that for the airport's older revenue bond issues.

11. Comparing the indexes of overall bond market rates with that of airports is somewhat misleading, since the market indexes reflect only those bonds with 25- to 30-year maturities, whereas some airport bonds mature in less time. Over the 1978-1982 period, airport bonds averaged 14.7 years in average maturity. In 1981, when high interest rates caused some airports to favor shorter-term bonds, the average maturity for airport bonds dropped to 10.4 years. Since bonds with longer-term maturities tend to have higher interest rates than shorter-term bonds, this comparison results in average interest costs for airport bonds that appear slightly lower relative to rates in the market generally. CBO's statistical analysis indicates that, on average, for each 10 percent increase in market interest rates, issuers of airport bonds respond by reducing the average maturity of their issues by about 7 percent.

TABLE 20. DIFFERENCES IN INTEREST RATES PAID ON AIRPORT BONDS RELATIVE TO OTHER MUNICIPAL BONDS, BY AIRPORT TYPE AND SIZE, 1978-1982 (In basis points)

Airports by Size and Category and Bond Type	1978	1979 a/	1980	1981	1982	1978-1982
COMMERCIAL AIRPORTS						
Large						
General obligation	-64	b/	-109	-115	-138	-95
Revenue	N/A	19	-66	-166	-12	-55
Medium-sized						
General obligation	-80	-45	-73	4	6	-34
Revenue	N/A	-117	-46	11	-13	-29
Small						
General obligation	-71	-46	-50	-183	-101	-82
Revenue	N/A	-84	-189	-133	-132	-153
All						
General obligation	-71	-46	-70	-102	-85	-73
Revenue	N/A	-29	-98	-124	-28	-68
GENERAL AVIATION AIRPORTS						
Reliever						
General obligation	76	-106	-32	b/	b/	3
Revenue	N/A	b/	-47	b/	-64	-55
Other						
General obligation	-89	-37	-138	-46	39	-53
Revenue	N/A	b/	-243	-113	-60	-107
All						
General obligation	-48	-47	-85	-46	39	-43
Revenue	N/A	b/	-145	-113	-61	-92
ALL AIRPORTS						
General obligation	-63	-46	-73	-89	-66	-65
Revenue	N/A	-29	-103	-123	-32	-70

SOURCE: Congressional Budget Office.

NOTE: Data reflect difference in interest rates between airport bonds and other general obligation and revenue bond issues, in basis points. General obligation issues are compared with the average value of the Bond Buyer's Index of 20 municipal bonds during the month of issue. Revenue bonds are compared with the Bond Buyer's Revenue Bond Index during the month of issue. N/A = Not available; the Bond Buyer's Revenue Bond Index did not start until September 1979.

a. Revenue bond figures for 1979 based on September-December only.

b. No issue of this security in this year.

creditworthiness of the issuing government). Rated revenue bonds are offered for sale in one of two ways. Under competitive bidding, the airport selects the lowest bid and thus obtains funds at the lowest cost of borrowing. Under a negotiated sale, the bond purchaser consents at the outset to purchase the bonds at an agreed-to price. 12/ In either case, the entire bond issue is usually purchased by an underwriter (commonly, an investment brokerage company) or a team of underwriters that, in turn, markets the bonds to institutional and individual investors.

In deciding the price of a particular bond issue, underwriters identify a "ballpark" interest rate on the basis of general market conditions, and they then refine this estimate according to the credit standing of the airport in question. General market conditions represent by far the most important determinant of interest costs on airport revenue bonds, and in this respect airports have little control over their cost of capital. Airport revenue and general obligation bonds issued over the 1978-1982 period followed quite closely the interest cost indexes of revenue or general obligation bonds in general, going from a low of some 5 percent in 1978 to a high of nearly 15 percent in 1982. In fact, statistical analysis indicates that each 1 percent change in the overall market rate of interest for tax-exempt municipal bonds leads to roughly a 1 percent change in interest rates for airport bonds (see Appendix C). Of course, interest costs differ depending on the type of underlying security and the number of years until the bonds mature. CBO's analysis indicates that, other things being equal, general obligation bonds for airport purposes draw interest costs that fall about 9 percent below the interest paid on revenue bonds.

Within the range of interest costs dictated by market conditions, underwriters refine their bids on airport revenue bonds on the basis of the individual airport's credit standing. Two factors have greatest importance here: the airport's basic fiscal condition, including its prospects for traffic growth and the strength of its local economic base; and the presence of special pressures on the airport to expand capacity, thereby necessitating extensive capital development.

Effect on Interest Costs of Airports' Fiscal Conditions. In general, an airport's basic fiscal condition appears to be more important than the

12. In bond industry terminology, bonds are thought of in terms of either price or bond yield (interest cost). Prices and interest cost move inversely--as prices increase, interest rates decrease, and vice versa. For simplicity, this chapter assesses interest costs--the airport's cost of borrowing. It is noteworthy that the underwriters typically speak in terms of dollar prices; when they say that the market is "off" or "down," they mean that dollar prices are lower and yields higher.

existence of long-term airport use agreements with the airlines serving the airport. For example, airports using a compensatory approach to financial management--which tend to have stronger overall financial performance and shorter-term use agreements than residual cost airports--drew revenue bond interest costs that were 95 basis points below other revenue bonds over the 1979-1982 period (see Table 21). 13/ Residual cost airports, by contrast, paid only 4 basis points below other municipal revenue bonds.

TABLE 21. AIRPORT BOND INTEREST COSTS RELATIVE TO OTHER MUNICIPAL BONDS', BY FINANCIAL MANAGEMENT APPROACH, 1978-1982 (In basis points)

	Residual Cost Airports	Compensatory Airports	Total a/
General Obligation	-37	-83	-65
Revenue b/	-4	-95	-70

SOURCE: Congressional Budget Office.

NOTE: Data reflect difference in interest rates between airport bonds and other general obligation and revenue bond issues, in basis points. General obligation issues are compared with the average value of the Bond Buyer's Index of 20 municipal bonds during the month of issue. Revenue bonds are compared with the Bond Buyer's Revenue Bond Index during the month of issue.

a. Total includes airports for which the management approach is unknown.

b. Revenue bond figures based on September 1979-1982 issues.

13. Part of this difference is attributable to revenue bonds issued by the Port Authority of New York and New Jersey. These bonds are backed by revenues from all Port Authority operations and not just airport revenues. Even excluding these bonds, however, compensatory airports had interest costs 47 basis points lower than other revenue bonds.

32-938 O - 84 - 7

Effect of Airport Size and Expansion Pressures on Interest Costs. On average, larger airports pay lower interest costs than do smaller ones, after allowing for differences in types of security and average maturities of issues (see Appendix C). 14/ However, without such statistical controls, there is considerable variation in the interest costs paid by different sized airports in the five years since airline deregulation took effect. In general, though, large commercial airports have actually incurred somewhat higher interest costs for new bond issues than have small airports, despite the formers' history of generally more favorable bond ratings. As shown in Table 20, for example, large airports paid 55 basis points below the market average for revenue bonds over the 1979-1982 period, while small airports paid 153 basis points less. Medium-sized airports drew higher interest costs, on average, than did either large or small commercial airports--29 basis points below the market average for revenue bonds.

This pattern appears to reflect two factors. First, as noted above, the market is wary of increasing expansion needs at the nation's major hub airports and of the pressure that future investments could exert on the availability of airport revenues to service outstanding debt. Indeed, from Table 20, it appears that medium-sized airports have incurred the greatest increase in interest costs, a pattern that goes along with their mounting debt-to-asset ratios (treated in Chapter III).

Second, the size of the average bond issued by larger airports far exceeds that of smaller ones (see Table 18), and underwriters' bids usually reflect an interest premium in such cases (to cover the added risks of marketing such a large volume of bonds). In the determination of interest rates, such premiums alone could offset the moderately higher bond ratings achieved by larger airports.

Defaults

Finally, the history of an enterprise, or of an entire industry, with regard to the number of defaults is another index of its investment value. On this measure, the airports' record is particularly strong. The airport industry has never suffered a single default, a fact noted by several credit

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14. In technical jargon, the "elasticity" of interest cost with respect to airport size averaged about -0.013 over the 1978-1982 period. This means that an airport with 10 percent more passenger boardings than another airport would draw interest rates about 0.13 percent lower on its bonds.

analysts in citing the premium quality of airports as credit risks. One analyst has put it as follows:

> Airport revenue bonds have a remarkable track record. In spite of recessions, inflation, oil embargoes, fare wars, deregulation, astronomical increases in the price of aviation fuel, increasingly difficult community/airport relationships, costly noise mitigation programs, slot restrictions, a controllers' strike, curfews, threats about antitrust exposure, and the like, the nation's airports have shown that they can meet the challenges, cope with change, and consistently make payments on their outstanding debt. The industry has survived without a single default. The investment community has had its "seasoning" with airport revenue bonds. As a result of the positive experience, there is a great deal of "comfort" in airports as credit risks today. 15/

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15. See Roger H. Bates, "Airport Financing: Whither (or Wither?) the Market?"

CHAPTER V. EFFICIENCY OF CURRENT FEDERAL POLICY AND ALTERNATIVE APPROACHES

With the nation's commercial airports in sound financial condition and enjoying reasonably easy access to private capital, the federal role in helping to finance airport spending may warrant reevaluation. Current and anticipated crowding at many airports have already given rise to expansion needs and are likely to exert greater pressure in coming years. This chapter subjects the question of the proper level of federal airport assistance to two tests that can provide good gauges of need and requisite federal involvement:

- **Users' willingness to pay**--Would the demand for airport facilities continue to grow at its current rate if all users were charged in proportion to the costs they impose; and

- **Federal interest**--Which facilities are of primarily local benefit and thus of secondary importance to the federal government?

After considering these questions, this chapter evaluates the airports' financial self-sufficiency in the context of the more restrictive definition of the need for federal aid that emerges. Finally, it establishes a framework for judging the merits of alternative federal strategies for improving the efficiency of existing programs and providing other ways to meet airport development needs. Specific legislative proposals are not treated in detail, since doing so would go beyond the scope of this study's objective of providing information for Congressional debate. Thus, within the framework of alternative strategies are many possible variations, only some of which are touched on here by way of example.

USERS' WILLINGNESS TO PAY--A MEASURE OF DEMAND

The economic viability of airport investments can be measured directly by the willingness of aviation service users to pay for those investments through fees. For example, if general aviation users, whose rapid numerical growth has been encouraged by access to services at subsidized rates, had to pay the full costs of the airport investments occasioned by that growth, the

demand for such investments would decline. 1/ At present, general aviation pays about one-sixth of the costs it imposes on the airport and airways network. (Most of these costs appear to arise from business planes rather than recreational flyers.) A system of fees designed to recover the government's full costs would either diminish demand--permitting fewer airport improvements--or generate the revenues to pay for these investments. 2/ In either case, the federal government, as investor, would profit from improved economic efficiency.

In relieving congestion, however, fee structure is more important than fee level. Even if all users paid their full shares of federal airport investments (as commercial airline users now do--in fact, they slightly overpay), local user fees as they are now structured could still result in excessive demand for airport expansion. This occurs because air traffic congestion, and thus pressure to expand airport capacity, is concentrated during daily periods of peak demand--usually in the morning and in the late afternoon, when most airline passengers and general aviation users prefer to travel. During off-peak times when traffic is light, facilities and services at many large airports do relatively little business. At such times, small airports within easy reach of large ones may actually lie nearly idle.

Local user fees, in the form of landing charges, do not reflect the high capital costs of congestion during periods of peak demand. Rather, landing fees are commonly determined on the basis of aircraft weight and do not vary by time of day (see Table 22). 3/ Few airports impose special peak-period fees--a common practice abroad and one used in some other modes of travel in the United States (transit systems such as Washington D.C.'s Metro). In many cases, though, peak-hour charges are prevented by long-

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1. In fact, a large part of the subsidy to general aviation is financed by taxes on commercial airline tickets. Technically a cross-subsidy, it can be termed a federal subsidy because it results from the current structure of federal taxes on aviation service use. See Congressional Budget Office, *Charging for Federal Services*, Chapter V.

2. See also Congressional Budget Office, *Public Works Infrastructure*, Chapter I and *Charging for Federal Services*, Chapter I.

3. To be sure, heavy aircraft, such as large commercial airliners, cause greater runway wear than do lighter planes, suggesting that weight-based landing fees may approximate the maintenance costs occasioned by planes of different weights. But this is already reflected in current fees--light planes pay as little as one-twentieth the rates that heavy planes pay, regardless of traffic conditions (see Table 22).

TABLE 22. LANDING FEES AT FIVE MAJOR U.S. AIRPORTS IN 1982, BY AIRCRAFT TYPE (In dollars)

Aircraft by Type of Use and Passenger Capacity	Atlanta	Los Angeles	La Guardia	Washington National	Denver-Stapleton
DC 10-30 (Air carrier-- 240-270 seats)	200 a/	416 a/	1,332 a/	b/	189
Boeing 727-200 (Air carrier-- 120-140 seats)	75 a/	156 a/	499 a/	114	71
Boeing 737-200 (Air carrier-- 115-120 seats)	39 a/	82 a/	262 a/	60	37
Fairchild Metro IIIA (Air taxi-- 19-20 seats)	9	15	38	4	5
Learjet 25D (General aviation-- eight seats)	9	15	38 (off-peak) 88 (peak) c/	5	5

SOURCE: Congressional Budget Office from Airport Operators Council International, *User Charges Report,* Calendar Year 1982 (April 1983).

a. Fees somewhat higher for air carriers that have not signed airport's basic use agreement.

b. Federal noise-abatement regulations prohibit DC10-30s from using Washington National Airport.

c. Reflects $50 peak-hour surcharge on general aviation aircraft imposed by the Port Authority of New York and New Jersey.

term contracts between airport managers and airlines. Boston's Logan Airport and the Port Authority of New York and New Jersey, which operates LaGuardia and John F. Kennedy, are notable exceptions. Fees at LaGuardia and Kennedy were increased five-fold for general aviation during peak periods in 1968 (from $5 to $25), and doubled again in 1979 (to $50). The result has been a marked decline in takeoff and landing delays for all aircraft.

Were airports to levy peak-hour landing surcharges (also called congestion fees) to reflect the costs of congestion, a shift in traffic patterns might well follow, with a corresponding decline in the need for new capacity. All users would be encouraged to make use of some airport time and space capacity that now go to waste. On a per passenger basis, fees for light planes would increase appreciably, forcing many general aviation users either to pay the increased rates or to take advantage of less congested reliever airports (see Text Box on page 2). According to the FAA, if peak-hour surcharges were imposed and improvements in air traffic control made simultaneously, some 80 percent of the costs of air carrier delays anticipated at the nation's 25 largest airports over the coming quarter century could be eliminated. 4/ (Again, of course, if travel patterns did not shift, increased collections could help finance the needed expansion.) One proposal would sell the limited number of peak-hour landing slots available at congested airports to the highest-bidding airlines on a competitive basis.

Though difficult to estimate, the potential delay in the need for expansion resulting from surcharges at some commercial airports appears significant. For example, new construction might be postponed as long as eight years at Phoenix Sky Harbor Airport, up to five years at Memphis International, and three years at San Diego's Lindbergh Airport (see Table 23). Since more than two-thirds of airport capital demand is capacity-related, any postponed need to expand could have significant effects on financing requirements as well.

Potential delays in the need for expansion are tied to the portion of each airport's use accounted for by general aviation. Though peak-hour fees would be imposed on all types of aircraft, the impact on commercial

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4. See Federal Aviation Administration, *Policy Analysis of the Upgraded Third Generation Air Traffic Control System* (January 1977), p. 71. For an analysis of the FAA's plan to modernize the air traffic control system, see Congressional Budget Office, *Improving the Air Traffic Control System.* See also, Federal Aviation Administration, *Airfield and Airspace Capacity/Delay Policy Analysis* (December 1981), p. iii.

TABLE 23. POTENTIAL POSTPONEMENT IN AIRPORT EXPANSION AT SELECTED AIRPORTS AS A FUNCTION OF CHANGED GENERAL AVIATION USE

Airport	General Aviation Share of Total Operations (1981)	Estimated Postponement with General Aviation Paying User Fees Set at Full Cost Recovery
Phoenix Sky Harbor International	58 percent	Eight years
San Diego International (Lindbergh)	31 percent	Three years
San Jose Municipal	84 percent	Seven years
Denver Stapleton International	21 percent	Two years
Ft. Lauderdale-Hollywood International	64 percent	Four years
Nashville Metropolitan	61 percent	Five years
Detroit Metropolitan	25 percent	Five years
Cleveland-Hopkins International	37 percent	Three years
Memphis International	45 percent	Five years

SOURCE: Congressional Budget Office, adapted from Federal Aviation Administration, *Analysis of Non-Capital Alternatives for Handling General Aviation Activity at Busy Airports* (August 1977).

NOTE: Estimated postponements based on anticipated dates when airports will be operating at full capacity ("saturation") and assume reliever airport capacity as estimated by the FAA to be adequate.

aircraft would likely be very minor, since the cost would be spread among a large number of travelers. General aviation, on the other hand, would bear the brunt of peak-hour surcharges and would therefore be the class of users most likely to alter its patterns of airport use. At most commercial airports, business planes account for the highest proportion of general aviation traffic.

FEDERAL INTEREST--AIRPORTS OF GREATEST NATIONAL IMPORTANCE

Not all the demand for airport capital spending (see Table 24) represents investments essential to a safe and efficient system of interconnected air routes--the explicit objective of federal aviation assistance. 5/ The 71 largest airports that serve 90 percent of commercial traffic account for about 70 percent of the estimate of demand for capital investment at commercial airports, or between $650 million and $1 billion a year. The remainder--about $400 million--is for commercial airports of lesser national importance. 6/

Of the 2,643 facilities serving general aviation, only the 219 FAA-designated reliever airports are needed to help reduce congestion at major commercial facilities. This designation qualifies an airport for inclusion in the National Airport System Plan, a comprehensive scheme for airport development. 7/ The remaining 2,424 serve primarily local needs. A general aviation airport qualifies as having "national significance"--the FAA's criterion for inclusion in the federal plan and eligibility for aid--if it is publicly owned, serves a community located 30 minutes or more flying time from another existing or proposed airport in the plan, and accommodates a certain minimum aircraft load. 8/ Since this definition does not account for the nature of traffic served, it includes a major share of the nation's public-use noncommercial general aviation airports. All together,

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5. See Office of Management and Budget, Executive Office of the President, *Budget of the United States Government, Fiscal Year 1985* (February 1984), p. 5-78.

6. The range of estimates reflects the difference between the FAA's last official estimate published in 1980 in the *National Airport System Plan* and preliminary estimates now being collected by the FAA.

7. See Federal Aviation Administration, *National Airport System Plan.*

TABLE 24. PROJECTED AIRPORT CAPITAL NEEDS AND FEDERAL OUTLAYS COMPARED TO ACTUAL BOND SALES (In millions of 1982 dollars)

Airports by Size and Type	Annual Airport Needs a/ 1984-1993	Annual Federal Outlays Under Current Policy 1985-1989	Annual Volume of Airport Bond Sales 1978-1982
		COMMERCIAL	
Large	450-650	200	690
Medium-sized	200-350	104	224
Small	400-450	256	93
Subtotal	1,050-1,450	560	1,006
		GENERAL AVIATION	
Reliever	100-150	84	8
Other	400-450	148	6
Subtotal	500-600	232	14
All Airports	1,550-2,050	800 b/	1,020

SOURCE: Congressional Budget Office.

a. Low estimate derived from data in FAA, *National Airport System Plan* (1980). High estimate derived from preliminary unpublished FAA estimates. Needs data are rounded to nearest $50 million.

b. Excludes state and local expenditures estimated at $200 million a year. Includes $8 million for planning.

investments in these primarily local airports account for about $400 million (80 percent) of the annual investment demand projected for all general aviation airports. This implies that a more restrictive definition of "national significance" would eliminate a significant portion of the federal investment in general aviation airports.

In sum, the 290 airports of greatest national importance (the 71 largest air carrier airports plus the 219 designated relievers) account for more than one half of the estimate of demand for airport spending, or about $750 million to $ 1.15 billion a year.

ADEQUACY OF NONFEDERAL FINANCING RESOURCES

Financial condition and access to nonfederal public or private sources of capital can be important determinants of an airport's need for federal aid (see Chapter III). Airports differ markedly from one another in their dependence on federal aid to finance capital improvements. As a rule, larger commercial airports are in better financial shape than smaller ones. Many general aviation airports, though they do not have the financial standing to obtain credit or carry sizable debts, appear to have considerable unused potential to raise revenues from users rather than debt markets. Even so, most of the smaller commercial and general aviation airports will depend on some public aid, whether from federal, state, or local sources, to finance part of their capital needs.

Large and Medium-Sized Airports

In general, the larger commercial airports appear able to meet their debt service requirements from operating income derived from such sources as landing fees, terminal concessions, and parking revenues. Thus, all large and medium-sized airports that have issued rated revenue bonds have received ratings in the medium- to best-grade categories, meaning they are regarded as good investments with little speculative risk (see Chapter IV). Indeed, without these ratings, they probably would not be able to market bonds.

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8. The minimum load capacity stipulated by the FAA is based not on number of aircraft but on numbers of engines of the planes based at the airport. The minimum standard is ten engines and any combination of aircraft with that total is enough. This allows, for example, ten single-engine planes (usually two- to four-seaters), or five twin-engine planes (four- to eight-seaters). These standards are currently under review by the FAA.

Despite the traditional financial well-being and favorable position of major airports in the tax-exempt bond market, airport managers must compete in financial markets in which there is considerable uncertainty about both interest rates and the demand for tax-exempt bonds. Nevertheless, over the five years since airline deregulation, the volume of annual bond sales by large and medium-sized airports actually exceeded their projected annual needs (see Table 24), indicating that the airport bond market is fully capable of supporting a large expansion program.

On the other hand, a reduction in federal aid could result in larger bond issues. For airports that depend on federal aid for a large fraction of their capital spending (mostly smaller airports or airports with major land-acquisition programs), the increase in bonding requirements could result in slightly higher interest costs. In light of the below-average interest costs that airports pay now, however, such increases are unlikely to prove burdensome for most major airports. Moreover, airports might be encouraged to consider their capital needs more carefully, and to apply peak-hour charges and other pricing mechanisms to moderate the demand for airport services.

The effects of longer-term financial trends are more difficult to gauge. On the one hand, two important developments--airline deregulation and rising fuel costs--seem to have had little negative impact on most large airports' finances. Analysis in earlier chapters indicates continued growth in net revenues and maintenance of generally adequate coverage of debt service on airport revenue bonds. Some airports, particularly medium-sized and large ones, have benefited from deregulation and the resulting increase in the number of carriers. On the other hand, credit analysts view with some concern the trend following deregulation for airlines to concentrate operations at a few major hubs, as this may increase these airports' needs for debt capital. From this pattern can follow increased borrowing costs and diminished access to private capital.

In addition, some airport managers argue, contractual and legislative barriers could hamper the ability of commercial airports to take full financial responsibility for all needed development, even at the financially strongest airports. To be sure, airport managers have limited control over the structure and level of charges. Airport fees, rates, and charges, as described in Chapter II, are established in binding leases and contracts for specified periods of time, sometimes longer than 20 years. The ability to amend existing contracts is usually limited to periodic increases to meet escalating costs, and opportunities to make significant changes in rates and charges generally arise only as leases and contracts expire. (For concession contracts, the extent of the opportunity also depends on market forces,

32-938 O - 84 - 8

since concessionaires are commonly selected by competitive bid.) Many airport/airline use agreements contain a clause specifically prohibiting the introduction of any new fees or charges during the term of the agreement. Legislation also prevents the introduction of certain types of charges. For example, the "head tax"--a charge on each passenger for use of terminal facilities--was banned by the Congress in 1973, in part because at least one city (Philadelphia) appeared to be diverting airport revenues to help finance unrelated investments. 9/

Large and medium-sized airports, on the other hand, have demonstrated their financial stability and creditworthiness with investors under the existing structure of fees and charges. In light of the only marginal federal role in many large, investment-grade airport bond issues, it appears unlikely that airports could not maintain their favorable status with investors if that role were diminished still further.

Another uncertainty affecting the airport bond market stems from existing and proposed restrictions on the issuance of industrial development bonds (IDBs). Under current legal interpretations, airport bonds are classified as IDBs. Private-purpose industrial development bonds include bonds issued for public facilities financed by user-charge revenues where more than 25 percent of the project is to be used by private businesses. The Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) added new restrictions, including a requirement for public approval of a project by any political jurisdiction or jurisdictions in which a facility is located. The impact on airports can be seen in a February 1983 ruling by the U.S. Treasury Department on a proposed revenue bond issue to finance runway

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9. Head taxes were banned by the Airport Development Acceleration Act of 1973. Passenger facility charges--charges assessed each airline passenger for the use of airport facilities--have a history of controversy in the United States, although they are commonly used in other countries. Though they are usually intended to maximize an airport's revenues, such charges can be designed as true user fees reflecting the actual costs to the airport of providing facilities to the individual passenger. Locally imposed passenger facility charges were tried very briefly in the United States during the 1972-1973 period, after the Supreme Court ruled them permissible and before the Congress prohibited their imposition. The controversy surrounding head taxes today stems in part from this initial experience, which was marked by the commercial airlines' actively resisting the collection of such charges and by isolated cases of cities' diverting head-tax proceeds to non-airport uses.

construction and improvement at Atlanta's Hartsfield Airport. The Treasury Department held that, despite the public purpose of the runway, the proposed issue is an IDB, because commercial airlines account for more than 25 percent of the use of the facilities financed. The issue is thus taxable unless approved by the other political jurisdictions in which the airport is located. (Atlanta's airport, like many others, is situated outside the city limits.)

Proposed legislation (H.R. 4170) would place an annual, state-by-state "cap" on the volume of IDBs. This measure could seriously affect the ability of airports to secure tax-free debt financing, since capital development projects, although not routine, tend to have substantial funding requirements. Such projects could thus strain the capacity of the issuing jurisdiction if its annual volume of IDBs was limited; they could also force a choice among airports' and other eligible IDBs. Airports would have either to use non-tax-exempt bonds with a higher rate of interest or to persuade local governments to issue general obligation bonds that usually require voters' approval. Because the provision would be retroactive to the first of the year, no new airport revenue bonds have been issued this year. An amendment added in the House Committee on Ways and Means, however, would exclude from the state-by-state cap all revenue bonds for airports, mass transit systems, and other publicly owned facilities.

Small Commercial Airports

Though most large and medium-sized commercial airports appear financially able to meet their capital requirements, many small commercial airports cannot. Less than one-tenth of all small commercial airports have issued bonds in recent years, and the volume of bond sales for these airports represents only some 20 percent of their projected demand (see Table 24). Moreover, changes in the airline industry reviewed earlier could make small airports in thin travel markets greater credit risks than they were before federal deregulation. For example, efforts by such airports to raise landing fees to finance airport improvements could lead airlines to withdraw service. Of course, unwillingness to pay on the part of airline managers could signal that the proposed improvements are not economically attractive. But many of these smaller airports serve small communities, and reductions in airline service could have important negative effects on local economies. Federal assistance might thus be justified as a means of preserving regional balance. Though the precise number of commercial airports in this position is difficult to estimate, they account for perhaps $150 million to $300 million of the improvement needs shown in Table 24.

General Aviation Airports

Although the volume of bond sales represents only a small fraction of total needs at general aviation airports, low landing fees, tie-down (aircraft parking) charges, and other fees give these facilities an opportunity to move toward self-financing of capital improvements. Though general aviation users have cause not to welcome new or increased fees, many of the airports they use could nonetheless substitute such local fee receipts for federal grant money.

Exceptions might apply in the case of general aviation reliever airports, especially those operating in direct competition with major commercial airports. Major airports attract general aviation business by offering services superior to those available at most reliever facilities (better runway lighting and landing aids, for example), while charging users less than their associated costs, especially during peak periods. This attraction shrinks the revenue base of reliever airports, diminishing their ability to compete by improving service. It also adds pressure to expand runway capacity at commercial airports, even though capacity at nearby reliever facilities is already available. Although charging higher fees at commercial airports would be the most direct way to correct this imbalance, to the extent that federally subsidized development at reliever airports encouraged general aviation users to switch, an economic advantage might result from offering such subsidies. 10/

ALTERNATIVE FEDERAL ROLES IN AIRPORT FINANCING

Federal aid to airports now totals $800 million a year, with about one third going to large and medium-sized commercial airports, one-third to small commercial airports and reliever airports, and one-third to other general aviation airports. The remainder of this chapter reviews three possible alternatives to current policy concerning the federal government's participation in airport financing:

- Alternative 1. Withdraw all federal aid,
- Alternative 2. Restrict federal aid to only those airports with clear national significance but lacking full financial self-sufficiency, and

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10. In economic jargon, such an approach is termed "second-best" subsidization, which is a means of offsetting a market externality; see S. Glaister, "Generalized Consumer Surplus and Public Transport Pricing," *The Economic Journal* (December 1974).

- Alternative 3. Grant federal aid only to those airports able to demonstrate need for federal financial support.

The analysis of these alternatives focuses on three points: budgetary effects, implications for airport adequacy, and potential effects on airport users. Table 25, near the end of this chapter, provides a summary of these options. First, however, the analysis considers the implications of continuing current policy, under which all 3,203 airports qualify for federal assistance. The three options concern only the $800 million a year (in 1982 dollars) in airport development grants and would not affect the nearly $4 billion a year committed to air traffic control.

Each alternative to current policy implies a reduction in the overall level of federal user fees, since the total commitment of federal dollars, hence the requirement to recover those monies, would diminish. The size and nature of these adjustments would vary, of course. The analysis does not, however, consider further refinements that could be made either to existing policy or alternative approaches. For example, federal grants could be changed into block grants to state airport authorities, rather than direct grants from the federal government to specific airports.

Current Policy

The $800 million in grants now authorized for airport development between 1985 and 1989 are projected to cover roughly half all estimated demand for airport investment over the next ten years. The 71 largest commercial airports appear financially able to meet all their capital requirements, let alone the balance remaining after federal aid. These airports could probably support a great deal more development on their own than they now do. Nevertheless, economic inefficiencies--such as overinvestment stemming from capital grants to self-sufficient airports and the heavy subsidization of general aviation--suggest consideration of other, potentially more cost-effective strategies.

Alternative 1. Withdraw All Federal Assistance

Perhaps the most radical shift in federal airport policy would entail withdrawing federal airport grants. Two rationales would underlie such a change. First, if airports that provide predominantly local or regional benefits need outside support, the federal government is not the appropriate provider of such aid. Second, those airports that do provide significant national benefits are financially self-sufficient. Such a dramatic change would, however, argue for imposition of peak-hour surcharges, as airport

managers seek methods of rationing scarce capital resources, or raising additional financing.

Budgetary Effects. Eliminating the direct federal financial role in airport development would reduce budgetary outlays by the full $800 million the government spends on airport grants. A concomitant drop in the need for federal user fees would follow. Thus, with federal savings offset by a roughly equal drop in revenues, the net effect on the federal budget deficit would be negligible. To the extent that airport operators used tax-exempt bond financing to substitute for federal aid, federal tax collections could also diminish. But with a reduced federal ticket tax, part or all of that loss could be recovered by higher corporate tax collections resulting from strengthened airline profits.

Without federal financing, the money for capital investments would have to come from airports' retained earnings, from increased debt issuance, or from more effective use of existing resources. In either case, nonfederal charges would have to rise. For small airports, however, state and local governments might be expected to subsidize airport development beyond what they do now to avert the losses of service that could result from higher fees.

Effects on Airport Adequacy. If withdrawal of federal aid were accompanied by encouragement for airport managers to impose variable fees (including peak-hour pricing), improved efficiency in the use of existing airport capacity could result. Congestion fees could disperse peak demands and increase use of idle time and space now available during off-peak hours and at reliever airports. Overall, the FAA projects that peak-hour pricing could significantly reduce (though by no means eliminate) the cost of air carrier delays anticipated at the largest airports for the next decade. 11/ If demand were not reduced, however, the increase in revenue would finance the expansion needed to reduce peak-hour delays.

Encouraging a more efficient price structure, even after imposition of congestion fees, could further strengthen the financial performance of commercial airports still in need of capital investments. It is possible that investors would have greater confidence in the economic soundness of the projects, and bond rating decisions might thus prove more favorable. If this occurred, airports' cost of capital would drop, and with better access to private investors, airport managers could raise more funds for expansion than under the current system of federal grants.

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11. See Federal Aviation Administration, *Policy Analysis of the Upgraded Third Generation Air Traffic Control System* (January 1977).

In the past, general aviation airports have relied heavily on federal grants for capital improvements, even though, as a group, these airports make limited contribution to a national transportation system and many have untapped revenue-raising potential. A withdrawal of federal aid would provide an incentive to managers of general aviation airports to levy appropriate user fees. From this would follow improved efficiency in the use of general aviation capacity and in the use of investment funds for further development. If the primary beneficiaries--the users of these airports--did not find adequate benefit to prompt them to finance further development through such user fees, then the demand for airport services would diminish.

Impacts on Users. In general, relatively little change in the quality of airport service need result from withdrawal of federal grant aid--certainly the vast majority of commercial airline passengers would see no change in service and only a very small decline in fares. Some shifts in financial burden would occur, as the federal ticket tax was reduced and nonfederal charges (including landing fees) were increased. Commercial airline passengers would probably see a drop in fares attributable to a roughly 2 1/2 percentage point drop in the current 8 percent federal ticket tax. Moreover, since airlines schedule flights when they think passengers want to fly, they would likely absorb moderate cost increases in the form of peak-hour landing fees to continue using the airports at those times. In the context of the total operating costs of a large jetliner, even a sharply increased landing fee would be small when divided among a large number of passengers.

General aviation users, in contrast, would be more sensitive to increases in landing fees. As noted in Chapter IV, congestion fees for general aviation aircraft at New York's Kennedy and LaGuardia airports resulted in a 30 percent decrease in general aviation traffic, though it is not known how many trips were not taken, made by other means such as commercial airlines, or diverted to reliever airports. 12/ Some personal cost and inconvenience would seem inevitable, however, particularly to recreational flyers and users of private business planes now using major commercial airports.

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12. See Office of Technology Assessment, *Airport and Air Traffic Control Systems* (January 1982).

Alternative 2. Restrict Federal Assistance on the Basis of National Significance and Financial Need

A less drastic alternative than total withdrawal of aid would be a program of selective assistance for four groups of recipients: large and medium-sized airports that face difficulty in obtaining bond financing--perhaps for a major purchase of land for expansion; small commercial airports (including air taxi and commuter facilities); general aviation airports designated relievers by the FAA; and noise abatement schemes. 13/ Such a diminished federal role could avert risks of regional imbalances in airport development and continue efforts to moderate aircraft noise in communities surrounding airports. (See Appendix D for a comparison of interest costs by region.)

Budgetary Implications. Direct grants might total roughly $300 million a year, about 37 percent of currently planned spending. As in Alternative 1, while federal spending would decline, reduced federal user taxes would offset this change, resulting in little or no diminution of the budget deficit. Because of the healthy financial condition of most major airports--and the potential for greater use of cost-based fees--the total volume of federal grants for these airports could be reduced substantially.

Effects on Users and Airport Finance. Selective federal assistance would permit the commercial ticket tax to fall by about 1 1/2 percentage points. As under current policy, however, general aviation fees would still be increased, if the full cost of general aviation's use of federally financed airport development were to be recovered. The extent of this increase would depend in large part on the costs of air traffic control, since aviation user fees cover these as well as airport-related costs.

Effects on Airport Adequacy. Direct grants to certain airports might help foster regional development in economically declining areas. This would result from federal grants' encouraging more commercial air service than the market itself would support. Selective federal aid to upgrade the 219 general aviation reliever airports designated by the FAA--particularly in conjunction with congestion fees at larger airports--might help divert general aviation users away from now-overburdened air carrier facilities.

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13. At present, 8 percent of total federal grants to airports must be used for noise-related projects. Most of these funds--about $65 million a year--are spent by large and medium-sized commercial airports. Typical projects include noise barriers near residential areas.

Alternative 3. Grant Federal Aid on the Basis of Need

Attached to a scheme of granting federal assistance only to those airports without recourse of other adequate financial support, the term "defederalization" was first applied to airports in the late 1970s. At the time, proposals raised in the Senate recommended dropping large and medium-sized airports from the federal aid program. 14/ Arguments were based on grounds that such airports were financially self-sufficient. Other airports were to continue their eligibility under the airport program as it stood. In addition, repeal of the federal prohibition on head taxes was proposed as a means of averting the risk that some large or medium-sized airports might have insufficient revenues under their existing fees to compensate fully for the loss of federal aid.

Budgetary Implications. Direct grants might total about $500 million a year--little more than half of currently planned airport spending. As before, this would reduce federal spending on airport development, but to the extent that user fees were also cut, there would be little or no effect on the federal deficit.

Effects on Airport Finance and Users. The effect of defederalization on airport finance and on users could differ from the more general effects of Alternative 2, depending on the use of head taxes. Were the ban on head taxes not repealed, the effects would be very small indeed. If, on the other hand, the head tax was permitted at large and medium-sized airports, the charge per passenger might range from $1 to $5; any head tax in this range would represent a larger fraction of the ticket price for short-distance travelers than it would for long-distance journeys. On average, the price of air travel might increase by about 1 percent. Of course, the bonding experience over the past five years indicates the ability of most large and medium-sized airports to finance their capital needs without imposing a head tax.

In contrast to the minimal effect on the price of travel, the additional airport revenues raised through a head tax would provide airports with a stronger revenue base and thus presumably with stronger bond ratings and lower interest costs as well.

Potential Problems with Head Taxes. Needs-based aid and repeal of the federal ban on head taxes need not necessarily be linked: defederalization could probably be financed by most airports through other means, and head taxes could be held as a backstop measure. Partly as a result of the

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14. See the *Airport and Airway System Development Act of 1979* (S. 1648) introduced in the 96th Congress.

1972-1973 experience with head taxes, some serious questions have been raised about the feasibility and advisability of implementing local passenger facility-user charges. Four issues are of particular concern:

- o Practical difficulties of fee collection--how and by whom should they be collected, and how could the confusion caused by different rates at different airports be avoided or managed;
- o Potential obstacles to instituting such fees, notably clauses in long-term airport use agreements that prohibit introduction of new charges for airport facilities;
- o How to prevent the possible diversion of receipts to non-airport uses; and
- o Airports that could not raise revenues sufficient to finance airport development through head taxes alone.

Recent studies indicate that implementation of passenger-facility charges is feasible, and the means of collecting them is already largely available. 15/ The easiest means of collecting such a fee would be through a unit charge collected by the travel agent or other ticket seller--the same method used to collect the federal head tax for international departures.

Another possibility would be a charge assessed against the airlines, rather than the passenger, based on each airline's passenger counts at an airport. This is the most common form of collecting passenger facility charges in Europe today, and many U.S. airports currently charge the airlines for their use of international terminal facilities on a per passenger basis. The evidence suggests that, in most cases, airport collection of head taxes would be the most costly and inconvenient. 16/

Federal legislation could override standing provisions in airport use agreements that prohibit the airport's introduction of passenger facility

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15. See Thompson Crenshaw Aviation/Management Consultants, *Airport Passenger Facility Charges*, Final Report to the U.S. Department of Transportation (February 1984), and William R. Fromme, *The Airport Passenger Head Tax: Analysis of its Potential Impact*, Final Report to the U.S. Department of Transportation (July 1974).

16. For detailed analysis of the practical problems of collection and the options discussed here, see Thompson Crenshaw, *Airport Passenger Facility Charges*.

TABLE 25. SUMMARY OF ALTERNATIVE FEDERAL ROLES IN AIRPORT ASSISTANCE

Recipient Airports		Annual Federal	
Numbers	Qualifying Types	Commitment (In millions of 1982 dollars)	Principal Effects on Users
	CURRENT POLICY		
3,203	All	800	Ticket tax unchanged
	ALTERNATIVE 1. WITHDRAW ALL ASSISTANCE		
0	None	0	Ticket tax reduced by 2 ½ percent
Large and medium-sized commercial airports would depend more heavily on bond financing. They would also be encouraged to expand use of cost-based pricing to recover lost subsidization. Small commercial and general aviation airports would also be encouraged to apply cost-based pricing; pressure for state aid would increase; some financially weak airports might close.			
	ALTERNATIVE 2. RESTRICT AID TO NATIONALLY SIGNIFICANT AIRPORTS		
708	Small commercial, reliever	340	Ticket tax reduced by 1 ½ percent
Effects on large and medium-sized commercial airports would be similar to those under Alternative 1. General aviation airports would experience particular financial pressure; relievers and small commercial airports would become central in federal program.			
	ALTERNATIVE 3. GRANT AID TO AIRPORTS WITH GREATEST NEED		
3,132	Small commercial, all general aviation	500	Ticket tax reduced by 1 percent
Effects on large and medium-sized commercial airports would be similar to those under Alternatives 1 and 2. Small commercial airports would become major focus of federal program. Though possibly applicable under Alternatives 1 and 2, fees for use of passenger facilities ("head taxes") have been considered most often for this approach; repeal of the federal ban on head taxes would require legislative action.			

SOURCE: Congressional Budget Office.

charges. Although a few airports have introduced clauses in newly negotiated use agreements that specifically protect the airport's right to levy a passenger facility charge (in the event that such charges become legally permissible once again), the Airport Operators Council International estimates that at least 20 of the largest 71 airports could not legally impose a passenger facility charge without federal enabling legislation. The diversion of head tax proceeds for non-airport uses could be prevented by federal legislation requiring that the passenger facility charges imposed by airports be designed to reflect actual costs, and that the proceeds be used solely for airport purposes.

Airports could be allowed to decide for themselves whether the head tax option was a realistic alternative for financing airport development. For those unable to rely solely on a passenger facility charge, other tariffs, such as higher landing fees, could be applied. In addition, selective federal assistance could be provided.

CONCLUSIONS

The choice between continuation of current policy in airport finance and any of the possible reduced federal roles considered here would turn largely on whether the Congress feels that continued federal support of a relatively new but now generally strong industry is appropriate. The critical part the airports play in the nation's transportation network--obviously, essential to the nation's economy--may argue for continued federal participation in some form. On the other hand, a perception that the federal government's work in establishing an airport infrastructure is now done may argue for a diminished or even eliminated federal role.

Decisions about federal priorities would influence a choice among the three reduction options considered in this chapter. Complete withdrawal of federal aid (Alternative 1) offers the clearest incentive for improved decisionmaking with regard to pricing and investment. Selective federal aid granted only to airports of national significance and in need of external support (Alternative 2) would contribute significantly to relieving the airports' mounting congestion problems. Finally, if the Congress interprets the federal role as a final recourse for airports lacking other financial resources, the granting of federal dollars strictly on a needs basis (Alternative 3) would seem a logical choice.

In general, however, none of these choices faces the Congress with a decision to undermine the adequacy of the airport system or alter its principal elements radically. The solid financial position of most major airports offers air travelers a good prospect for a sound airport system with

either continued, withdrawn, or redirected federal aid. At the same time, however, none of the departures from current policy offers promise of major budgetary savings or reductions in the federal budget deficit.

APPENDIXES

APPENDIX A. SURVEY OF CURRENT AIRPORT FINANCIAL MANAGEMENT PRACTICES

The data on 60 large and medium-sized airports' financial policies and practices used in this study were gathered in a survey conducted by CBO in the summer of 1983. Those data are summarized in the following table, which lists the airports surveyed in rank order of numbers of passenger boardings (enplanements) in calendar year 1982. It gives each airport's size (in terms of passenger boardings), type of public operator, and financial management approach (see Chapter II). It also indicates whether or not the airport has a use agreement containing a majority-in-interest clause, gives the terms and expiration dates of current use agreements (if any), and notes any recent, ongoing, or planned changes in financial management or related developments.

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APPENDIX TABLE A-1. CBO SURVEY DATA ON FINANCIAL MANAGEMENT PRACTICES AT 60 LARGE AND MEDIUM-SIZED COMMERCIAL AIRPORTS, 1983 (Numbers of enplanements in 1982 in parentheses)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
HARTSFIELD ATLANTA INTERNATIONAL (17,653,400), Run by city			
Residual cost, but terminal concession revenues shared by city and airlines	Yes (all capital projects involving increase in landing fee)	30 years (2010)	Basic landing fee will be renegotiated in 1991
CHICAGO-O'HARE INTERNATIONAL (17,428,127), Run by city			
Residual cost	Yes	35 years (2018)	Allocation of costs, majority-in-interest clause revised in new agreement; clause protecting right to levy passenger facility charge included
LOS ANGELES INTERNATIONAL (15,758,082), Run by semi-autonomous department of the city			
Residual cost	No, but airlines must approve debt financing exceeding $515 million limit in use agreements	30 years (1992); 40 years (United and American)	Terminal leases of five years or less where possible, except when airlines make extensive capital commitments (terminal modifications by United and American Airlines); shorter-term, more compensatory agreements anticipated after 1992

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
NEW YORK--JOHN F. KENNEDY INTERNATIONAL (12,490,411), Run by port authority			
Compensatory	None	25 years (2004)	JFK and LaGuardia are leased from New York City; city's share of these airports' net revenues will rise from 60 to 75 percent in 1985
DALLAS-FORT WORTH REGIONAL (12,401,626), Run by both cities			
Residual Cost	None	40 years (2014)	None reported
DENVER-STAPLETON INTERNATIONAL (11,608,458), Run by city/county			
Compensatory	None	28 years (1992)	May move to annual adjustment of fees and rental rates next year (currently adjusted biennially)

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	SAN FRANCISCO INTERNATIONAL (9,915,042), Run by city/county		
Residual cost	Yes, but can only defer for six months	30 years (2011)	Current revenue may not be used to fund capital development over $2 million in any one year. City must exercise best efforts to issue revenue bonds to finance capital development
	MIAMI INTERNATIONAL (9,256,017), Run by county		
Residual cost, but some properties excluded from revenue base in calculating residual cost	Yes (except $1 million Discretionary Fund and projects supported by revenues not counted in revenue base)	25 years (1987)	Month-to-month leasing of terminal space when leases expire or new space added. Last year, moved from three-year to annual rent adjustments
	NEW YORK--LAGUARDIA (9,235,150), Run by port authority		
Compensatory	None	Being negotiated (25-year lease expired in 1980)	Airport seeking shorter-term (ten-year) lease. LaGuardia and JFK are leased from New York City; city's share of net revenues will rise from 60 percent to 75 percent in 1985

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	BOSTON LOGAN INTERNATIONAL (7,934,881), Run by port authority		
Compensatory	None	No use agreements	Short-term leases will be developed in an effort to maintain flexibility in terminal space allocations
	HONOLULU INTERNATIONAL (7,533,909), Run by state		
Residual cost	None	30 years (1992)	Last year, created minimum landing fee for airlines and raised inter-island carriers' fee; interest from bond proceeds now to be used for capital development rather than credited to airlines
	HOUSTON INTERCONTINENTAL (6,371,546), Run by city		
Compensatory	No	28 years (1997)	Much future capital development planned
	WASHINGTON NATIONAL (6,333,478), Run by federal government		
Compensatory, but FBO revenues credited to landing area	No	Ten years (1984)	None reported

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	LAMBERT-ST. LOUIS INTERNATIONAL (5,962,718), Run by city		
Compensatory	Yes	40 years (2005)	Terminal rentals will be adjusted annually as leases expire (currently adjusted every two years)
	NEWARK (N.J.) (5,817,050), Run by port authority		
Compensatory	None	25 years (1998)	Moving to shorter-term building leases, as possible. City's share of net revenues will rise from 60 percent to 75 percent in 1986
	MINNEAPOLIS-ST. PAUL INTERNATIONAL (5,337,845), Run by airport authority		
Residual cost (airfield); terminal, compensatory	Yes, for airfield area only	27 years (1989)	None reported

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	GREATER PITTSBURGH INTERNATIONAL (5,029,694), Run by county		
Residual cost	None	Two years (1983) + 1-year renewal option (1984)	Majority-in-interest clause deleted in new agreement; clause added protecting airport's right to levy passenger facility charge if law permits
	SEATTLE-TACOMA INTERNATIONAL (5,012,249), Run by port authority		
Residual cost; terminal, compensatory	Airport Affairs Committee reviews and approves capital projects	32 years (2001); month-to-month	Will offer month-to-month tenants five-year "rollover" leases (five years with three five-year renewal options)
	DETROIT METROPOLITAN WAYNE COUNTY (4,935,203), Run by county		
Residual cost	Yes (except for airport Discretionary Fund projects)	(2009)	None reported

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	LAS VEGAS--McCARRAN INTERNATIONAL (4,655,484), Run by county		
Compensatory	None	No use agreements (ordinance)	None reported
	PHILADELPHIA INTERNATIONAL (4,403,541), Run by city		
Residual cost	Yes (can disapprove any project with life of more than five years, costing over $100,000)	32 years (2006)	None reported
	PHOENIX SKY HARBOR INTERNATIONAL (4,007,579), Run by city		
Compensatory	None	No use agreements (ordinance)	Might move in future to some form of lease/use agreement to protect airport in post-deregulatory environment

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	TAMPA INTERNATIONAL (3,861,509), Run by airport authority		
Residual cost	Yes, but no clear direct veto power; excludes Discretionary Fund and all projects in Master Plan	30 years (1999)	None reported
	ORLANDO INTERNATIONAL (3,383,495), Run by airport authority		
Residual cost	Yes	28 years (2008)	Developing 1400-acre industrial park to maximize revenues
	NEW ORLEANS INTERNATIONAL (3,020,438), Run by city		
Residual cost	Yes (except small Discretionary Fund)	20 years (1992)	None reported
	CHARLOTTE-DOUGLAS INTERNATIONAL (2,860,092), Run by city		
Compensatory	Yes, airfield only (projects that will increase airline fees)	25 years (2004)	Revenues have increased since Charlotte became Piedmont's major hub

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	SAN DIEGO INTERNATIONAL (2,818,374), Run by port authority		
Compensatory	None	15 years (1994); month-to-month (new entrants)	Term shortened for recent entrants
	SALT LAKE CITY INTERNATIONAL (2,703,003), Run by city (in process of forming airport authority)		
Compensatory	Yes (approve capital projects over $50,000; one signatory airline sufficient to approve)	25 years (2003)	Revenues have grown because of hub operations, but bond rating fell due to Western's financial problems and cost allocation dispute over terminal development project (now resolved)
	CLEVELAND HOPKINS INTERNATIONAL (2,656,252), Run by city		
Residual cost	Yes (except Discretionary Fund); can disapprove projects over $250,000 (1976 dollars), but city can override airlines after projects have been disapproved twice	30 years (2005)	None reported

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	KANSAS CITY INTERNATIONAL (2,623,808), Run by city		
Compensatory	Yes, for airfield capital projects (except Discretionary Fund)	28 years (1998)	None reported
	MEMPHIS INTERNATIONAL (2,290,930), Run by airport authority		
Residual cost	Yes, all projects over $5,000 (except Discretionary Fund)	30 or more years (1999)	Growth of Federal Express has helped offset loss in commercial air carrier landed weights; landing fees and rentals reduced recently
	BALTIMORE-WASHINGTON INTERNATIONAL (2,269,164), Run by state		
Compensatory (modified; space rentals set too low to recover costs)	Yes (projects over $25,000)	15 years (1993) plus ten-year renewal (2003)	None reported
	PORTLAND (ORE.) INTERNATIONAL (1,928,054), Run by port authority		
Residual cost	Yes (except Discretionary Fund)	20 years (1991)	None reported

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	SAN ANTONIO INTERNATIONAL (1,776,650), Run by city		
Compensatory	None	Eight years (1984)	New agreement being negotiated probably will be very similar to existing one
	KAHULUI (MAUI) (1,670,782), Run by state		
Residual cost	None	30 years (1992)	None reported
	GREATER CINCINNATI INTERNATIONAL (1,663,686), Run by airport authority		
Residual cost	Yes (all projects over $50,000, except Discretionary Fund)	30 years (2002)	Concession revenues have increased since Cincinnati became a hub for Delta

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	MILWAUKEE--GENERAL MITCHELL FIELD (1,611,100), Run by county		
Residual cost	Yes, but can only defer projects for 2 years (projects over $100,000, or several adding up to $200,000)	25 years (2010)	Went to long-term residual cost agreement to finance new terminal, to be completed in 1985
	PALM BEACH INTERNATIONAL (1,607,760), Run by county		
Residual cost	None	17 years (1984)	Airport seeks compensatory approach, much shorter term for new agreement. Major improvements to begin in 1985
	SAN JOSE MUNICIPAL (1,520,519), Run by city		
Residual cost	None	30 years (2009); three to five years (new entrants)	Moving to shorter-term agreements for recent entrants and adjusting terminal rental rates upwards, as possible

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	INDIANAPOLIS INTERNATIONAL (1,383,011), Run by airport authority		
Compensatory	None	One to five years (ordinance); some carriers operating without agreement	Ratemaking subject to challenge in litigation pending in U.S. Circuit Court of Appeals, Seventh Circuit
	PORT COLUMBUS INTERNATIONAL (1,315,612), Run by city		
Residual cost (airfield); terminal--concession revenues go to airport	Yes, airfield only (projects over $25,000)	25 years (2000)	None reported
	OKLAHOMA CITY--WILL ROGERS WORLD (1,302,459), Run by city		
Compensatory (modified; airlines do not contribute to most capital development)	None	30 years (1997); one to five years (new entrants)	Rates negotiated by supplemental agreements every five years. New entrants are offered one-year agreements until expiration of five-year cycle

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	RENO CANNON INTERNATIONAL (1,281,393), Run by airport authority		
Residual cost	Yes, but airport can override after two deferrals	17 years (1996)	Short-term lease and use agreement now available
	TULSA INTERNATIONAL (1,274,199), Run by airport authority		
Residual cost	Yes (projects over $400,000; except Discretionary Fund)	30 years (2008)	None reported
	ALBUQUERQUE INTERNATIONAL (1,269,279), Run by city		
Compensatory	None	Renegotiating; last agreement two to five years (1981)	New agreement will resemble previous one

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	WINDSOR LOCKS (CT.)--BRADLEY INTERNATIONAL (1,232,669), Run by state		
Compensatory	Yes (airfield projects over $250,000, terminal projects over $75,000)	30 years (2011)	None reported
	SACRAMENTO METROPOLITAN (1,227,096), Run by county		
Residual cost	Yes, but can only defer projects for two years (projects over $100,000; except Discretionary Fund)	Five years (1986)	Term, rate-setting practices, and majority-in-interest clause altered in new agreement
	WASHINGTON, D.C.--DULLES INTERNATIONAL (1,207,343), Run by federal government		
Compensatory (but FBO revenues credited to landing area)	None	10 years (1984)	None reported

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APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	NORFOLK INTERNATIONAL (1,196,286), Run by port authority		
Residual cost	Yes, can request cost justification, and arbitration if not satisfied, for any item in capital budget	25 years (1999)	None reported
	NASHVILLE METROPOLITAN (1,153,019), Run by airport authority		
Residual cost	Yes (projects over $20,000)	30 years (2005)	None reported
	AUSTIN--MUELLER MUNICIPAL (1,115,992) Run by City		
Compensatory	Not formal, but implied in lease for projects for which airline rates amortize airport costs	Five years (1988)	Term shortened and ratemaking approach changed in new agreement (effective 1 March 1983)

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	JACKSONVILLE INTERNATIONAL (1,008,891), Run by port authority		
Compensatory (modified)	None	20 years (1990)	None reported
	LIHUE (KAUAI) (995,512), Run by state		
Residual cost	None	30 years (1992)	None reported
	EL PASO INTERNATIONAL (994,102), Run by city		
Residual cost	None	Renegotiating; last agreement 20 years (1982)	None reported
	ONTARIO (CAL.) INTERNATIONAL (989,024), Run by semi-autonomous department of the city of Los Angeles		
Residual cost	None	Five years (1985)	Landing fees same as Los Angeles International; only Southern California airport with capacity to expand

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
	RALEIGH-DURHAM (941,005), Run by airport authority		
Compensatory	None	No use agreements	None reported
	LOUISVILLE--STANDIFORD FIELD (922,009), Run by airport authority		
By negotiation (noncompensatory, but not residual cost)	None	Renegotiating; last agreement 30 or more years (1983)	Airport seeks shorter term, fully compensatory terminal, residual cost airfield in new agreement
	TUCSON INTERNATIONAL (900,547), Run by airport authority		
Residual cost	Yes, projects over $35,000 (except Special Reserve Fund) and next year's budget	30 years (2006)	$60 million terminal expansion project under way, to be completed in April 1985

(Continued)

APPENDIX TABLE A-1. (Continued)

Financial Management Approach	Majority-in-Interest Clause	Term and Expiration Date of Use Agreement	Recent or Planned Changes
OMAHA--EPPLEY AIRFIELD (848,257), Run by airport authority			
Compensatory	No	Year-to-year (1984)	Major terminal expansion project will begin in 1984
COX DAYTON INTERNATIONAL (806,464), Run by city			
Residual cost	Yes, projects over $10,000 (except Discretionary Fund)	23 years (1996)	Traffic has increased significantly since Dayton became hub for Piedmont. Terminal apron overlay project to begin in 1984; possible terminal expansion in 1985

SOURCE: Congressional Budget Office.

APPENDIX B. IMPACT OF MANAGEMENT APPROACH AND AIRPORT SIZE ON AIRPORT FINANCIAL PERFORMANCE

The analysis in Chapter III divides airports into the three conventional size categories defined on page 2. Such divisions, though useful, are necessarily arbitrary, and should be understood to carry the caution that slight changes in definition can shift conclusions regarding the effect of airport size on financial performance. A similar caution should be applied in assessing the relative shifts in financial performance between large and small airports following federal deregulation of the airlines, at which time major air carriers curtailed service to some small airports in favor of the larger facilities serving more profitable routes.

To overcome the problems created by arbitrary distinctions in airport size, the CBO has related airport financial data to airport size as a continuous variable. The statistical results are reported in Table B-1 and interpreted numerically in Table B-2. As shown in Table B-2, an airport's approach to financial management and the volume of traffic it serves bear significantly on financial performance.

Effect of Management Approach

Airports that use the compensatory approach have net take-down ratios better, on average, by 24 percent than residual cost airports, and debt service safety margins more than twice as good. There are two possible interpretations of this result, however. One is that the added earning power possible with the compensatory approach improves an airport's financial performance. A second is that only those airports in the strongest travel markets turn to the compensatory approach in the first place. Both explanations may apply to some extent.

Debt-to-asset ratio appears not to be affected by management approach--that is, no statistically significant relationship is apparent. This is not surprising, as management approach itself need not influence the actual level of investment. There is also no statistically significant relationship between management approach and operating ratio.

Effect of Airport Size

Airport size has a measurable influence on financial performance. As shown in Table B-2, the elasticity of airport size with respect to an airport's operating ratio lies at about -0.24; this means that each 10 percent increase in the volume of an airport's traffic improves its operating ratio by 2.4 percent. Conversely, each 10 percent fall in traffic volume causes an estimated 2.4 percent deterioration in operating ratio. Similar relationships emerge for the other financial indicators shown in Table B-2.

APPENDIX TABLE B-1. ORDINARY LEAST SQUARES REGRESSION ESTIMATES FOR AIRPORT FINANCIAL PERFORMANCE, POOLED CROSS-SECTIONS, 1975-1982

	Log Operating Ratio	Log Net Take-Down Ratio	Log Debt-to-Asset Ratio	Log Debt-Service Safety Margin
Constant	5.894 (29.22)	1.883 (8.770)	1.647 (3.192)	1.334 (3.223)
Financial Management Approach (1 = Compensatory)	-0.101 (-1.873)	0.218 (3.873)	-0.145 (-1.096)	0.791 (7.575)
Log of Enplanements				
1975 Ratios	-0.238 (-9.081)	0.253 (8.752)	0.182 (2.423)	0.184 (3.300)
1976 Ratios	-0.229 (-9.099)	0.228 (8.148)	0.244 (3.657)	0.124 (2.400)
1977 Ratios	-0.231 (-9.280)	0.229 (8.596)	0.233 (3.636)	0.167 (3.277)
1978 Ratios	-0.230 (-9.036)	0.229 (8.483)	0.249 (3.864)	0.179 (3.472)
1979 Ratios	-0.235 (-9.493)	0.238 (9.055)	0.274 (4.315)	0.206 (4.092)
1980 Ratios	-0.237 (-9.456)	0.240 (9.016)	0.272 (4.221)	0.217 (4.271)
1981 Ratios	-0.241 (-9.791)	0.243 (9.316)	0.257 (4.080)	0.207 (4.126)
1982 Ratios	-0.261 (-9.933)	0.242 (9.104)	0.282 (3.033)	0.173 (3.402)
R^2	0.558	0.579	0.272	0.5690
F Value	12.760	12.985	2.701	12.320

SOURCE: Congressional Budget Office.

NOTE: "t-ratios" are given in parentheses. Logs are natural logs.

APPENDIX TABLE B-2. ESTIMATED IMPACT OF APPROACH TO FINANCIAL MANAGEMENT AND AIRPORT SIZE ON AIRPORT FINANCIAL PERFORMANCE (95 percent Confidence Intervals in parentheses)

	Operating Ratio	Net Take-down Ratio	Debt-to-Asset Ratio	Debt Service Safety Margin
Percentage Differences in Financial Performance at Compensatory Relative to Residual Cost Airports				
	-9.61 (±10.56)	24.35 (±11.03)	-13.47 (±25.88)	120.49 (±20.46)
Elasticity with Respect to Number of Enplaned Passengers				
1975	-0.24 (±0.05)	0.25 (±0.06)	0.18 (±0.15)	0.18 (±0.11)
1976	-0.23 (±0.05)	0.23 (±0.05)	0.24 (±0.13)	0.12 (±0.10)
1977	-0.23 (±0.05)	0.23 (±0.05)	0.23 (±0.13)	0.17 (±0.10)
1978	-0.23 (±0.05)	0.23 (±0.05)	0.25 (±0.13)	0.18 (±0.10)
1979	-0.24 (±0.05)	0.24 (±0.05)	0.27 (±0.13)	0.21 (±0.10)
1980	-0.24 (±0.05)	0.24 (±0.05)	0.27 (±0.12)	0.22 (±0.10)
1981	-0.24 (±0.05)	0.24 (±0.05)	0.26 (±0.12)	0.21 (±0.10)
1982	-0.26 (±0.05)	0.24 (±0.05)	0.28 (±0.18)	0.17 (±0.10)

SOURCE: Table B-1.

APPENDIX C. FACTORS AFFECTING AIRPORT COSTS OF CAPITAL

The statistical (regression) analysis summarized in Table C-1 attempts to quantify the effects of four factors on interest costs paid by the issuers of airport bonds: general market conditions, type of security used to back airport bonds, numbers of years in which bonds mature, and airport size (in terms of numbers of passenger enplanements).

The results indicate that interest costs and market conditions are proportional; a 1 percent change in market interest costs yields roughly a 1 percent change in airport interest costs. Issuers of general obligation bonds, on average, obtain 8 percent lower interest costs than issuers of revenue bonds (see Table C-2). Further, the regression provides statistical confirmation of the typical bond yield curve, with longer-term issues requiring higher interest rates. As the average maturity of the bond increases, so does the average interest paid, with a 10 percent increase in maturity resulting, on average, in a 1.1 percent increase in the interest rate over this period. The analysis also shows that, after adjustments are made for these other factors, the larger the airport, the lower the interest rate. On average, 10 percent more enplanements results in a 1 percent to 1.5 percent decrease in interest.

APPENDIX TABLE C-1. ORDINARY LEAST SQUARES REGRESSION ESTIMATES, POOLED CROSS-SECTION: 1978-1982

	Log Interest Cost
Constant	-0.174 (-1.105)
Log of Bond Buyer's 20 Bond Market Index	0.992 (14.355)
Bond Security (General obligation = 1)	-0.088 (-4.520)
Log of Average Maturity	0.111 (6.739)
Log of Enplanements	
1978	-0.0146 (-2.844)
1979	-0.0117 (-2.208)
1980	-0.0123 (-2.421)
1981	-0.0113 (-1.988)
1982	-0.0156 (-2.783)
R^2	0.896
F value	125.576

SOURCE: Congressional Budget Office.

NOTE: "t-ratios" are given in parentheses. Logs are natural logs.

APPENDIX TABLE C-2. ESTIMATED IMPACT OF MARKET INTEREST RATES, TYPE OF SECURITY, AVERAGE MATURITY, AND AIRPORT SIZE ON AIRPORT COST OF CAPITAL, 1978-1982 (95 percent Confidence Intervals in Parentheses)

	Interest Cost
Elasticity with Respect to Market Interest Rates	0.99 (±0.14)
Percentage Difference in Interest Costs of General Obligation Versus Revenue Bonds	-8.4 (±3.8)
Elasticity with Respect to Average Maturity of Issues	0.1115 (±0.0324)
Elasticity with Respect to Number of Enplaned Passengers	
1978	-0.0146 (±0.0100)
1979	0.0117 (±0.0103)
1980	0.0123 (±0.0099)
1981	0.0113 (±0.0111)
1982	0.0156 (±0.0110)

SOURCE: Table C-1.

APPENDIX D. AIRPORTS IN THE MUNICIPAL BOND MARKET: A REGIONAL ANALYSIS

This appendix summarizes the participation of airports in the municipal bond market by FAA region over the 1978-1982 period (see Table D-1) and charts regional differences in interest rates paid on airport bonds relative to other municipal bonds (Table D-2).

The FAA breaks down regions as follows:

New England Region: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

Eastern Region: Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Virginia, West Virginia.

Southern Region: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Virgin Islands.

Great Lakes Region: Illinois, Indiana, Michigan, Minnesota, North Dakota, Ohio, South Dakota, Wisconsin.

Central Region: Iowa, Kansas, Missouri, Nebraska.

Northwest Mountain Region: Colorado, Idaho, Montana, Oregon, Utah, Washington, Wyoming.

Western Pacific Region: Arizona, California, Guam, Hawaii, Nevada.

Southwest Region: Arkansas, Louisiana, New Mexico, Oklahoma, Texas.

Alaskan Region: Alaska.

APPENDIX TABLE D-1. BOND ISSUES FOR AIRPORTS BY REGION, 1978-1982

Region	Number of Issues	In millions of 1982 dollars: Average Size of Issue	In millions of 1982 dollars: Value of Issues	Percent of Total: Number of Issues	Percent of Total: Value of Issues
New England					
General obligation	3	0.4	1.1	1.3	a/
Revenue	1	100.2	100.2	0.4	2.0
Subtotal	4	25.3	101.2	1.7	2.0
Eastern					
General obligation	7	8.2	57.3	2.9	1.1
Revenue	21	14.9	312.4	8.8	6.2
Subtotal	28	13.2	369.7	11.8	7.3
Southern					
General obligation	9	9.2	82.4	3.8	1.6
Revenue	34	44.0	1,496.8	14.3	29.7
Subtotal	43	36.7	1,579.2	18.1	31.3
Great Lakes					
General obligation	43	4.3	185.1	18.1	3.7
Revenue	17	10.3	174.6	7.1	3.5
Subtotal	60	6.0	359.6	25.2	7.1
Central					
General obligation	13	1.9	25.2	5.5	0.5
Revenue	8	12.9	103.4	3.4	2.0
Subtotal	21	6.1	128.6	8.8	2.5

(Continued)

TABLE D-1. Continued

Region	Number of Issues	In millions of 1982 dollars: Average Size of Issue	In millions of 1982 dollars: Value of Issues	Percent of Total: Number of Issues	Percent of Total: Value of Issues
Northwest Mountain					
General obligation	4	2.3	9.2	1.7	0.2
Revenue	15	21.1	315.8	6.3	6.3
Subtotal	19	17.1	325.0	8.0	6.4
Western Pacific					
General obligation	5	5.5	27.3	2.1	0.5
Revenue	20	52.7	1,053.6	8.4	20.9
Subtotal	25	43.2	1,080.9	10.5	21.4
Southwest					
General obligation	7	3.2	22.5	2.9	0.4
Revenue	30	35.9	1,077.1	12.6	21.3
Subtotal	37	29.7	1,099.6	15.5	21.8
Alaska [b]					
General obligation	1	3.0	3.0	0.4	0.1
All Regions					
General obligation	92	4.5	413.0	38.7	8.2
Revenue	146	31.7	4,633.8	61.3	91.8
Total	238	21.2	5,046.8	100.0	100.0

SOURCE: Congressional Budget Office.

NOTE: Details may not add to totals because of rounding.

a. Less than 0.05 percent.

b. No revenue bonds issued for this region.

APPENDIX TABLE D-2. DIFFERENCES IN INTEREST RATES PAID ON AIRPORT BONDS RELATIVE TO OTHER MUNICIPAL BONDS BY REGION, 1978-1982 (In basis points)

Region	1978	1979	1980	1981	1982	1978 to 1982
New England						
General obligation	-58	a/	-122	a/	a/	-79
Revenue	N/A	a/	a/	a/	22	22
Eastern						
General obligation	a/	-4	a/	-57	-18	-26
Revenue	N/A	a/	-47	-469	-36	-167
Southern						
General obligation	-71	-51	-95	a/	a/	-70
Revenue	N/A	-101	-156	-77	8	-63
Great Lakes						
General obligation	-75	-36	-43	-75	-54	-59
Revenue	N/A	a/	-223	-74	-142	-154
Central						
General obligation	-88	-32	a/	-153	-81	-94
Revenue	N/A	a/	a/	22	a/	22
Northwest Mountain						
General obligation	-102	-69	a/	a/	-237	-119
Revenue	N/A	N/A	-102	a/	-37	-53
Western Pacific						
General obligation	93	a/	-109	-115	-138	-35
Revenue	N/A	64	17	-8	-15	5
Southwest						
General obligation	a/	-70	-46	a/	-8	-49
Revenue	N/A	-72	-70	-28	-25	-51
Alaska						
General obligation	a/	a/	a/	a/	-42	-42
Revenue	N/A	a/	a/	a/	a/	b/
Total						
General obligation	-63	-46	-73	-89	-66	-65
Revenue	N/A	-29	-103	-123	-32	-70

SOURCE: Congressional Budget Office.

NOTES: Data reflect difference in interest rates between airport bonds and other general obligation and revenue bond issues, in basis points. General obligation issues are compared with the average value of the Bond Buyer's Index of 20 municipal bonds during the month of issue. Revenue bonds are compared with the Bond Buyer's Revenue Bond Index during the month of June. Revenue bond figures for 1979 based on September-December only. N/A = data not available.

a. No issues with this security in this year.

b. No issues with this security in region.