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*W. V. Van Dine*  
Ann Arbor Oct. '73

# PROCEEDINGS —

## Fourteenth Annual Meeting

Theme:

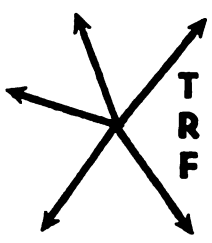
“Search For New Transportation Horizons”

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Hollenden House  
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**TRANSPORTATION RESEARCH FORUM**

# Financing of the Major U.S. Scheduled Airlines

by Nawal K. Taneja\*

## INTRODUCTION

A RECENT STUDY performed by the Air Transport Association estimated the capital requirements for the scheduled air transportation industry to be \$7.4 billion for the first half of this decade and \$20.3 billion for the second half of the decade.<sup>1</sup> This is almost two and a half times the volume of capital expenditures of the major trunk carriers and Pan Am in the previous two decades. While a significant portion of the capital requirements are expected to be generated internally, the industry will have to finance a substantial amount from external sources. With a deterioration in the financial performance of the industry at the beginning of this decade, the question is by what instrument of financing would the industry meet its long-term requirements?

Although it is difficult to forecast accurately the sources of long-term financing it may prove helpful to review past methods of financing to understand how the industry arrived at its present financial position and the possible alternatives available to finance the future requirements. An attempt is made to investigate the reasons for the industry to change the emphasis in its source of financing from equity to long-term debt followed by internal sources such as earnings and depreciation to more recent sources such as convertible debenture and lease financing. The focal point of the paper centers on the investigation of the industry's capital structure and its impact on the carriers' sales, profit and investment. The profound influence of the capital structure on profitability can be seen through its relationship with return on investment as described by the Civil Aeronautics Board. This relationship is analyzed for the industry as well as individual carriers whose financial performance has been consistently superior.

The industry analysis is performed through a detailed examination of the financial practices concerning the acquisition of corporate capital during the last two decades. The industry considered is made up of the total system operations of the eleven trunk carriers as of 1971 and Pan American. Trunk carriers such as Capital which did not exist in 1971 are left out entirely from the Analysis. Although the basic data was taken from the Civil Aeronautics Board's various editions of *Handbook of Airline Statistics* and the *Air Carrier Financial Statistics* the reader is cautioned that the comparative balance sheet

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<sup>1</sup> Air Transport Association, U.S. Certified Scheduled Airlines Capital Requirements, 1971-1980. Economics and Finance Department, August, 1972.

and income statement data for the industry is slightly different in this analysis due to the differences in the definition of the number of trunk carriers in the industry. The CAB's *Handbook of Atrline Statistics* reports income statement data for each carrier for its domestic and international/territorial operations separately while balance sheet data is reported on a system basis. At the same time aggregate data on the system operations of the total trunk carriers is not readily available for the last two decades in any consistent form for both the balance sheets and income statements. The industry analysis presented here is based on balance sheets and income statements constructed by adding the domestic and international/territorial operations of each of the twelve carriers for twenty-one years from 1951 to 1971.

### THE PERIOD OF EQUITY FINANCING

The early fifties represented a period of strong financial stability according to the usual measures of financial risk and profitability. The data shown in Table I which measures short-term financial risk by operating ratio, current ratio, and interest coverage ratio is indicative of a financially stable industry. During the period 1951-1956 the operating ratio was about 90 percent, leaving 10 percent of the operating revenue for interest charges, taxes and profit. From the bankers' point of view a net working capital of about 100 million dollars accompanied by a current ratio of 1.3 provided an acceptable indicator of financial strength. In addition, the earning power relative to the fixed interest charges was extremely favorable as shown by the interest coverage ratio. The long-term financial risk was fairly low as indicated by the ratio of long-term debt to stockholder equity at 0.4 and financial leverage measured as the ratio of long-term debt to total assets at approximately 20 percent.

During the early development the industry had met its capital requirements primarily through equity financing. Capitalization of the major U.S. airlines (Table 2) shows that up until the mid-fifties less than 30 percent of the industry's capital represented long-term debt. However, during the early fifties the industry financed a substantial part of its capital requirements through internal sources, basically depreciation and earnings. The relatively fast rate of technological change produced high depreciation charges for the airlines, and depreciation represented the single largest source of financing in the industry. Although these charges varied from carrier to carrier and from year to year, the total depreciation charges as a percent of the total operating expenses have remained in the 8-10 percent range. Table 3 which shows the uses and sources for funds points out that for the period 1951-1956 over 40 percent of the funds came from depreciation. When interpreting the "Uses of Funds" table the reader is cautioned that the data shown represents actual monies spent during a particular period. This clarification is necessary since a significant part of the funds used for equipment purchases is normally committed a number of years prior to equipment delivery.

The second important source of internal financing in this period was the earnings of the industry justified on the basis of its rate of return on investment during the period. Net income financed almost a quarter of the total capital requirements. Table 1 shows the extent of profitability during this period as measured by the average rate of return on combined investment. In this analysis ROI is derived by dividing the net income *excluding* special items

**SELECTED FINANCIAL AND OPERATING RATIOS—  
MAJOR U.S. AIRLINES**

	Debt Equity	Interest Coverage	Operating Ratio	Total Investment	Rate of Return on		
					Long- Term Debt	Stockholder Equity	Current Ratio
1951	0.4	17.0	86.4%	10.2%	4.4%	12.7	1.3
1952	0.4	14.2	90.0%	7.2%	3.6%	8.8	1.4
1953	0.4	11.4	91.0%	6.8%	4.6%	7.7	1.3
1954	0.4	11.7	90.3%	8.0%	5.0%	9.2	1.4
1955	0.4	15.1	90.2%	7.4%	3.8%	8.9	1.5
1956	0.5	12.0	91.7%	5.8%	3.2%	7.1	1.3
1957	0.7	3.9	96.2%	2.6%	3.4%	2.0	1.4
1958	0.9	3.8	94.8%	3.2%	3.7%	2.8	1.6
1959	1.2	3.3	94.5%	3.2%	3.7%	2.7	1.4
1960	1.7	1.5	96.5%	2.1%	3.9%	—0.8	1.4
1961	2.0	0.2	99.2%	1.0%	4.9%	—6.7	1.3
1962	2.0	1.6	94.7%	4.0%	5.5%	1.0	1.3
1963	1.6	2.8	92.2%	6.0%	5.9%	6.1	1.3
1964	1.4	4.9	88.4%	9.3%	5.2%	15.1	1.2
1965	1.1	6.4	85.9%	10.7%	5.0%	17.3	1.4
1966	1.3	6.4	86.0%	9.0%	4.0%	15.4	1.6
1967	1.3	5.6	88.8%	7.2%	3.4%	12.2	1.6
1968	1.5	3.0	92.4%	5.1%	4.0%	6.9	1.3
1969	1.6	1.9	94.7%	3.9%	4.5%	3.1	1.2
1970	1.9	0.2	99.4%	1.2%	4.4%	—4.9	1.1
1971	1.6	1.0	96.9%	3.0%	5.2%	—0.3	1.2

Source: *CAB's Handbook of Airline Statistics*

**TABLE 1**

plus interest expenses by the sum of net stockholder equity and long-term debt.<sup>2</sup> Special items constitute extra-ordinary credits and debits (including

<sup>2</sup> This differs from the Board's definition of ROI. The Civil Aeronautics Board defines rate of return on adjusted investment as the ratio of net income to total investment defined as: net income after special items but before interest expense allocated to long-term debt and including investment tax credits not allocated to cost of service in the case of computation: including investment tax credits, and exclusive of the above in case of computation: excluding investment tax credits, to adjusted investment (total investment defined as . . . a sum of average (arithmetic mean) of five quarterly balances of stockholder equity, long-term debt less unamortized discount and expense on debt and advances from associated companies and non-transport divisions . . . less equipment purchase deposits and applicable capitalized interest).

Source: Part X, Glossary of Air-Transport Terms, *Handbook of Airline Statistics*, 1971 edition, p. 581.

## CAPITALIZATION OF MAJOR U.S. AIRLINES

Year	Long-term Debt		Stockholders' Equity		Deferred credits		Value of Leased Aircraft*	
	\$M	%	\$M	%	\$M	%	\$M	%
1951	154.6	29.3	361.7	68.4	12.1	2.3	N.A.	
1952	192.7	29.5	447.5	68.7	12.0	1.8	N.A.	
1953	194.7	28.1	486.6	70.1	12.5	1.8	N.A.	
1954	208.7	27.5	536.1	70.6	14.6	1.9	N.A.	
1955	246.9	28.3	599.2	68.5	27.7	3.2	N.A.	
1956	346.2	32.3	681.4	63.6	43.6	4.1	N.A.	
1957	516.2	39.1	750.4	56.7	55.2	4.2	N.A.	
1958	717.3	44.6	808.4	50.2	84.2	5.2	N.A.	
1959	1031.5	51.0	868.8	42.9	122.4	6.1	N.A.	
1960	1478.8	58.7	876.7	34.9	162.3	6.4	N.A.	
1961	1706.2	60.6	857.8	30.4	176.2	6.3	75.2	2.7
1962	1739.3	59.2	881.9	30.1	220.9	7.5	93.9	3.2
1963	1530.2	53.0	968.7	33.5	289.5	10.0	100.1	3.5
1964	1688.8	49.6	1191.7	35.0	381.5	11.2	142.5	4.2
1965	1908.4	44.2	1661.4	38.4	431.1	10.0	320.0	7.4
1966	2721.9	46.5	2158.7	36.9	520.7	8.9	450.7	7.7
1967	3583.9	47.6	2701.5	35.8	643.6	8.5	607.8	8.1
1968	4455.9	48.2	2890.9	31.2	808.0	8.7	1098.6	11.9
1969	4815.3	45.7	3074.2	29.2	954.2	9.1	1684.7	16.0
1970	5565.8	47.9	2906.5	25.0	1016.9	8.8	2129.6	18.3
1971	5230.1	44.1	3356.6	28.2	1064.2	9.0	2219.0**	18.7

Source: CAB *Handbook of Airline Statistics*, various editions.  
 CAB *Air Carrier Financial Statistics*, December, 1971.

\*Tripp, Frederick Gerald, "Aircraft Leasing: An Evaluation in Terms of the Public Interest of Constructive Ownership Versus Direct Expense Reporting by the Domestic Trunk Air Carriers." Ph.D. thesis, The American University, 1972. Pan American is not included in these numbers.

\*\*Lloyd-Jones, D. J. "Financing the Air Transportation Industry." Paper presented at the MIT-NASA Workshop on Airline System Analysis at Waterville Valley, New Hampshire, Aug. 1972, MIT Report FTL-R-1972-7.

TABLE 2

the associated special income tax credits and debits) that are of sufficient magnitude to materially distort the total operating revenues or total operating expenses if included therein. Interest expense is added back to the net income since the overall rate of return is based on total investment, and interest expense represents a return on the debt part of the total investment.

SOURCES AND USES OF FUNDS FOR MAJOR U.S. AIRLINES

	1951 - 1956		1956 - 1961		1961 - 1966		1966 - 1971	
	\$M	%	\$M	%	\$M	%	\$M	%
<b>Major Uses</b>								
Increase in:								
Current Assets	\$ 173.7	12.5	\$ 349.9	10.4	\$ 874.9	16.8	\$ 596.6	6.4
Investments and Special Funds	107.0	7.7	14.3	0.4	429.1	8.2	516.4	5.6
Flight and Ground Equipment (At Cost)	822.0	59.0	2188.1	65.1	2506.4	48.0	5709.6	61.5
Deferred Charges	—	—	80.8	2.4	—	—	136.6	1.5
Accumulated Retained Earnings	218.8	15.7	—	—	876.9	16.8	320.0	3.4
Dividends	109.4	7.9	174.1	5.2	235.2	4.5	379.3	4.1
Other	(38.2)	(2.8)	552.6	16.5	295.5	5.7	1628.0	17.5
TOTAL	\$1392.7	100.0	\$3359.8	100.0	\$5218.0	100.0	\$9286.5	100.0
<b>Major Sources</b>								
Increase in:								
Current Liabilities	134.1	9.6	262.0	7.8	425.4	8.2	891.5	9.6
Long-Term Debt	191.6	13.8	1360.0	40.5	1015.7	19.5	2508.2	27.0
Deferred Credits	31.5	2.3	132.6	3.9	344.5	6.6	543.5	5.9
Deferred Charges	14.3	1.0	—	—	21.9	0.4	—	—
Stockholder's Equity (not including Retained Earnings)	100.9	7.2	191.2	5.7	424.0	8.1	877.9	9.5
Retained Earnings (Accumulated)	—	—	24.5	0.7	—	—	—	—
Depreciation Expenses	595.8	42.8	1222.4	36.4	1933.4	37.1	3704.4	39.8
Net Income	324.5	23.3	167.1	5.0	1053.1	20.1	761.0	8.2
TOTAL	\$1392.7	100.0	\$3359.8	100.0	\$5218.0	100.0	\$9286.5	100.0

Source: CAB's Handbook of Airline Statistics, various editions.

TABLE 3

Table 1 also shows the separate rate of return on investment for the debt holders and the stockholders. This provides information on the cost of debt and equity financing. Since debt has a lower cost relative to equity capital the debt to equity ratio has a considerable influence on the overall rate of return. The data illustrates the effect of this financial leverage on the overall rate of return on investment. During this early period the stockholders enjoyed a substantial gain from trading on equity. For example, Dr. Alvord's analysis shows:

“. . . American('s) stockholders enjoyed very substantial gains from trading on their equity in 1951-1955. In 1954, the year in which trading on equity was least profitable, relative to the investment of the common stockholders, the gains from trading on the equity amounted to \$5.7 million or well over half of net common stock earnings. In 1951, the year in which the return on common equity was highest trading on the equity amounted to \$6.2 million or 68 percent of that year's net common stock earnings . . . in 1954, . . . Eastern's trading on equity . . . amounted to around \$3,549,000 or almost half of the net common stock earnings in the period. . . . In every year (from 1951 to 1955) the return on United's common stock equity was above 10 percent. In 1955, when trading on the equity gains were least relatively, they amounted to \$4.1 million or around 38 percent of the common stock earnings. . . .”<sup>3</sup>

Although major portions of the funds were generated internally, relatively small amounts of external funds were raised. For instance, long-term debt and new stock issues accounted for about a fifth of the total sources. The amount and source of external financing naturally varied within the industry. For example, American did not use long-term debt while Eastern relied heavily upon this source. TWA financed only about 10 percent of its funds from external sources most of which were derived from the sale of common stock. In this case, the choice of the financial instrument was due basically to the limited availability of debt capital. The carrier was experiencing high operating ratio which is indicative of higher than average business risk. At the same time the current ratio was extremely low which is a sign of high degree of financial risk. The amount of debt that TWA could raise was therefore limited. Another carrier going against the industry trend was Delta Air Lines. During this period the carrier financed over 60 percent of its requirements from external sources. Most of Delta's debt was financed through bank loans and the issuance of \$10.8 million of its convertible subordinated debentures to the holders of Chicago and Southern common.

### THE PERIOD OF DEBT FINANCING

During the mid-fifties the industry began turning its attention to planning for the jet aircraft. The carriers committed themselves to almost \$2 billion for flight equipment and the associated ground equipment. This was a considerable amount of capital to be raised through pure equity—without causing excessive dilution of earnings. Besides, the rate of return on invest-

<sup>3</sup> Alvord, Ben Major. *A Study of the Financing of the U.S. Trunk Airlines, 1946-55*. Ph.D. thesis, University of Illinois, 1960, pp. 187, 195 and 208.



ment had dwindled to about 3 percent with return on stockholder equity even lower. This implied that a good portion of the funds would have to be raised as external debt. The banks were relatively uninterested in financing this huge long-term debt at rates anywhere near the prime rates. There were, however, exceptions to this general feeling. Delta, for example, in 1956 arranged a credit with a group of banks for 35 million dollars at 4.5 percent, borrowed 30 million dollars, and in 1959 renegotiated the loan.

The industry, however, was not in any desperate situation since the carriers had not as yet fully exploited the insurance companies. The insurance companies were very interested in negotiating the long-term debt based basically on the extremely high interest coverage ratio in the previous five-year period. Table 4 shows a summary of the long-term debt owed by the trunks at the end of 1959. The period 1956-1961 was therefore a period of debt financing. A little over forty percent or 1.4 billion dollars was raised through new debt. This was more than seven times the amount raised in the previous five years.

During this period less than fifty percent of the financing was obtained through internal sources such as depreciation, net income and deferred credits. As expected, most of the internal funds came from depreciation. Net income provided a mere five percent of the needed capital since the industry

**SUMMARY OF LONG TERM DEBT OWED BY THE TRUNK AIRLINES AT DECEMBER 31, 1959 (in thousands of dollars)**

	Bank	Ins. Co.	Debentures	Other	Total
AMERICAN	—	150,000	25,384	40,000	215,384
EASTERN	20,000	90,000	25,000	—	135,000
TWA	—	—	—	32,952	32,952
UNITED	—	—	148,644	—	148,644
BRANIFF	—	27,000	—	—	27,000
DELTA	30,000	15,000	—	—	45,000
NATIONAL	—	—	—	—	38,656
NORTHWEST	10,000	40,000	—	—	50,000
WESTERN	4,020	17,280	1,878	—	23,178
CAPITAL	—	—	12,000	11,355	23,355
CONTINENTAL	26,128	—	9,396	4,095	39,619
NORTHEAST	2,763	—	—	21,813	24,576

Source: Silverman, Mitchell L. *A Study of the Financial Strategies That Were Pursued by TWA and Delta During 1956-1971*. MS thesis, MIT, June 1973, p. 119 and Bruce Benner, Jr., *Air Transport in the U.S. and Financing of Jet Passenger Equipment by the Major Airlines*.

TABLE 4

had only earned a modest 3 percent return on investment. Operating ratio had reached around 95 percent and interest coverage ratio had dropped to around three. The worst year was 1957 when the interest coverage ratio had dropped sharply from 12.0 to 3.9 in a single year. The drastic decline in the profitability was partially the result of the recession, since the industry is highly susceptible to the business cycle. The deterioration in the interest coverage ratio alarmed the insurance companies because New York State Insurance Laws (and many similar laws in other states) state that:

“. . . the airline, or any corporation to whom an insurance company makes a loan must have cash flow equivalent to 1.5 times the fixed interest obligations for the year. Any loans to corporations that fail to meet that test in one of the last two years or an average in the last five years are put into a special pot and the insurance company has to increase its reserve against that particular loan. . . .”<sup>4</sup>

While it is a prudent business practice for high business risk industries to aim for low financial risk, the airline industry has been characterized by high degree of financial risk. However, some carriers have consistently been conservative by providing themselves with adequate buffers against various types of business and financial risk. For example, Dr. Johnson's analysis shows that:

“. . . during the mid to late 1950's the firm (Delta) decided to skip the turbo-prop stage in its equipment planning. In retrospect this was a very wise decision since it enabled the firm to move confidently into the transition to jet without making it necessary to dispose of older aircraft much earlier than originally planned, thus avoiding huge writeoffs from the loss on the sale of equipment. . . . Unlike the majority of the trunklines, Delta has remained conservative in its accounting practices in so far as writing off its jets is concerned. These practices have placed the carrier in an advantageous position at the end of the decade, when it was time to retire or sell some of its older aircraft especially the Convair-880's and older DC-8's. These aircraft were almost completely depreciated and further writedowns at the time of sale were not necessary and Delta realized gains on their disposal. . . .”<sup>5</sup>

Considering the poor earning performance of the industry, the Civil Aeronautics Board initiated the General Passenger Fare Investigation to determine whether the general level of passenger fares was “fair and reasonable.” The Board granted a temporary fare increase equivalent to 6.6 percent while the investigation was in progress. During the investigation the carriers argued that their security analysis indicated the airline industry risks to be closely related to the profit margin or its complement, the operating ratio. The Board, however, concluded that the crucial parameter to consider in the rate regulation was rate of return on long-term capital investment. In

<sup>4</sup> Lloyd-Jones, D. J. *op. cit.*, p. 15.

<sup>5</sup> Johnson, Timothy Edward, *Financing of the U.S. Domestic Trunk Airlines, 1940-1969*. Ph.D. thesis, University of Illinois, 1971, p. 220.

1960 the Board concluded a reasonable rate of return of 10.5 percent (after taxes) for the domestic carrier trunk industry. Table 5 shows the capital structure used in the calculations.

Early financing for the jet equipment changed drastically the capital structure of the industry. At the end of 1960 long-term debt accounted for almost 60 percent of the capital while stockholder equity was half this amount. The size of the new debt imposed considerable interest charges relative to the size and the stability of the operating income. The operating ratio of 96.5 percent left the industry with only 3.5 percent to cover interest charges, pay taxes and show profit. The interest coverage ratio had diminished to 1.5 at the end of 1960 from 17.0 at the end of 1951.

### THE PERIOD OF INTERNAL FINANCING

The early sixties brought more capital requirements for the airline industry. Although the four-engine jets were in service the carriers were placing orders for two and three-engine jets. While the capital money market was unfavorable at the beginning of the sixties, the situation improved significantly by mid-sixties due to the strong earning performance of the industry. Besides strengthening investor confidence the considerable net earnings allowed for substantial internal financing. In 1965 the industry earned the highest return on investment during the entire twenty-year period covered in this analysis.

### RATE OF RETURN ON INVESTMENT (1960) DOMESTIC TRUNK CARRIERS

Type	Capitalization		Weighted Cost
	Percent	Cost	
<b>Big Four</b>			
Debt	50	4.5	2.25%
Equity	50	16.0	8.00%
			<u>10.25%</u>
<b>Other Eight</b>			
Debt	55	5.5	3.03%
Equity	45	18.0	8.10%
			<u>11.13%</u>
<b>All Trunks</b>			
(2/3 Big Four + 1/3 of Other Eight)			<u><u>10.50%</u></u>

TABLE 5

The average rate of return on investment of 10.7 percent produced a healthy 17.3 percent return on a stockholder equity due to the relatively low rate on long-term debt accompanied by a 1.1 debt to equity ratio.

The period 1961-1966 was financed heavily through internal sources due basically to the high profits earned during this period. Over a third of the funds came from depreciation, about 20 percent from net earnings and 6.6 percent from deferred credits which were mostly deferred income taxes. Profitability was important in this period not only as an internal source of funds but because of its critical influence on the availability of debt financing. In addition, the existence of profits enabled the industry to raise almost 350 million dollars through deferred credits, a figure almost three times larger than the previous five-year period. Most of this resulted from the reported difference in depreciation charges to stockholders and the Internal Revenue Service. External sources during this period fulfilled less than a third of the total requirements with 19.5 percent derived from long-term debt and 8.1 percent from new stock issue.

These figures reflect the trend in the industry and examination of each carrier shows considerable differences within the industry. For example, Dr. Johnson's analysis shows that:

“. . . (Delta) company's heavy reliance on the increase in non-current liabilities as a source of funds . . . this was mainly due to a 41 million dollar rise in deferred federal income taxes. . . . The second exception to the average of the Smaller Seven group was the firm's (Delta's) decrease in long-term debt during the first six years (1960-1965) . . . the structure of Northwest, like that of Delta, contained no bond or debenture issues throughout the ten-year period (1960-1969). The firm(s) relied solely on notes issued to banks and insurance companies . . .”<sup>6</sup>

#### THE PERIOD OF MIXED FINANCING

Between 1966-1971 the industry once again ordered larger wide-body equipment to the tune of \$10 billion. This tremendous commitment was made soon after the industry had realized substantial profits. However, towards the end of the sixties the financial position of the industry began to deteriorate. The high operating ratios, fluctuating and uncertain earnings, inflation, and declining airline stock prices resulted in a tight supply of money for industry. Capital in the form of debt or equity was not readily available as in the previous decade and the industry began to investigate different and more expensive instruments of financing its capital requirements including subordinated convertible debenture financing, bank financing and lease financing.

The subordinated convertible debenture financing was used when the insurance companies did not want to buy straight senior debt. The convertible debenture is a hybrid type of security having characteristics of both straight debt and common equity. This source of financing can be superior to both straight debt and common equity. However, if improperly used, it can produce

<sup>6</sup> Johnson, T. E., *Ibid.* pp. 218, 248 and 250.

the worst features of both major alternatives. The airlines used this instrument as a sweetener in attracting money from the insurance companies. Table 6 shows that a sizeable amount of funds were still obtained from the insurance companies except now part of the securities were convertible debentures.<sup>7</sup> There are many advantages in using convertibles as a source of financing. For example, even if conversion is exercised convertible debentures can result in a lesser number of additional common shares compared to a straight sale of common stock in the same amount. Furthermore, the convertibles can be issued at a lower effective interest cost and sinking fund rates compared to straight long-term debt because of the convertible feature. Table 8 shows the extent of convertible debt as a source of financing.

During the 1966-1971 period the share of the capital provided by the banks increased from 8.9 percent in 1967 to 16.0 percent in 1971. Delta relied heavily on this source and increased its bank loans from 54.2 to 204 million dollars. This source of financing can be expensive since, not only are the short-term interest rates usually high, but the loan has to be renegotiated two or three times during the life of flight equipment. In light of this, it is not clear why Delta's conservative management subscribed to this form of financing unless the company expected its average short-term interest cost to be lower than the long-term interest rate.

Aircraft leasing as a source of financing became significant in the mid-sixties due basically to the existence of investment tax credit. The trend in aircraft leasing can be seen in Table 9 taken from Dr. Tripp's analysis. Although some of the smaller trunks had been using leasing as a source of financing since the early sixties, the extent of this source was small until the mid-sixties when the Big Four began to use this instrument. Dr. Tripp's analysis further shows that,

“ . . . In contrast, a few of the carriers have virtually avoided leasing entirely. Delta Air Lines and Northwest Airlines have not entered into any long-term leases for aircraft during the entire period. In addition, the number of leased aircraft operated by Continental Airlines and National Airlines is so minimal as to not warrant mention. . . .”<sup>8</sup>

There appears to be a relation between rate of return on investment and the use of leasing as a source of financing. Table 10 shows that carriers earning higher rate of return than the industry average were the ones to avoid leasing aircraft. Their higher than average earnings have provided them with other more desirable sources of financing. Furthermore, carriers with poor or no earnings were not able to take advantage of the investment tax credit laws. For example, a carrier has to make profit in order to have tax obligations before it can benefit from the investment tax credit set up. For these carriers leases provided a partial benefit since the tax advantages obtained by the lessor (say the bank) were generally shared with the lessee (the air carrier) through lower effective interest rates. Towards the end of the sixties for some carriers, leasing was not only a way of obtaining aircraft at lower effective interest rates but perhaps the only way of acquiring an aircraft.

<sup>7</sup> Delta in fact reduced its long-term debt with insurance companies as seen in Table 7.  
<sup>8</sup> Dr. Frederick Tripp, *op. cit.*, p. 52.

**INDEBTEDNESS OF MAJOR U.S. AIRLINES  
EQUITY PLUS LONG AND SHORT-TERM DEBT**

	1967	1968	1969	1970	1971
	\$M	\$M	\$M	\$M	\$M
Stockholders' Equity	2701.5	2890.9	3074.2	2906.5	3356.6
Total Debt	3721.0	4589.6	4809.6	5604.8	5153.7
Insurance Co.	1560.0	1713.4	1896.1	2005.6	1987.5
Banks	568.9	1188.9	1091.9	1678.3	1359.5
Airline Supplier	102.0	190.5	192.1	161.0	283.3
Other	1490.1	1496.8	1629.5	1759.9	1523.4
	%	%	%	%	%
	42.0	38.6	39.0	34.1	39.4
	58.0	61.4	61.0	65.9	60.6
	24.3	22.9	24.1	23.6	23.4
	8.9	15.9	13.8	19.7	16.0
	1.6	2.6	2.4	1.9	3.3
	23.2	20.0	20.7	20.7	17.9

Source: *U.S. Civil Aeronautics Board. Reports to the Congress 1968-1972.*

TABLE 6

**DELTA AIR LINES INDEBTEDNESS  
EQUITY PLUS LONG AND SHORT-TERM DEBT**

	1967	1968	1969	1970	1971
	\$M	\$M	\$M	\$M	\$M
Stockholders' Equity	177.4	207.6	241.4	274.2	299.0
Total Debt	90.0	197.5	238.8	243.7	222.8
Insurance Co.	35.0	32.5	28.8	23.7	18.8
Banks	54.2	165.0	210.0	220.0	204.0
Airline Supplier	—	—	—	—	—
Other	0.8	0.3	—	—	—
	66.3	51.2	50.3	52.9	57.3
	33.7	48.8	49.7	47.1	42.7
	13.1	8.0	6.0	4.6	3.6
	20.3	40.8	43.7	42.5	39.1
	—	—	—	—	—
	0.3	—	—	—	—

Source: *U.S. Civil Aeronautics Board. Reports to the Congress 1968-1972.*

TABLE 7

## CONVERTIBLE DEBT OF MAJOR U.S. AIRLINES

1971

	Total Debt (\$M)	Convertible Debt (\$M)	Convertible Debt % of Total Debt
American	657	173	26.3
Braniff	189	—	—
Continental	301	47	15.6
Delta	223	—	—
Eastern	608	125	20.6
National	212	—	—
Northeast	39	22	56.4
Northwest	256	—	—
Pan American	1018	350	34.4
Trans World	776	346	44.6
United	703	—	—
Western	174	30	17.2
<b>TOTAL</b>	<b>5156</b>	<b>1093</b>	<b>21.2</b>

1970

American	732	283	38.7
Braniff	214	—	—
Continental	323	35	10.8
Delta	244	—	—
Eastern	757	205	27.1
National	170	—	—
Northeast	42	22	51.4
Northwest	279	—	—
Pan American	1037	350	33.8
Trans World	835	250	29.9
United	773	—	—
Western	197	30	15.2
<b>TOTAL</b>	<b>5603</b>	<b>1175</b>	<b>21.0</b>

Source: U.S. Civil Aeronautics Board. Reports to the Congress 1971-1972.

TABLE 8

The financial position of the industry looked fairly gloomy at the end of 1970. The earnings had been declining steadily in the past few years due basically to the slowdown in the economy, excess capacity and substantial increase in operating costs. The interest coverage ratio had dropped down to an unacceptable level of 0.2 and the operating ratio stood at an all-time high of 99.4 percent. The highly leveraged position of the industry (debt to equity ratio of 1.9) accompanied by a lower average rate of return on investment relative to the interest rate on debt produced losses for the stockholders.

In 1970, as before in 1957, the Civil Aeronautics Board initiated the Domestic Passenger Fare Investigation to conduct a full scale investigation into the domestic passenger fare level and structure. The following is a summary of the decision on Phase 8 of the investigation regarding the rate of return on investment.<sup>9,10</sup>

**DOMESTIC TRUNK AIR CARRIERS  
SYSTEM OPERATIONS  
COMPARISON OF THE VALUE OF OWNED  
AND LEASED AIRCRAFT  
(\$000)**

**1961 - 1970**

Year	Total Aircraft Investment at Cost	Owned Aircraft at Cost	Leased Aircraft at Cost	Per Cent Leased
1970	\$10,594,770	\$8,465,213	\$2,129,557	20.10
1969	9,364,691	7,679,954	1,684,737	17.99
1968	7,694,584	6,595,981	1,098,603	14.28
1967	6,053,284	5,445,475	607,809	10.04
1966	4,851,002	4,400,351	450,651	9.29
1965	3,939,008	3,618,987	320,021	8.12
1964	3,388,739	3,246,271	142,468	4.21
1963	2,938,889	2,838,766	100,123	3.40
1962	2,891,231	2,797,357	93,874	3.24
1961	2,643,562	2,549,718	75,200	2.84

Source: *Dr. Frederick Tripp*, op. cit. p. 51

**TABLE 9**

<sup>9</sup> U.S. Civil Aeronautics Board Domestic Passenger Fare Investigation. Phase 8—Rate of Return. Decided April 9, 1971, Docket 21866-8.

<sup>10</sup> An excellent discussion on the various historical changes on the regulation of rate of return on investment can be found in a recent article by Thomas H. Vernon, *Air Carrier ROI*, *Financial Analysts Journal*, Jan-Feb, 1971, pp. 44-53.



1. There being no likelihood in the foreseeable future of conversion into common equity of outstanding convertible debentures, such debentures should be considered as debt, rather than equity, and their recognized costs should be based upon the coupon rate.

2. In view of the unsoundness of the actual industry average debt ratios, a hypothetical ratio shall be employed.

3. Consistent with the assumptions implicit in the hypothetical equity structure, cost of debt shall be based upon present embedded cost with no allowance for cost related to future debt financing.

4. A single rate of return should be established for the domestic trunkline industry as a whole.

5. The fair and reasonable rate of return on investment for domestic passenger-fare services of the domestic trunkline carriers is 12 percent (after tax), based upon a 6.2 percent cost of debt, a 16.75 percent cost of equity and a 45/55 debt equity ratio.

6. The fair and reasonable rate of return on investment for local service carriers for passenger-fare purposes is 12.35 percent, based upon a 7.25 percent cost of debt, 20 percent cost of equity, and a 60/40 debt/equity ratio.

### RATE OF RETURN ON INVESTMENT (%)

	Selected Carriers						
	Major U.S. Airlines	Delta	Northwest	Continental	United	TWA	Eastern
1960	2.1	5.3	1.6	7.1	2.5	2.1	—0.5
1961	1.0	7.2	4.6	6.1	2.2	—5.2	—2.7
1962	4.0	12.7	9.4	4.2	3.7	2.9	—3.9
1963	6.0	12.8	11.4	7.8	5.2	9.9	—11.2
1964	9.3	15.8	16.6	11.3	6.8	11.5	1.2
1965	10.7	18.8	19.2	13.2	7.6	12.9	10.8
1966	9.0	20.2	17.6	16.4	5.0	7.6	5.3
1967	7.2	12.8	17.5	8.0	6.5	4.8	5.4
1968	5.1	10.3	20.6	4.7	4.1	4.1	1.4
1969	3.9	11.6	8.7	4.6	5.4	2.5	2.9
1970	1.2	11.3	7.4	4.9	—0.8	—5.2	4.5
1971	3.0	12.5	4.1	6.4	2.2	1.5	3.9

Source: U.S. Civil Aeronautics Board. *Handbook of Airline Statistics*, (Various Editions)

TABLE 10

The industry has made a turn since the beginning of the decade. The net income of the domestic trunks and Pan American in 1973 is expected to be in the range of 200-300 million dollars. Still less than the highest earnings recorded in 1967 at 411 million dollars. The recent improvement is due basically to the drastic cost-cutting measures put in effect by the carriers in 1970 and 1971 and the improvement in operating revenue. The reduction in operating costs was the result of tight capacity control and a cutback in the number of employees. The improvement in operating revenue was the result of increases in traffic growth accompanied by fare increases in the last three years. This level of earnings is less, however, than a third of the amount required to achieve a 12 percent rate of return allowed by the Board.

### FUTURE FINANCING

Current estimates for the capital requirements of the industry stand at over 7 billion dollars for the first half of this decade and over 20 billion for the second half of the seventies. The question is what sources will the industry use to meet these mammoth capital requirements. In considering the possible alternative instruments of financing we have to rely on the experience of twenty years. The historical analysis is especially useful for a cyclical industry and based on the past analysis it appears that the airlines portray the cyclical trend with the cycle running from five to ten years. However, while the equipment cycle has a significant influence on the carriers' earning cycle, the existence of an economic cycle on top of the equipment cycle makes the interpretation of the results very difficult.

The key factor determining the ability and needs of the airlines to raise the necessary funds will be the future profitability. Future profitability will not only be a significant source of internal financing as during the years 1951 to 1956 and 1961 to 1966 but will exert substantial influence in attracting external funds. As seen from the historic analysis the airlines represent a high risk industry. The earnings fluctuate considerably, operating ratios are high and it is highly susceptible to the business cycle. Furthermore, the industry is highly competitive and subject to rapid technological change. It is therefore difficult to forecast accurately the extent and timing of future profitability.

The difficulty in forecasting profitability lies in the inability to forecast accurately the operating costs, traffic growth, trends in yield and the operating load factors. In general, current industry analysis show that earnings can be expected at least during the mid-seventies even though they probably will not reach the 12 percent rate of return allowed by the Board.

The outlook for the carriers' profitability is based on an expected growth in traffic to the tune of 10 percent per year, a reversal in the downward trend in the average yield and a continuation of the cost-controlling mechanisms. The growth in traffic can be justified due to an expected increase in the factors relating to travel—gross national product, personal disposable income and corporate profits. The improvement in yield will result not so much from fare increases but instead from reduction in discount fares. While it is difficult to gauge accurately the influence of such factors as Travel Group Charters and individual airline innovations such as TWA's Demand Scheduling, it

seems reasonable to assume that on short-term basis the Travel Group Charters may have a negative impact on the yield, whereas on long-term basis they will probably improve profitability due to greater demand for mass transportation.

On the costs side, even though costs such as fuel and landing fees may go up, it is expected that the Board will provide adequate compensatory rate increases. Furthermore, the completion of all of the phases of the Domestic Passenger Fare Investigation will provide the Board with a set of parameters to make prompt decisions on future fare applications. It is also expected that a significant penetration of the wide-body equipment should produce a decline in unit costs in the coming years. With the recent cancellation on the Concorde options by TWA and Pan American, the industry may not have to absorb the cost of another technological change at least in this decade. However, while the absence of a technological change may keep the average unit costs down, it also implies a possible reduction in potential productivity growth.

By far the single largest source of internal funds will still be depreciation. Historically this source has provided between 30 and 40 percent of the total funds needed. In future, the percentage of the funds raised through this source may decline slightly due to the greater use of leased aircraft. Although the extent of funds raised through this source will depend on CAB regulations and vary by carrier reflecting individual management policies, this will remain the major source of internal funds.

With respect to external financing a slow down is expected in the acquisition of long-term debt. There are two reasons for this expectation. First, the current level of fixed interest expense is becoming fairly large relative to the total operating expenses. Also the industry is facing difficulty in meeting such expenses in light of the high operating ratio. In 1971 this expense amounted to \$270 million, more than three times the amount for 1961. Second, since the volatility of the earnings relative to capital investment if continued would not justify the values of the recent debt to equity ratios the industry would be forced to improve its debt to equity ratio if it is to attract the insurance companies and the banks.

In the past there has been a substantial concentration of the debt held by these institutions. For example, Table 11 shows that during the period 1967-1969 the top three insurance companies held 65 percent of the total debt held by these institutions and 43 percent of the total bank debt was held by the top three banks. With so much at stake these institutions therefore maintain financial specialists in the airline industry to determine the relative risk of the industry. Certain carriers such as Delta represent very favorable risk/return characteristics from the point of view of these institutions due to their low debt to equity ratio and high interest coverage ratios. These conservative carriers Delta, Northwest, Continental and possibly National and Western with low financial leverages should be able to attract debt capital more easily than the high financially leveraged carriers such as TWA and Eastern. In addition, the debt could be of the convertible type if the flight long-term debt is too expensive and/or the industry can not raise enough common equity but future prospects are viewed favorably.

## CONCENTRATION OF DEBT—MAJOR U.S. AIRLINES

<b>Insurance Companies</b>	<b>1967</b>	<b>1968</b>	<b>1969</b>
Metropolitan	\$ 465,686	\$ 515,583	\$ 522,608
Prudential	383,750	363,500	460,462
Equitable	220,833	216,533	231,967
	<hr/>	<hr/>	<hr/>
Top Three	1,070,269	1,095,616	1,215,037
Other	489,723	617,783	680,985
TOTAL	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>
	\$1,559,992	\$1,713,399	\$1,896,022
<b>Banks</b>			
Chase Manhattan	\$ 121,627	\$ 179,624	\$ 165,968
Bank of America	64,266	148,234	145,979
Bankers Trust	74,687	163,530	130,460
	<hr/>	<hr/>	<hr/>
Top Three	260,580	491,388	442,407
Other	308,381	627,497	649,548
TOTAL	<hr/> <hr/>	<hr/> <hr/>	<hr/> <hr/>
	\$ 568,961	\$1,118,885	\$1,091,955

Source: *U.S. Civil Aeronautics Board. Reports to the Congress 1968-1970.*

TABLE 11

Since airline stocks are generally considered as short-term trading vehicles, equity financing should increase slightly towards the mid-seventies due to improvement in the earnings. It is however, difficult to forecast the extent of this source since it would depend on the financial position of the industry in general and dividend policy, rate of return in stockholder equity, beta coefficient and the earnings to price ratio in specific. Again, carriers which have shown relatively low level of business and financial risk should have no problem in attracting equity capital. Delta and Northwest are certainly examples of investment grade. These carriers are practically the only ones to pay dividends continually even through the recent recession periods.

Leasing as a source of equipment financing will continue to be popular as long as the investment tax credit is in existence and the tax laws do not change severely to alter the attractiveness to lessors. Furthermore, since the present leases cover the next 8-10 years which is about the same as the useful life of the flight equipment, leasing should prove to be a significant source. It is possible that leasing may finance as much as 30 percent of the new aircraft. However, anything above this is not probable due to the covenant restrictions.