

Chapter 7  
**AIRPORT FUNDING**



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# AIRPORT FUNDING'

This chapter examines the financial condition of U.S. airports and their ability to compete for private capital. It begins with a brief outline of the evolution of Federal airport funding programs and summarizes the demand for airport investment under current policy. This is followed by analysis of the financial performance of airports

in recent years compared to other municipal enterprises, with special attention to the effects of airline deregulation. Since tax-exempt municipal bonds are a primary source of capital for commercial airports, extended treatment is given to the ability of airports of different kinds and sizes to compete in the bond market.

## FEDERAL AIRPORT DEVELOPMENT AID

Federal capital spending on airports is financed by user fees, levied chiefly as excise taxes on domestic airline tickets and general aviation (GA) fuel. These taxes, which originated in 1933 and 1941, were not formally linked to airport expenditures until 1970, when the Airport and Airway Revenue Act established the Airport and Airway Trust Fund. Most of the Trust Fund income (over 80 percent) derives from an 8 percent tax on domestic passenger tickets. A tax of 14 cents per gallon on GA 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, construction or improvement of public-use terminal areas, and projects related to safety and noise reduction. Over the next few years, Federal aid to airports is projected to increase from the average of \$600 million per year for the period 1970-82 to \$800 million by 1986 (all in 1982 dollars, see table 24).

### Investment Trends

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.<sup>2</sup> These overall figures, however, mask wide year-to-year fluctuations in the Federal share

<sup>1</sup>This chapter was prepared by the Congressional Budget Office and appears in unabridged form in *Financing U.S. Airports in the 1980s*, April 1984. The version here has been condensed and edited to conform to the OTA report format.

<sup>2</sup>This excludes the value of tax expenditures stemming from tax-exempt bonds issued by municipal and airport authorities.

**Table 24.—Projected Federal Capital Expenditures on Airports Under Current Policy, 1984-89**  
(in millions of 1982 dollars)

	1984	1985	1966	1967	1988	1989
<b>Commercial:</b>						
<b>Large</b> .....	194	188	200	207	196	200
Medium .....	101	98	104	108	102	104
Small .....	248	240	256	265	251	256
Subtotal .....	543	526	560	580	549	560
<b>General aviation:</b>						
Reliever .....	81	79	64	87	82	84
Other .....	143	139	148	153	145	148
Subtotal .....	224	218	232	240	227	232
<b>Total</b> .....	775	751	601	827	785	800

NOTES: Projections assume that currently authorized funding is continued through 1989 and that obligations equal new authorizations in each year. Allocation among airports is based on data supplied by FAA.

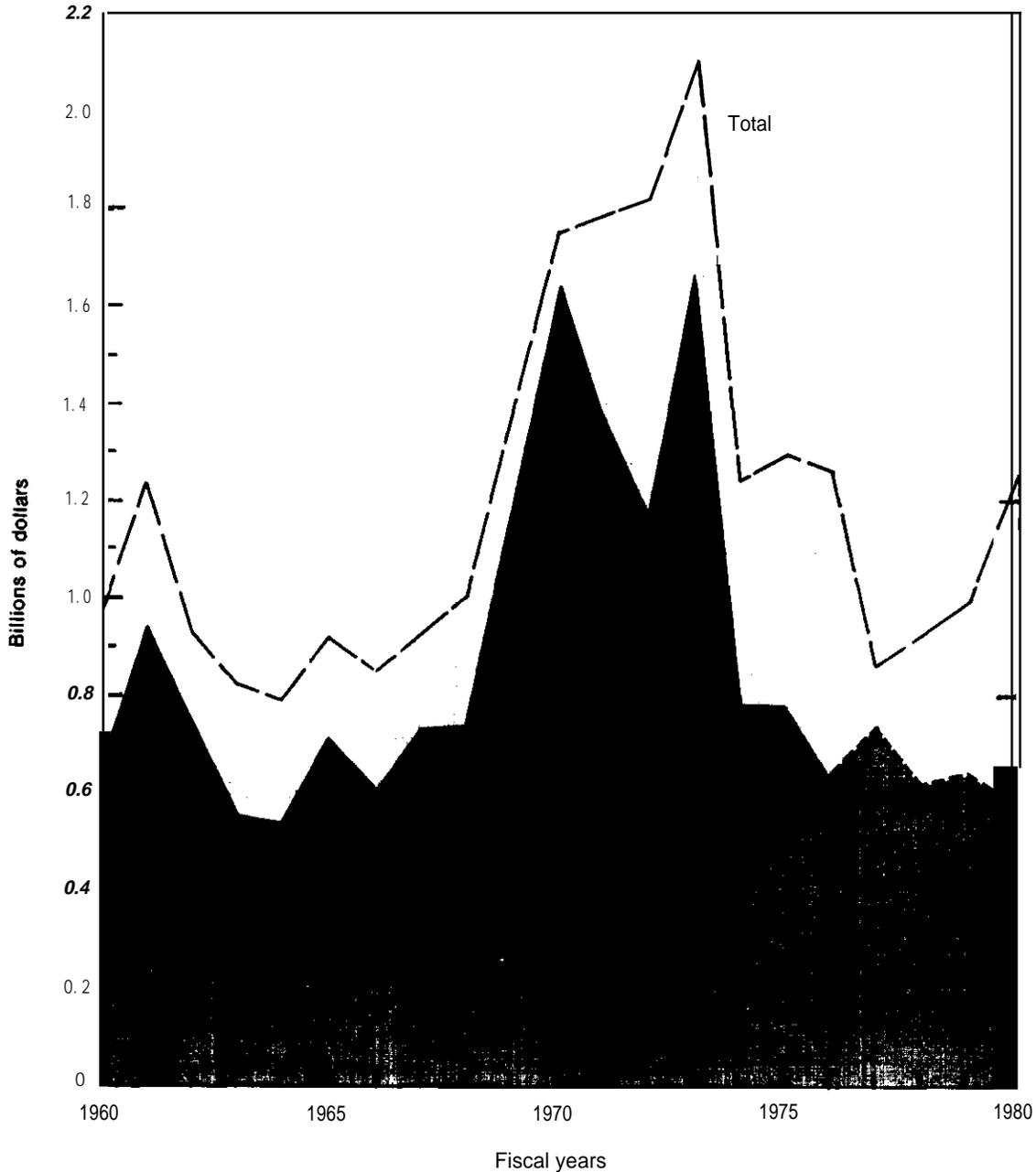
Totals may not add because of rounding and because they include 1 percent of funding used for planning.

SOURCE: Congressional Budget Office.

of total airport investment. Between 1973 and 1977, the Federal share swung from a post-1970 low of **20** percent to a high of **85** percent (see fig. 17). 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 more on debt financing than on Federal aid for investment capital. On the other hand, many small airports, par-

**Figure 17.—Federal, State, and Local Shares of Public Spending on Airports, 1960-80**



SOURCES: Congressional Budget Office based on data provided by Federal Aviation Administration (Federal outlays) and U.S. Department of Commerce, Bureau of the Census (State and local outlays).

ticularly 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 GA airport improvements, the Federal share exceeded 80 percent. The States' share of airport investment has remained fairly stable since 1970, at about 11 percent.<sup>3</sup>

The Airport Improvement Program currently targets Federal funds both to commercial airports and to 2,643 general aviation facilities. Of the latter, 219 "reliever" airports are eligible for specially targeted funds that will amount to \$80 million per year by 1986—a dramatic increase over the average of about \$25 million per year for such airports in the period 1976-82 (see fig. 18). Federal investment in other general aviation airports also grew steadily throughout the 1970s, and under current policies, outlays in constant dollars would triple by 1987, compared to the 1980-82 level.

### Demand for Airport Investment

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 GA 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 Federal Aviation Administration (FAA) to project a need for substantial investment in upgrading, maintenance, and expansion. Annual airport investment demand, including work not eligible for Federal grants, will be \$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.<sup>4</sup> Of the \$1.5 billion to \$2 billion, roughly one-third would be needed to correct all present and expected deficiencies at commercial airports; two-thirds would pay for new capacity (see table 25).

<sup>3</sup>From data supplied by the National Association of State Aviation Officials.

<sup>4</sup>Public Works Infrastructure: Policy Considerations for the 1980s, (Washington, DC: Congressional Budget Office, April 1983).

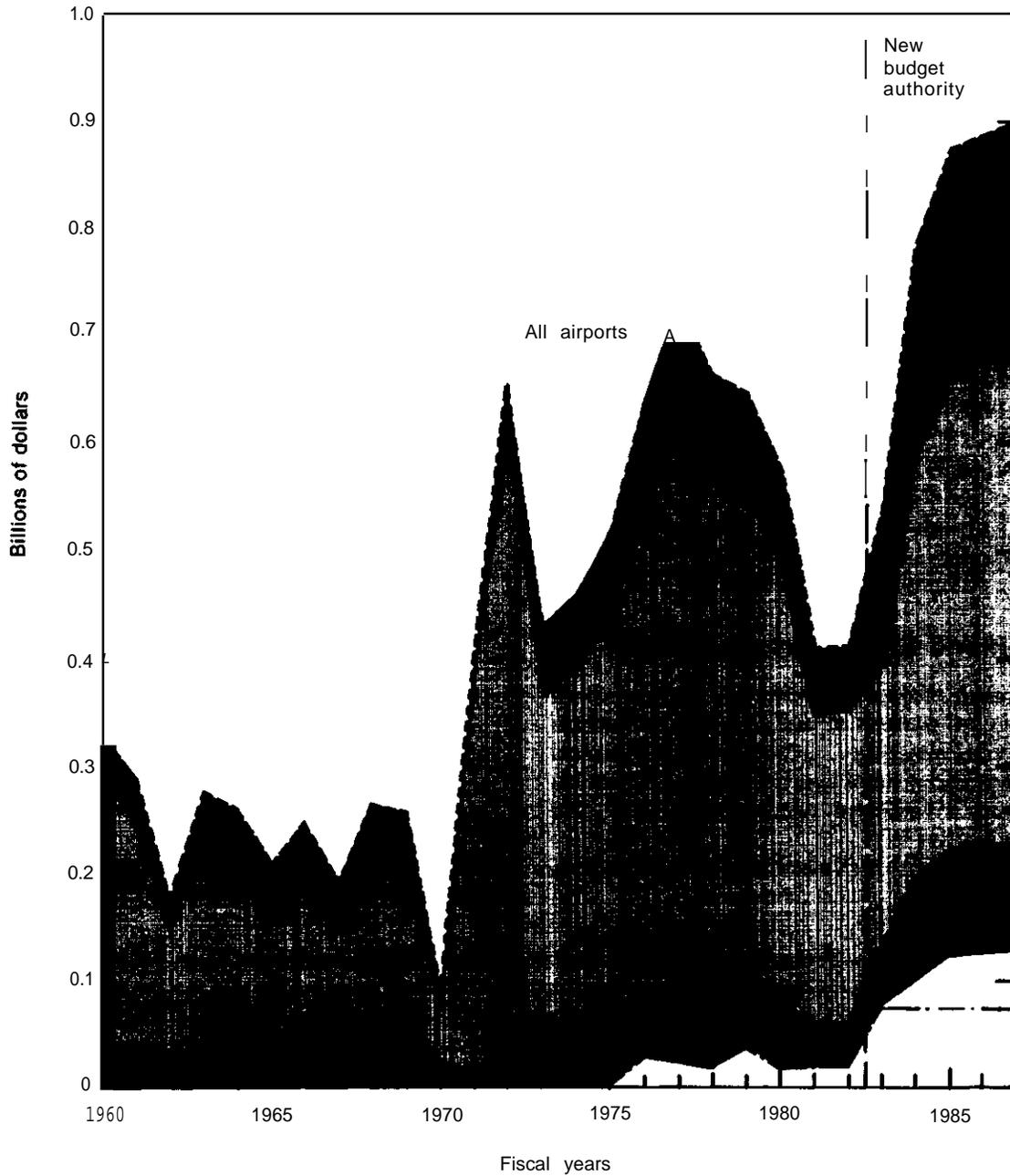
Table 25.—Projected Annual Demand for Airport Capital, by Airport Type, 1984=93

	Estimated total demand (millions of 1982 dollars)	Percent of demand		
		Expanded capacity	Upgrading	Maintenance
Commercial:				
Large . . . . .	450-650	20	4	5
Medium . . . . .	200-350	10	2	1
Small . . . . .	400-500	15	5	5
Subtotal . . . . .	1,050-1,450	45	11	11
General aviation:				
Reliever . . . . .	100-150	5	2	1
Other . . . . .	400-450	15	6	4
Subtotal . . . . .	500-600	20	8	5
Total . . . . .	1,550-2,050	65	19	16

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, etc.). Total rounded to nearest \$50 million; details may not add to totals because of rounding.

SOURCES: 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*, Apr., 17, 1979; and unpublished FAA data.

Figure 18.—Federal Capital Spending on Airports, By Type of Airport, 1960.87



NOTE: Outlays for 1983-87 are based on authorizations in the Airport and Airway Improvement Act of 1982. Typically, appropriations and thus actual outlays are somewhat below authorized levels.

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

## FINANCIAL CONDITION OF U.S. AIRPORTS

As in any enterprise, the ability of an airport to survive without public support hinges on its financial strength. This section examines recent trends in the financial performance of major commercial airports—those with earning power sufficient to issue revenue-backed bonds. It also compares the performance of these airports with that of the other municipal enterprises competing with airports in capital markets—electric utilities, water supply and wastewater treatment projects, and turnpike, bridge, tunnel, and expressway authorities.<sup>a</sup> This section also assesses how the shifts resulting from Federal deregulation of the airlines might affect the financial condition of airports of various sizes.

### Measures of 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.<sup>b</sup> Many different financial ratios can be constructed, each revealing a particular aspect of business performance.

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

- **Operating Ratio**—Derived by dividing operating and maintenance expenses by operating revenue, this ratio measures the share of revenues absorbed by operating and maintenance costs. A relatively low operating ratio indicates financial strength, since it signifies that only a small share of revenue is required to satisfy operating requirements. A high ratio (close to 1) indicates that rela-

tively little additional revenue is available for capital spending.

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

The second two indicators measure the ability of an airport 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 new debt and the financial cushion to protect against unexpectedly low revenues.

### Recent Trends in the Financial Strength of Airports

Overall, examination of these measures shows a trend toward improved strength in the finances of major commercial airports. Compared to the 1975-'78 period, when the operating ratio for these airports averaged 55 percent, this measure improved significantly over the subsequent 4 years, declining to 50 percent (see table 26).<sup>7</sup> The net

<sup>a</sup>The data used here, 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.

<sup>b</sup>J. F. Weston, and E. F. Brigham, *Managet/ Finance* (New York: Dryden, 5th ed. 1975), pp. 19-53.

<sup>7</sup>Although most credit analysts (including Moody's) use medians rather than averages in analyzing industry groups, CBO has found that averages give an equally meaningful measure of relative performance. This conclusion is based on an analysis of the statistical distribution of each financial ratio across individual airports. In statistical terminology, these distributions are "normal" for the in-  
(continued)

**Table 26.—Financial Performance of Commercial Airports, 1975-82**

Year	Financial performance measures (in percent) <sup>a</sup>			
	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
<b>Period averages:</b>				
1975-78 .....	54.5	48.5	39.0	19.9
1979-82 .....	50.2	54.2	48.1	31.6

<sup>a</sup>Methods of calculating performance measures are explained in the text. Data reflect averages of all commercial airports represented.

SOURCE: Congressional Budget Office, based on financial performance data from Moody's Investors Services, Inc., for 13 large, 10 medium, and 2 small commercial airports.

take-down ratio has also improved, increasing from 48 to 54 percent. This indicates a steady increase in the ability of commercial airports to service new debt from available net revenues. Indeed, 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 Box B).

Purchasers of airport revenue bonds look for assurances that an airport can generate net revenue (i.e., 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, in comparison 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 relatively strong. Indeed, as shown in table 26, 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 1975-78 period, the safety margin grew to 32 percent over the

years 1979-82. 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 Airport Characteristics

Although major commercial airports as a group appear financially strong, important differences are apparent among them. These variations stem primarily from the approach to financial management and the size and economic strength of the airport service area.

### 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 the 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. 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 using a compensatory approach.

Operating and net take-down ratios are substantially stronger at airports using the compen-

(continued)

dustry as a whole and for different airport size categories, indicating that financial averages provide 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. 16-54.

### Box B.—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. However, they appear to maintain smaller operating margins than highway toll facilities.

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

**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 percent)

Service	Financial performance measures			
	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
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

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.

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

satory approach (see table 27). Over the 1979-82 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 revenue 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 25 percent for residual-cost airports. This indicates that compensatory airports have greater ability to finance development with retained earnings or through bond sales.

Table 27.—Financial Performance of Commercial Airports, Compared by Management Approach, 1975-82

Performance measure <sup>a</sup>	Averages of all Airports in category (in percent)					
	Residual cost		Compensatory		All airports <sup>b</sup>	
	1975-78	1979-82	1975-78	1979-82	1975-78	1979-82
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

<sup>a</sup>Methods of calculating performance measures are explained in the text.

<sup>b</sup>Includes airports for which the management approach was not determined.

SOURCE: Congressional Budget Office, based on financial performance data provided by Moody's Investors Service, Inc., for 13 large, 10 medium, and 2 small commercial airports.

## Airport Size

Airport size (measured in passenger enplanements) has historically been an important determinant of financial performance. Larger airports show relatively stronger performance than smaller ones. Operating ratios at large airports were 15 percentage points better than those at medium airports during the 1975-78 period and 18 percentage points better over the 1979-82 period (see table 28). Net take-down ratios and debt service safety margins reflect the same spread, while only debt-to-asset ratios are better at medium airports.

### Effects of Airline Deregulation

Since deregulation of the airlines in 1978, the financial performance of large and medium airports has improved. Indeed, except for the debt-to-asset ratio at medium airports, large and medium 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 air-

**Table 28.—Financial Performance of Commercial Airports, by Airport Size, 1975-82**

Performance measure <sup>a</sup>	Averages of all airports in category (in percent)	
	1975-78 before airline deregulation	1979-82 after airline deregulation
<b>Large airports:</b> <sup>b</sup>		
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
<b>Medium airports:</b> <sup>c</sup>		
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
<b>All commercial airports:</b> <sup>d</sup>		
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

<sup>a</sup>Methods of calculating performance measures are explained in the text.

<sup>b</sup>Includes data on 13 airports.

<sup>c</sup>Includes data on 10 airports.

<sup>d</sup>Includes 2 small airports for which financial performance measures were available only for the years 1977-80. These airports have substantially better financial ratios than do the large and medium airports. As with the other airports, they also show some improvement between the two time periods.

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

ports. On balance, each 10-percent increase in traffic volume translates into a 2-percent improvement in operating and net take-down ratios and debt service safety margin (see app. C). Increased traffic volume at many large and medium airports since deregulation appears therefore to have improved gross revenues, yielding improvements 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. In particular, they seek low debt-to-asset ratios as good cushions against possible defaults. Though gross revenues grow with increased business, so do capital needs as 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 airports, however, debt-to-asset ratios have indeed increased by more than 14 percentage points between the 1975-78 and 1979-82 periods. As a result, the difference between the debt-to-asset ratios at large and medium airports has declined from 27 percentage points during the 1975-78 period to 10 percentage points between 1979-82. At the same time, the debt-to-asset ratio at large airports actually improved somewhat, from 57 percent (1975-78) to 54 percent (1979-82). Although the debt-to-asset ratio of medium airports is still better than at large airports, investors tend to be wary of worsening conditions because of the speculative factor that they introduce into a prospective investment. Whether these trends have actually diminished the investment value of medium airports is dealt with more closely later in this chapter.

The picture of small airport performance is extremely uncertain. The CBO analysis includes only two small airports, and performance indicators are available only for the 1977-80 span, rather than for the full 1975-82 period at other airports. The two small airports examined are close in size to some medium airports, indicating that they probably represent the financially stronger airports in their class. Indeed, their financial ratios are better than those of the average medium airport—perhaps an indication that smaller airports

require better finances to offset the greater risks associated with their size.

Financial ratios are unavailable for the remaining 489 small commercial airports and for publicly owned GA airports. In general, it appears that the income of these airports is inadequate to support the issuance of revenue-backed bonds. Instead, to help finance capital development, many of these airports depend on government-issued general obligation bonds, local taxpayer support,

and Federal grants. Revenues at some of the smaller airports are so low that they fail to cover even operating costs. However, some of these airports—especially GA airports with low user fees and aircraft parking charges—could strengthen their financial performance by introducing new or increased charges for the use of airport facilities.<sup>8</sup>

## AIRPORTS IN THE MUNICIPAL BOND MARKET

Perhaps the stiffest test of an airport's financial strength is its success in competing with other municipal enterprises for private investment capital in the bond market. The analysis presented below 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 they must use the taxing power of the local government as security for bond financing. Second, by comparing the cost of capital (the interest that must be paid to attract bond buyers) for airports with that of other public enterprises, it is clear that airports are generally viewed as good investments.

### 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 financ-

ing to pay for capital improvements (see table 29).<sup>9</sup> Most municipal bonds are exempt from Federal income tax, a key feature 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 about 2 percent of the total volume of \$79 billion in long-term tax-exempt securities sold in that year.

The 235 bond issues sold partly or wholly for airport development between 1975 and 1982 were divided more or less equally between county and municipal governments (45 percent) and port or airport authorities (43 percent). Only a small proportion (about 6 percent) of all bonds sold were issued by State governments, and about 6 percent

<sup>9</sup> These are new bond issues only; refinancing issues are excluded.

Table 29.—Airport Bond Issues, 1978-82

Airports by size and category	Airport bond issues (millions of 1982 dollars) <sup>a</sup>						Percent of total
	1978	1979	1980	1981	1982	1978-82	
<b>Commercial:</b>							
Large . . . . .	955	672	186	547	1,036	3,396	67.3
Medium . . . . .	280	109	246	188	296	1,119	22.2
Small . . . . .	25	134	172	70	63	464	9.2
Subtotal . . . . .	1,260	915	604	805	1,395	4,979	98.6
<b>General aviation:</b>							
Reliever . . . . .	17	1	13	0	8	39	0.8
Other . . . . .	3	5	2	14	7	31	0.6
Subtotal . . . . .	20	6	15	14	15	70	1.4
<b>Total . . . . .</b>	<b>1,280</b>	<b>921</b>	<b>619</b>	<b>819</b>	<b>1,410</b>	<b>5,049</b>	<b>100.0</b>

<sup>a</sup>Excludes refunding issues.

SOURCE: Congressional Budget Office.

(14 issues) were sold by special districts and other jurisdictions (see table 30).

### Effects of 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 commercial airports—together serving about nineteenth of all passenger traffic—41 (58 percent) used bond financing for capital development over the 1978-82 period (see table 31). Moreover, according to Moody's Investors Service, all large and medium airports have issued bonds at some time in the past. Although many small commercial airports also use bond financing, this group of airports participates in the bond market in only a small way, with just 50 of 489 airports (10 percent) issuing bonds over the past 5 years. The same is true of general aviation airports. Although 43 used bond financing over the past 5 years, this represents only 2 percent of all facilities in this class. However, GA reliever airports—those identified by the FAA as important in relieving congestion at major commercial airports—appear more likely than other GA airports to draw on the debt markets to finance capital improvements.

In terms of total dollar volume of bond sales, large and medium airports are by far the most prominent in the bond market. Of the total amount of municipal debt sold for airport purposes over the 1978-82 period, 90 percent was for large and medium airports, in contrast to only 9 percent for small commercial airports. GA airports accounted for a little more than 1 percent of total airport bond sales.

**Table 31.—Use of Bond Market to Raise Capital, By Airport Size and Type, 1978=82**

Airports by size and category	Number of airports		Percent issuing bonds 1978-82
	Total existing	Issuing bonds 1978-82	
<b>Commercial:</b>			
Large . . . . .	24	19	79
Medium . . . . .	47	22	47
Small . . . . .	489	50	10
Subtotal . . . . .	560	91	16
<b>General aviation:</b>			
Reliever . . . . .	219	9	4
Other . . . . .	2,424	34	1
Subtotal . . . . .	2,643	43	2
<b>Total . . . . .</b>	<b>3,203</b>	<b>134</b>	<b>4</b>

SOURCES: Bond data adapted by Congressional Budget Office from Public Securities Association, Long-Term Municipal Bond File. The numbers of existing airports by size from the Federal Aviation Administration, as of February 1984.

The role of bond finance in overall investment also varies greatly according to an airport's size and type of air traffic served. Over the 1978-82 period, investment dollars raised through the bond market for large airports were three times greater than the Federal grants awarded these airports. At small airports, in contrast, Federal grants were more than double bond proceeds (see table 32). Not surprisingly, debt finance plays the smallest role at GA airports, where it has accounted for only about 10 percent of total Federal-plus-private investment over the past 5 years.<sup>10</sup>

Although smaller commercial airports rely more heavily on Federal grants than do larger airports, they nonetheless undertake a sizable amount

<sup>10</sup>This excludes State and local grants and the fraction of airport investments covered by retained earnings.

**Table 30.—Airport Bond issues, By Type of issue and Security, 1978.82**

Type of issuer	Number of issues			Percent of total issues
	General obligation bonds <sup>a</sup>	Revenue bonds <sup>b</sup>	Total issues	
Municipality or county . . . . .	60	46	106	45
Port or airport authority . . . . .	19	83	102	43
State . . . . .	11	2	13	6
Other <sup>c</sup> . . . . .	9	5	14	6
<b>Total . . . . .</b>	<b>99</b>	<b>136</b>	<b>235</b>	<b>—</b>

<sup>a</sup>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.

<sup>b</sup>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.

<sup>c</sup>Special districts and other special-purpose jurisdictions.

SOURCE: Congressional Budget Office.

**Table 32.—Contribution of Federal Grants and Bond Issues to Airport Investment, 1978-82**

Airports by size and category	Percent of investment	
	Federal grants	Bond issues
Commercial:		
Large . . . . .	18	82
Medium . . . . .	27	73
Small . . . . .	69	31
Subtotal . . . . .	31	69
General aviation:		
Reliever . . . . .	80	20
Other . . . . .	92	8
Subtotal . . . . .	87	13
Total . . . . .	35	65

SOURCE: Congressional Budget Office.

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, more than four times the amount 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. In contrast, GA airports as a group appear to raise debt capital only to the extent that, when it is combined with moneys from non-Federal 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 in one of two ways:

- general obligation bonds pledge the unlimited taxing power and the full faith and credit of the State, municipality, or other general-purpose government, while
- revenue bonds pledge the user fee or lessee revenues generated by the 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 speci-

fied fraction of the taxable value of all property within its jurisdiction. In addition, many States require voter 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 voter approval is usually not required. Revenue bonds generally bear higher interest 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 less certain than 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 three-quarters of all tax-exempt bond sales, compared to about one-third in 1970. With the increasing financial pressures on local governments to reserve general obligation funding for nonrevenue-producing facilities, revenue bonds represented the vast majority—over 90 percent—of the total dollar volume of airport bond sales over the 1978-82 period (see table 33). During this period, the use of general obligation bonds for airport development was most prominent among municipalities and counties, accounting for over half of their airport development issues—though a much smaller fraction of total proceeds. Revenue bonds predominated, however, accounting for nearly 60 percent of bonds sold by all levels of government for airport development during this period.

In addition to these two basic forms of bondholder security, a few bond issues combine sources of security to produce a hybrid bond. This device offers certain advantages, such as improved ratings and lower interest costs, without placing undue pressure on the municipal debt ceiling. In Florida, for example, the City of Tampa and Hillsborough County lent their credit to the revenue bond program undertaken to finance a new terminal at Tampa International Airport by executing standby agreements with the Hillsborough County Aviation Authority, pledging tax revenues to replenish the debt service reserve fund in the event it had to be drawn down for any reason. As further examples, the cities of Charlotte, NC, and Austin, TX, built or expanded terminal

Table 33.-Airport Bond Issues, By Type of Security, 1978-82

Airport category and bond type	Airport bond issues (millions of 1982 dollars)						Percent of total
	1978	1979	1980	1981	1982	1978-82	
<b>Commercial airports:</b>							
Large:							
General obligation . . . . .	30	0	33	10	2	75	2
Revenue . . . . .	925	672	152	538	1,034	3,321	98
Subtotal . . . . .	955	672	186	548	1,036	3,396	100
Medium:							
General obligation . . . . .	34	7	55	56	5	157	
Revenue . . . . .	246	103	190	132	290	961	:
Subtotal . . . . .	280	109	246	188	296	1,118	100
Small:							
General obligation . . . . .	11	38	42	16	30	137	30
Revenue . . . . .	14	96	131	54	32	327	70
Subtotal . . . . .	25	134	172	70	63	464	100
All:							
General obligation . . . . .	75	45	130	81	38	370	7
Revenue . . . . .	1,185	871	473	724	1,357	4,609	93
Total . . . . .	1,260	916	603	805	1,394	4,978	100
<b>General aviation airports:</b>							
Reliever							
General obligation . . . . .	8	1	4	0	6	19	49
Revenue . . . . .	9	a	9	0	2	20	52
Subtotal . . . . .	17	1	13	0	8	39	100
Other							
General obligation . . . . .	2	4	1	13	4	25	83
Revenue . . . . .	a	a	a	1	3	5	17
Subtotal . . . . .	2	5	2	14	7	30	100
<b>All airports:</b>							
General obligation . . . . .	86		136	94	47	413	8
Revenue . . . . .	1,194	8 %	482	725	1,361	4,634	92
Grand total . . . . .	1,280	921	618	819	1,409	5,047	100

<sup>a</sup>Less than \$0.5 million.

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

SOURCE: Congressional Budget Office.

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.”<sup>11</sup>

Airport size appears to have great 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 1978-82 period, general obligation debt accounted for only 2 percent of total bond financing at the largest commercial airports, 14 percent at medium commercial airports, and 30 percent at small commercial airports. Among GA reliever airports, by contrast, some 49 percent of all tax-exempt debt

capital has general obligation backing. And at other GA airports, more than 83 percent of debt finance is secured in this way.

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 the debt limit and, ultimately, on the credit rating of a municipality, airport operators generally must rely on revenue bonds to finance large-scale airport improvements. During the 1978-82 period, the average size of bonds issued by large commercial airports was \$49 million, compared to \$26 million at medium airports, \$6 million at small commercial airports,

<sup>11</sup>R. Bates, “Airport Financing: Whither (or Wither?) the Market?” presented at Airport Operators Council International Economic Specialty Conference, Sacramento, CA, Mar. 31, 1982.

\$2.8 million at GA reliever airports, and \$0.9 million at other GA airports (see table 34). Over the same period, the average size of revenue bonds issued by commercial airports was three to five times greater than the average proceeds of general obligation bonds used for commercial airports of the same size category.

Thus, revenue bonds are the dominant form of debt financing where investments are large and where revenues from airport fees and charges are sufficient to cover debt service requirements. On the other hand, at GA airports, where the average size of a bond issue is small (about \$1 million), general obligation bonds far 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:

- bond ratings—a simple system used by major investor services to grade bonds according to investment quality (see Box C);
- interest costs—the interest paid by airports to attract investors relative to what other municipal enterprises pay; and

Table 34.—Average Size of Airport Bond Issues, 1978-82

Airport size and category	Average bond issue (millions of 1982 dollars)		
	General obligation bonds <sup>a</sup>	Revenue bonds	Total
Commercial:			
Large . . . . .	10.7	53.6	49.2
Medium . . . . .	12.1	32.0	26.0
Small . . . . .	3.2	9.3	6.0
Category average . . . . .	5.9	36.3	26.2
General aviation:			
Reliever . . . . .	3.8	2.2	2.8
Other . . . . .	1.0	0.5	0.9
Category average . . . . .	1.5	1.3	1.4
All-airport average . . . . .	4.5	31.7	21.2

<sup>a</sup>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, with the balance going for other public investment purposes.

SOURCE: Congressional Budget Office.

### Box C.—What Investment-Grade Bond Ratings Mean

#### Best 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.

#### High Grade

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

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.

#### Medium Grade

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.

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 Corp. 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.

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

defaults—the frequency with which a given type of enterprise has defaulted on a bond issue.

## Bond Ratings

For the 134 airports where new airport bonds were issued over the past years (including general obligation bonds used at least in part for airport development), every rated bond has received an "investment grade" from the two major investment rating services, Moody's Investors Service, Inc., and Standard & Poor's Corp. (See table 35 for ratings of the most recent airport issues.)<sup>12</sup> One

<sup>12</sup>Note that not all traded bonds receive ratings. Of the 235 bonds used for airport purposes over the 1978-82 period, only 149 were rated. However, rated bonds accounted for more than 90 percent of the dollar volume of all airport bonds issued over the past 2 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 buying 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 rate a bond issue.) Over the 1978-82 period, only 8 percent of all revenue bonds issued by large airports and 13 percent of those issued by medium commercial airports were unrated. In contrast, 66 percent of revenue bonds issued by small commercial airports were unrated. All

explanation for these consistently good ratings is that airports expecting poor ratings do not enter the bond market.

Although investors clearly have considerable confidence in airport bonds, ratings 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 35, general obligation bonds draw the best ratings. Under this form of security, ratings are determined by the economic vigor of the municipality or the entire State, 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 cri-

(continued)

nonreliever GA 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.

Table 35.—Airport Bond Ratings, 1978=82

Airports by size and category and bond type	Rating received (percent)				
	Best grade (Aaa)	High grade (Aa1/Aa)	Upper medium grade (A1/A)	Medium grade (Baa1/Baa)	Not rated
<b>Commercial</b>					
<b>Large:</b>					
General obligation . . . . .	33	67	0	0	0
Revenue . . . . .	0	6	89	0	6
<b>Medium:</b>					
General obligation . . . . .	50	0	50	0	0
Revenue . . . . .	0	0	65	18	18
<b>Small:</b>					
General obligation . . . . .	11	36	21	7	25
Revenue . . . . .	0	4	14	7	75
<b>All:</b>					
General obligation . . . . .	19	32	24	5	19
Revenue . . . . .	0	3	49	8	40
<b>General aviation</b>					
<b>Reliever:</b>					
General obligation . . . . .	0	20	20	0	60
Revenue . . . . .	0	0	20	0	80
<b>Other:</b>					
General obligation . . . . .	0	8	35	4	63
Revenue . . . . .	0	0	0	0	100
<b>All:</b>					
General obligation . . . . .	0	10	24	3	62
Revenue . . . . .	0	0	7	0	93

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 1978-82.

SOURCE: Congressional Budget Office.

teria used by investor services to rate such bonds are central to the marketability of such bonds.

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.<sup>13</sup> Financial strength is viewed as a direct function of passenger demand at the airport, and credit analysts review both financial indicators and underlying patterns of passenger traffic.<sup>\*4</sup>

Airline deregulation, which has freed air carriers from virtually all obligation 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 local economic strength than on airport 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 attract other airlines to pick up the travel business.

In view of the methods adopted by the investor services, it is not surprising that large airports—with their comparatively stronger financial showings—tend to draw the best revenue bond ratings. Over the 1978-82 period, credit analysts were far more likely to assign medium-grade revenue bond ratings to issues for medium and small airports

<sup>13</sup>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 bonds proceeds and revenue.

<sup>14</sup>In considering a particular airport project, credit analysts pay special attention to past and anticipated growth in air traffic, diversity of revenue sources, level of service, number 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.

than for large airports. In fact, over that period, not a single large airport issuing debt was rated below the upper-medium category.

Since deregulation, bond rating organizations have emphasized that passengers are an airport's true customers and that sufficient passenger demand will provide financial incentives for some airline to offer 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 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 had held a significant share of the Dallas-Fort Worth market and, under a residual-cost use agreement, had agreed to pay a substantial portion of the total airline share of airport costs. Moody's municipal credit report on the issue cited the bond's security provisions, the adequacy and diversity of pledged revenues, and the airport's role as one of the 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."<sup>15</sup>

For hub airports serving large numbers of connecting flights, however, the poor financial outlook for a major airline could mean a permanent loss of patronage, with important implications for bond ratings. In May 1983, for example, Moody's revised the rating of Atlanta Hartsfield on approximately \$86 million "third-lien" revenue bonds downward from A to Baal, citing as the primary reasons Eastern Airline's financial problems (reflected in a net loss of \$113.8 million in fiscal year 1982), a trend of declining traffic, and reduced debt service coverage. Likewise, for the Salt Lake City Airport, Moody's downgraded its rating in

<sup>15</sup>Moody's Investors Service, Inc., *Municipal Credit Report*, for Dallas-Fort Worth Regional Airport, Texas, Nov. 10, 1982.

connection with the sale of \$26 million in revenue bonds, stating that the long-term security of the bonds must be viewed with uncertainty in light of the airport's growing reliance on connecting passengers carried by the financially troubled Western Airlines.<sup>16</sup> In addition, while strengthening and expansion of hub-and-spoke networks by major airlines since deregulation has improved gross revenues at some airports, the added volume of connecting traffic has also prompted the need for 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 growth in operations—and dramatic increases in debt financing requirements—since deregulation.<sup>17</sup> For example, Standard & Poor's published credit rating on the December 1982 issue of \$185 million of revenue bonds at Denver Stapleton stated that the issue is not rated higher than A "... 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 the recent sale of \$175 million revenue bonds for Chicago O'Hare 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 art A rating.<sup>18</sup>

### 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 36, airport interest costs for revenue bonds over the 1978-82 period were 70 "basis

points" below the interest cost index for all revenue bonds. (A basis point is one one-hundredth of a percentage point.) Even general obligation bonds issued in whole or in part for airport development brought below-average interest costs over that period—perhaps reflecting that municipalities with airports tend to be economically stronger than other places.<sup>19</sup>

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 or (in the case of general obligation bonds) the 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 price.<sup>20</sup> In either case, the entire bond issue is usually purchased by an underwriter (commonly, an investment brokerage company) or an underwriter team who, 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 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,

<sup>16</sup> Moody's Investors Service, Inc., Municipal Credit Report, for Salt Lake City, UT, 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.

<sup>17</sup> Cited by Ann Sowder, Smith Barney Harris Upham & Co. (formerly with Standard & Poor's), in a presentation at the 55th Annual Conference of the American Association of Airport Executives, Orlando, FL, June 1983.

<sup>18</sup> Another factor in the revision of the rating for Chicago O'Hare was evidently the reduced level of coverage on the new bonds compared to that for the airport's older revenue bond issues.

<sup>19</sup> Comparing the indicators of overall bond market rates with those of airports is somewhat misleading, since the market indicators reflect only those bonds with 25- to 30-year maturities, whereas some airport bonds mature in less time. Over the 1978-82 period, airport bonds averaged 14.7 years in 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 than general market rates. 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.

<sup>20</sup> 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, the discussion here focuses on 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.

Table 36.—Comparison of Interest Rates for Airport Bonds and Other Municipal Bonds, 1978-82

Airports by size and category and bond type	Difference (in basis points) <sup>a</sup>					
	1978	1979 <sup>b</sup>	1980	1981	1982	1978-82
<b>Commercial</b>						
Large:						
General obligation. . . . .	-64	<sup>c</sup>	-109	-115	-138	-95
Revenue . . . . .	N/A <sup>d</sup>	19	-66	-166	-12	-55
Medium:						
General obligation. . . . .	-80	-45	-73	4	6	-34
Revenue . . . . .	NIA	-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 . . . . .	NIA	-29	-98	-124	-28	-68
<b>General aviation</b>						
Reliever:						
General obligation. . . . .	76	-106	-32	<sup>c</sup>	<sup>c</sup>	3
Revenue . . . . .	N/A	<sup>c</sup>	-47	<sup>c</sup>	-64	-55
Other:						
General obligation. . . . .	-89	-37	-138	-46	39	-53
Revenue . . . . .	NIA	<sup>c</sup>	-243	-113	-60	-107
All:						
General obligation. . . . .	-48	-47	-85	-46	39	-43
Revenue . . . . .	NIA	<sup>c</sup>	-145	-113	-61	-92
All <b>airports</b> :						
General obligation. . . . .	-63	-46	-73	-89	-66	-65
Revenue . . . . .	NIA	-29	-103	-123	-32	-70

<sup>a</sup>Data reflect difference in interest rates between airport bonds and other general obligation and revenue bond issues, in basis points. (A basis point is one one-hundredth of a percentage point.) 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.

<sup>b</sup>Revenue bond figures for 1979 based on September-December only.

<sup>c</sup>No issue of this security in this year.

<sup>d</sup>N/A = Not available; the Bond Buyer's Revenue Bond Index did not start until September 1979.

SOURCE: Congressional Budget Office.

and in this respect airports have little control over the cost of capital. Airport revenue and general obligation bonds issued over the 1978-82 period followed quite closely the interest cost indicators of revenue or general obligation bonds as a whole, going from a low of 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 app. D). 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 credit standing of the individual airport. Two factors have greatest importance here: the airport's basic fiscal condition (including its prospects for traffic growth and the strength of the local economic base) and the presence of special pressures on the airport to expand capacity, thereby *necessitating* extensive capital development.

In general, an airport's basic fiscal condition appears to be more important than long-term airline use agreements. 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 1979-82 period (see table

37).<sup>21</sup> In contrast, residual-cost airports paid only 4 basis points below other municipal revenue bonds.

On average, larger airports pay lower interest costs than smaller airports, allowing for differences in types of security and average maturities of issues.<sup>22</sup> However, there is considerable variation in the interest costs paid by airports of different size in the 5 years since airline deregulation. Compared to small airports, large commercial airports have generally incurred somewhat higher interest costs for new bond issues, despite their history of more favorable bond ratings. For example, in the period 1978-82, the interest on revenue bonds paid by large airports was 55 basis points less than the market average, compared to 153 basis points less for small airports. Medium airports drew higher interest costs, on average, than either large or small commercial airports—29 basis points below the market average for revenue bonds.

This pattern appears to reflect two factors. First, 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 36, it appears that medium airports have incurred the greatest increase in interest costs, a pattern that goes along with their mounting debt-to-asset ratios. Second, the size of the average bond issued by large airports far exceeds that of smaller ones, 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

<sup>21</sup> 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.

<sup>22</sup> In technical terms, the elasticity of interest cost with respect to airport size averaged about -0.013 over the 1978-82 period. This means that an airport with 10 percent more passenger boardings than another airport would draw about a 0.13 percent lower interest rate on its bonds.

**Table 37.—influence of Financial Management Approach on Airport Bond Interest Rates, 1978-82**

	Difference (in basis points) <sup>a</sup>		
	Residual-cost airports	Compensatory airports	Total <sup>b</sup>
General obligation. . . . .	-37	-83	-65
Revenue . . . . .	-4	-95	-70

<sup>a</sup>Data reflect difference in interest rates between airport bonds and other general obligation and revenue bond issues, in basis points. (A basis point is one one-hundredth of a percentage point.) 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.

<sup>b</sup>Total includes airports for which the management approach is unknown.

<sup>c</sup>Revenue bond figures based on September 1979-82 issues.

SOURCE: Congressional Budget Office.

could offset the moderately higher bond ratings achieved by larger airports.

### Defaults

The history of an enterprise, or of an entire industry, with regard to the number of defaults is an important index of investment value. By this measure, the record of airports is particularly strong. The airport industry has never suffered a single default, a fact noted by several credit 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.<sup>23</sup>

<sup>23</sup>"R. H. Bates, "Airport Financing: Whither (or Wither?) the Market?" presented at Airport Operators Council International Economic Specialty Conference, Sacramento, CA, Mar. 31, 1982.