

**COMMENT: DEBT FINANCE AND VOLATILITY IN RATES OR RETURN
IN AIR TRANSPORT**

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Introduction

Air transport has long been noted as a high "risk" industry. One component of this risk, identified as "business" risk by many airlines economists, stems from the intrinsic nature of the industry and the intense competition facing many of the carriers.¹ It results in unstable revenue and operating profit levels.² To investors, a second component, "financial" risk, has been added. Its cause is the carriers' excessive dependence on long-term debt finance. Its result is instability in rates of returns to common stockholders.

The purpose of this paper is to summarize briefly the financing patterns of the ten Domestic Trunklines for the period, 1960-1972, in order to show this over-reliance on debt finance and to quantify its effect on rates of return. In an era of depressed airline stock prices, an analysis of these effects is of interest.

Financing Patterns:

The source and application of funds statement often yields insights into carrier attitudes toward various types of funds. Table I presents the major sources of funds to the Ten for 1960-1972 inclusive. Of particular interest on the exhibit is the heavy proportion of all sources arising from long-term debt finance. More debt equals more financial risk.

At the high end of the scale are TWA (long-term debt accounting for 34.9% of all funds), Continental (33.5%), Braniff (33.3%), National (29.4%), and Eastern (29.3%). Only Delta (10.0%) and Northwest (10.7%) are more conservative. UAL (27.2%), Western (21.8%), and American (19.8%) fall in between the two extremes. When other non-current liabilities (mostly deferred credits, etc.) are included, the figures are even more

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1. For an excellent discussion of this topic, see: Frederick, John H., *Commercial Air Transportation*, 4th ed., (Homewood, Ill.: Richard D. Irwin, Inc., 1961), 331-332.

2. There are many ways to measure business risk. For these measures and a comparative analysis of the high levels of this risk in air transport versus other utilities and industrial sub-groups, see: Brown, Victor H., "Testimony of Victor Brown", *Domestic Passenger Fare Investigation*, (Washington, D.C.: Civil Aeronautics Board, August 1970), Docket 21866-8, Exhibits BE-101 through BE-107.

TABLE I
SOURCES OF FUNDS (IN PERCENTS)
1960-1972

	AAL	EAL	TWA	UAL	BRN	CAL	DAL	NAL	NW	WAL
Decreases in Net Working Capital	3.1%	3.2%	0.1%	0.2%	0.0	1.6%	0.0	0.0	0.4	0.0
Funds from Operations—Depreciation	42.9	46.2	46.6	43.7	40.4	35.4	39.7	38.3	38.9	51.7
Net Profits	12.9	1.7	9.3	10.1	17.7	12.9	28.1	20.4	30.1	17.3
Increases in Long-Term Debt	19.8	29.3	34.9	27.2	33.3	33.5	10.0	29.4	10.7	21.8
Increases in other Non-Current Liabilities	7.1	0.1	2.3	8.2	2.2	7.4	12.7	11.4	9.9	6.3
Increases in Pref. Stock	0.1	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Increases in Common Stock	13.9	17.9	6.7	10.7	6.4	9.2	9.5	0.5	10.0	2.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE:

Computed from data in the *Handbook of Airline Statistics*, (Washington, D.C.: The Civil Aeronautics Board, 1971 edition. A source of funds is defined as an increase in a liability of equity item or a decrease in an asset. To generate this exhibit, net changes in each balance sheet item were computed for each airline over the selected period, and classified as sources or uses of funds. Refinements for net profits and depreciation were then introduced and percentages computed from the raw data. For details of the technique, see: Helfert, Eric A., *Techniques of Financial Analysis*, (Homewood, Ill.: Richard D. Irvin, Inc., 3rd edition, 1972), Ch. 1.

significant. American's proportion is increased from 19.8% to 26.9% (other non-current lia. 7.1%), UAL's to 35.4%, Continental's to 40.9%, etc.³ Such excessive reliance on long-term debt is *not* characteristic of other industries displaying similar conditions of cyclical vulnerability, intense competition, etc.⁴ The majority of the Ten thus stand as an example of a violation of a sound "principle of finance". That principle asserts that firms (and/or industries) facing high levels of business risk should *not* assume high debt burdens (that is, high financial risk).⁵

How this debt finance has affected widely known investor measures of financial risk, such as the Moody's debt ratio (long-term debt/total capitalization), can be seen from the following data. The carriers are ranked in descending order of financial risk.

TABLE II

TWA	64.4%	National	52.1%
Braniff	61.5%	Western	50.3%
EAL	59.5%	American	45.6%
Continental	58.4%	Delta	26.4%
UAL	55.4%	Northwest	24.9%

SOURCE: As of Dec. 31, 1972. Calculated from data in the *Air Carrier Financial Statistics*, (Washington, D.C.: Civil Aeronautics Board), December 1972.

According to one industry expert, a sound ratio in this industry would be in the 30-40% range.⁶ The CAB, in the recent *Domestic Passenger Fare Investigation*, selected 40-45% as the optimal debt ratio for the Ten.⁷ In either case, actual ratios exceed the "norm" by significant margins.

3. Even these figures understate the real debt burden to the carriers. Leasing, the equivalent of long-term debt finance in this industry, is not considered in the above analysis as it does not directly appear on the airlines' balance sheets. Leasing, however, is a major source of funds; especially to EAL and TWA, and its inclusion as long-term debt significantly affects measures of financial risk. For a detailed treatment of the effect of leasing on financial risk, see: Gritta, Richard D., and Peter M. Lynagh, "Aircraft Leasing: Panacea or Problem?", *Transportation Law Journal*, V(January 1973), 9-21.

4. See, Victor Brown, "Testimony of Victor Brown"; Exhibits BE-101 through BE-132. Brown contrasts air transport's levels of business and financial risks to those of a sample of 35 Electric companies, 7 Gas, 3 Telephone, and 74 Industrial firms. Only air transport evidences high levels of both business and financial risk.

5. Johnson, Robert W., *Financial Management*, 4th ed., (Boston, Mass.: Allyn and Bacon, Inc., 1971), Ch. 10, especially pp. 215-227.

6. See the summary of the testimony of David Kosh, in: "The Final Decision—Phase 8, The Rate of Return", *Domestic Passenger Fare Investigation*, Docket 21866-8, 12-14, issued April 9, 1971.

7. *Ibid.* See the statements of Whitney Gilliland, the CAB Examiner, on page 1 of the Final Decision.

Rates of Return:

Financial theory suggests that the effects of combining high levels of financial risk with high levels of business risk is a compound or multiplicative one. Unstable revenue and operating profit levels are further magnified by debt finance into more volatile rates of return on stockholders' equity (net profit after taxes/net worth.)⁸ Table III shows the net results on these returns for the 1960-1972 period.

TABLE III

	Mean	Range	Stand. Dev.	CV
American	8.3%	-7.3 to 19.1%	7.3%	0.88
Eastern	-3.3%	-40.1 to 24.1%	15.3%	4.64
UAL	6.2%	-7.2 to 16.1%	5.9%	0.95
TWA	5.7%	-21.3 to 26.4%	13.6%	2.39
Braniff	8.8%	-3.2 to 21.4%	6.6%	0.76
Continental	11.4%	3.3 to 27.4%	8.1%	0.71
Delta	17.8%	7.3 to 29.6%	6.5%	0.37
National	10.0%	-28.1 to 28.0%	15.4%	1.54
Northwest	13.9%	3.1 to 27.7%	8.0%	0.58
Western	10.9%	-15.4 to 24.7%	10.5%	0.96

SOURCE: Computed from basic data in the *Value Line Investment Survey*, October 21, 1973.

The mean return is the arithmetic average of the returns for each carrier for the period. CV is the coefficient of variation (the standard deviation/the mean). It allows for direct comparisons of data (that is, by dividing by the mean it adjusts for size differentials in the levels of the returns themselves).

Two factors are clear from this table. First, the reason for the above "principle of finance" is evident. The ranges of rates of returns are wide and the variability marked. Second, those carriers employing the largest amounts of debt are the most unstable. EAL's range is the greatest (-40.1% to 24.1%), its mean the lowest (-3.3%), and its CV the highest (4.64). As Table II shows, the carrier's debt ratio (59.5%) is exceeded only by TWA's (64.4%) and barely by Braniff's (61.5%). TWA's range is -21.3% to 26.4%, around a mean return of only 5.7% (with a standard deviation of 13.6% and the second highest CV of 2.39). Other carriers high in risk, such as Braniff, Continental, National, UAL, and Western have somewhat higher mean returns but still significantly wide

8. Johnson, *Financial Management*, Ch. 10 A good analytical presentation of the combined effects.

ranges and high standard deviations. Delta and Northwest, the only two carriers more conservatively financed, have the highest average returns (17.8% and 13.9%, respectively), the narrowest ranges (7.3% to 29.6% for Delta, 3.1% to 27.7% for Northwest), and the lowest relative variances (CVs of 0.37 and 0.58, respectively).⁹ The penalty for the excessive dependence on long-term debt in this industry has therefore been quite high.

Conclusions:

This paper has shown the carriers' heavy reliance on debt finance. The volatility introduced into rates of return to common stockholders bears testimony to the penalty extracted. This instability in returns is highly undesirable from the common stockholder's viewpoint and is one reason for the current lack of interest in airline securities. Empirical evidence has demonstrated that common stock price/earnings ratios are correlated to stockholders' perceptions of risk (as measured by the variance in rates of return).¹⁰ Increasing risk is discounted by stockholders in the form of lower price/earnings ratios and therefore in lower stock prices. For the past several years, carriers' stock prices have remained at very low levels, outperformed by virtually all other industry indices and by the general market, and at this writing eight of the ten are selling below book value.¹¹ Considering the key position occupied by air transport in the national economy, such a situation is significant.¹²

What are the implications of the above for the future? In light of the continuing high demands for new funds to finance the wide-body jet, one can only conclude that the carriers would be well advised to pursue a sounder course in future financing episodes. This means less long-term

9. In fairness to the other carriers, it must be noted here that these two carriers, because of competitive advantages and because of optimal route structures (both functions of historical development and CAB policies toward new route awards), are much lower in business risk than the other of the Ten. Only these two carriers approach the rate of return norm of 13-15% suggested by Weston and Brigham for large industrial firms high in business risk. See, Weston, J. Fred, and Eugene F. Brigham, *Managerial Finance*, 3rd ed., (New York, N.Y.: Holt Rinehart & Winston, Inc., 1969), 66. Brown's data suggests that the Ten face levels of business risk similar to his sub-samples of large industrial firms. Brown, "Testimony of Victor Brown", Exhibits BE-107 through 110, and 131-132 (a listing of the sub-samples). All the other carriers fall well below the 13-15% norm.

10. Weston and Brigham, *Managerial Finance*, 412-414.

11. *Value Line Investment Survey*, (New York, N.Y.: Arnold Bernhard & Co., Oct. 19, 1973), 254-268.

12. The high degree of financial risk in the industry has also had an impact on the credit ratings of the carriers. Most airline debt is now rated by Moody's as lower grade to speculative (Ba to B). See, Moody's *Transportation Manual*, 1973 edition. The net result of this poorer credit rating has been to significantly increase the cost of debt funds to the carriers.

debt and more equity finance. Continued additions to debt can serve only to further increase the variability in returns and compound the problems of the industry. While this remedy may be unpleasant in the short-run, (because it will temporarily dilute the stockholder's position), it may well be crucial to many carriers' survival in the long-run.