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AN UNRESOLVED ISSUE IN SETTING THE COST OF CAPITAL TO THE U.S. DOMESTIC AIRLINES

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INTRODUCTION

IN DETERMINING the reasonableness of overall fare levels to the domestic airlines, the Civil Aeronautics Board (CAB) must first estimate future total costs. The total required return allowed by the Board, from which fare levels are derived, is the sum of normal operating expenses, taxes, and a return to capital on the rate base (the book value of assets less accumulated depreciation), the cost of funds supplied to the carriers. An approximation of the latter, referred to as the cost of capital, is difficult.¹ Unlike other cost components, which are objectively determinable, this cost entails serious estimation problems.

The purpose of this article is to survey the CAB's approach to specifying the cost of capital and to point out an important unresolved problem associated with its estimation for the ten domestic trunklines. That problem concerns the appropriate capital structure for the industry.

THE COST OF CAPITAL

In theory, the cost of capital under regulation has been defined as "a percentage ratio which when applied to a rate base, yields the fair return in dollars which amounts utilities are generally entitled to earn."² It includes interest requirements on debt, dividends on

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¹ Its specification, however, is critically important to the carriers' financial condition. If investors are not permitted to earn their fair rate of return, or if this return is misspecified, the carriers will experience difficulty in attracting capital in the future.

² CAB DOCKET No. 21866-8 (Aug.—1970) at 1, [hereinafter cited as Do-

stock, and a return to retained earnings. In practice, this cost is usually determined as the weighted average of the costs of the various sources of funds, debt and equity, weighted according to the proportion of these sources of funds in the industry's capital structure. That is,³

$$\begin{array}{rcl}
 \text{Cost (in percent)} & \times & \text{Weight} & = & \text{Weighted Cost} \\
 \text{cost of debt} & \times & \text{debt/total capital} & = & \\
 \text{cost of equity} & \times & \text{equity/total capital} & = & \underline{\hspace{2cm}} \\
 & & & & \text{cost of capital}
 \end{array}$$

Total capital is the sum of long-term debt and equity, and the costs of debt and equity are the after-tax costs of these funds.⁴

In 1971, at the conclusion of Phase 8 of the *Domestic Passenger Fare Investigation*,⁵ the CAB set the cost of capital to the ten domestic carriers at 12.0 per cent. Using the above methodology, the cost was determined as,⁶

$$\begin{array}{rcl}
 \text{Cost} & \times & \text{Weight} & = & \text{Weighted Cost} \\
 \underline{6.20\%} & \times & \underline{.45} & = & \underline{2.79} \\
 16.75\% & \times & .55 & = & 9.21 \\
 & & & & \underline{\hspace{1.5cm}} \\
 & & & & 12.00\%
 \end{array}$$

based on estimates of the costs of debt and equity of 6.2 per cent and 16.75 per cent, respectively.⁷ This 12.0 per cent represented an increase from the 10.5 per cent set in the 1960 *Domestic Passenger Fare Investigation*.⁸ Central in this new formulation, however, were the weights assigned to debt and equity. Historically, such weights had always been generated from the *actual* book values of debt

MESTIC PASSENGER FARE INVESTIGATION]. Testimony of David A. Kosh before the CAB in the domestic passenger fare investigation.

³ For a complete discussion of the theory of the cost of capital, see R. JOHNSON, *FINANCIAL MANAGEMENT* ch. 11 (4th ed. 1971).

⁴ The cost of capital of debt is the embedded (historical) interest cost, adjusted for future conditions. The cost of equity, the rate of return expected by common stockholders, is usually defined as the dividend yield on stock plus the expected growth in dividends on that stock. It is often estimated in practice by the earnings yield (earnings/price ratio). For example definitions and the various techniques used to approximate the costs of debt and equity in 1971, see *DOMESTIC PASSENGER FARE INVESTIGATION* at 13-23. Testimony of David A. Kosh.

⁵ *DOMESTIC PASSENGER FARE INVESTIGATION* at 1. Testimony of Whitney Gilliland on April 9, 1971.

⁶ *Id.*

⁷ *Id.*

⁸ *Id.*

and equity on the carriers' balance sheets.⁹ In 1971, however, for the first time in a major regulatory proceeding, hypothetical or "optimal" weights (45/55) were employed in the calculation (versus the actual book value capital structure proportions in 1971 of 60 per cent debt, 40 per cent equity). The "optimal" weights reflected the CAB's judgment as to the proper capital structure for the ten. The greater weight placed on equity, the more expensive source of funds, via the application of the "optimal" structure (55 per cent in equity versus the actual of 40.0 per cent) was the *major* factor in the increase to 12.0 per cent in the cost of capital.¹⁰

In shifting from precedent, the Board argued that the industry was overburdened with debt and that sound public policy dictated that capital structures be more conservative.¹¹ It hoped that the use of the hypothetical capital structure would assist in this goal. But while the CAB's position was a step in the right direction, it can be argued that the Board did not go far enough in setting the "optimal" structure at 45/55. This author feels the true "optimal" is well below the 45 per cent debt ratio, as will be shown below.

THE OPTIMAL CAPITAL STRUCTURE

The optimal capital structure for any firm or industry is a theoretical concept conditioned on the total risk complexion of that firm or industry. Analysts have identified several levels of risk as relevant to capital structure considerations. These are business or operating risk, financial risk, and combined (total) risk.¹² Business

⁹ *Id.* at 4-14.

¹⁰ This is not to suggest that the specification of the costs of debt and equity are not important. They are highly important, but expert witnesses in Phase 8 on the rate of return differed little in their final estimates of these costs. The major debate was over the capital structure for the industry. Kosh argued for costs of 6.5 per cent for debt and 18.0 per cent for equity. Victor Brown set the costs at 5.7 per cent and 16.0 per cent respectively, and Rhoades Foster argued for 7.0 per cent and 17 per cent. *Id.* at 14-32.

¹¹ Whitney Gilliland, the CAB Examiner, overruled a preliminary finding holding for the actual capital structure as of mid-1970. He argued, "In our judgment, the use of the actual capital structure for purposes of determining the overall rate of return will constitute a substantial obstacle in the way of any real improvement in the carriers' debt/equity ratios within a reasonable time frame." *Id.* at 9.

¹² R. JOHNSON, *FINANCIAL MANAGEMENT* chs. 3, 10 (4th ed. 1971).

TABLE I
BUSINESS AND FINANCIAL RISK INDICATORS—THE AIRLINES VERSUS OTHER INDUSTRIES,
1961-1973

BUSINESS RISK	1961	1962	1963	1964	1965	1966	1967	1968	1969	1973	1961-1973 ²	Comments
OPERATING RATIO—												
Airlines (10 Firms)	99.3	97.0	96.4	93.5	91.7	91.3	93.2	94.8	96.7	95.1	95.0	High & Unstable
Electric (35 Firms)	78.8	78.2	78.2	77.7	77.5	77.5	77.3	77.8	77.4	78.9	77.9	Low & Very Stable
Gas (7 Firms)	86.2	85.9	86.1	85.5	85.5	85.5	85.3	85.8	85.4	85.2	85.6	Low & Very Stable
Industrial (74 Firms)	94.2	94.3	94.2	93.7	93.3	93.4	93.9	94.1	94.2	93.9	93.9	High & Very Stable
Telephone (3 Firms)	84.7	84.2	83.8	83.2	82.3	82.5	81.9	82.2	82.7	80.4	82.8	Low & Stable
STABILITY OF OPERATING REVENUES												
AROUND TREND (The higher the SI, the more unstable the firm) ¹ :					1965-69	5.4	5.6	1.9	1.6	3.6		STABILITY INDEX (SI)
Total					1961-69	9.8	8.1	2.1	2.7	4.2		
					1961-73	12.2	10.1	2.5	3.8	5.0		
					RANK	(1)*	(2)	(5)	(4)	(3)		*Most Unstable
FINANCIAL RISK												
	1961	1962	1963	1964	1965	1966	1967	1968	1969	1973	1961-1973	Comments
INTEREST COVERAGE RATIO												
Airlines	0.18	1.80	2.53	5.50	8.19	6.90	5.78	2.50	1.82	2.50	3.77	Poor to Good—Unstable
Electric	6.20	6.20	6.28	6.50	6.71	6.67	6.18	6.06	5.19	2.76	5.88	Good—Very Stable
Industrials	38.00	31.86	37.55	41.65	36.21	45.95	29.72	22.55	14.67	12.34	52.88	Excellent
Telephone	5.40	5.40	5.30	5.38	5.42	5.69	5.02	4.79	4.57	4.08	5.11	Good—Stable
Gas	5.36	5.33	5.11	5.21	5.21	4.87	4.56	4.33	4.11	3.73	4.78	Good—Stable
LONG-TERM DEBT TO TOTAL CAPITALIZATION												
Airlines	48.3%								50.4%	50.1%		High
Electric	49.8%								51.8%	50.8%		High
Gas	55.6%								57.4%	51.0%		High
Industrials	15.8%								20.8%	20.5%		Very Low
Telephone	44.3%								43.3%	48.8%		High

COMBINED RISK

STABILITY OF RATES OF RETURN ON COMMON EQUITY AROUND TREND (the higher the SI, the more unstable the firm) ¹	AIR* IND.	GAS	TEL. ELECT.	STABILITY INDEX (SI)
1965-69	37.1	4.5	3.5	4.5
1961-69	80.4	5.9	6.6	5.4
1961-73	86.6	6.2	6.8	5.7
RANK	(1)*	(2)	(3)	(5)

*Most Unstable

¹ The Stability Index is the Stability Index Formula employed by Standard and Poor's to compute the variance around a log-linear trend line. See Brown, Victor H., "Exhibits for Direct Testimony of Victor Brown," *Domestic Passenger-Fare Investigation* (Docket 21866-8), (Civil Aeronautics Board: Washington, D.C., 1970), Exhibit No. BE-103,1.

² Average (Mean) ratios for the period, 1961-1973.

Source: Interest coverage ratios, operating ratios, and SI for years up to 1969 were directly from, or computed from data contained in, Victor Brown's testimony before the CAB, 1973 ratios and all other data were calculated from Moody's *Transportation Manual*, *Public Utilities Manual*, and *Industrial Manual*. Comments are the authors.

risk stems from the intrinsic nature of the industry; that is, its cost structure, vulnerability to economic cycles, levels of competition, etc. It results in instability in revenues and operating profits. Financial risk, on the other hand, is caused by the use of debt finance, with its obligation to cover fixed charges. The use of debt magnifies changes in operating profits into more unstable after-tax earnings and rates of return. Finally, combined risk measures the total effects of both of the former.

Table I is a summary of various risk measures for the ten airlines plus data on a group of 35 electric firms, 7 gas, 74 industrials, and 3 telephone companies for comparative purposes. The operating ratio (operating revenues/operating expenses), a key statistic in public utility economics, is used as a proxy for business risk. The higher and the more unstable that ratio, the lower and more volatile will be operating profits.¹³ Two popular financial ratios, the Moody's debt ratio (long-term debt/total capital) and the interest coverage ratio, are traditional measures of financial risk. As with business risk, high ratios indicate greater risk exposure. Standard & Poor's Stability Index (SI) supplements the operating ratio as a measure of business risk and is useful as an index of combined risk. The study period 1961-69 covers the time frame surveyed by the CAB in setting the 12.0 per cent return in 1971. 1973 data are provided as an update.

In setting a sound capital structure for any industry, a proper combination of risks is essential. Generally, firms or industries high in one level of risk opt for lower levels of the other. A trade-off which balances total risk is a prerequisite to financial health. Adding high levels of financial risk onto high levels of business risk, for example, serves only to intensify the variability in after-tax returns to common stockholders, a very undesirable situation.¹⁴ Table I shows evidence of the attempted balance in the case of the samples of industrials, gas, electric, and telephone companies. Their con-

¹³ Kosh provides a direct measure to link the operating ratio to variability in operating profits. See DOMESTIC PASSENGER FARE INVESTIGATION. For the importance of the operating ratio as a measure of business risk in air transport, see J. FREDERICK, COMMERCIAL AIR TRANSPORTATION at 331-32 (4th ed. 1961).

¹⁴ Business and financial risk interact multiplicatively, much like levers in physics. Stockholders are, of course, adverse to unstable rates of return. R. JOHNSON, FINANCIAL MANAGEMENT Ch. 10 (4th ed. 1971).

trast to the ten airlines is noteworthy. The following summary, based on the exhibit, is useful:

TABLE II

		<u>Business Risk</u>	<u>Financial Risk</u>	<u>Combined Risk</u>
Airlines	(10 firms)	High	High	High-Unbalanced
Electrics	(35 firms)	Low	High	Moderate-Balanced
Gas	(7 firms)	Low	High	Moderate-Balanced
Industrials	(74 firms)	High	Low	Moderate-Balanced
Telephones	(3 firms)	Low	High	Moderate-Balanced

Of the five major groupings, the airlines and industrials stand out as sharply higher in business risk. The two have significantly higher operating ratios, (mean ratios for 1961-73 are 95.0 for the airlines and 93.9 for the industrials), and the ratios for the ten carriers are particularly unstable (ranging from 91.7 to 99.5). Compare these ratios to those of the electric (77.9), gas (85.6), and telephone companies (82.8). The SI confirms the greater instability facing the former two groups, (for the 1961-73 period, 16.2 for the airlines and 10.2 for the industrials), versus the more stable electric (5.0), gas (2.5), and telephone (3.8) groupings.¹⁵

At the financial risk level, however, the situation is reversed for all the samples but the airlines. The groups low in business risk have much higher debt ratios, (in 1973: 50.8 per cent for the electrics, 51.0 per cent for the gas companies, and 48.8 per cent for the telephones), and therefore lower interest coverage ratios (averaging 5.88, 4.78, and 5.11 respectively), than does the industrial group (with a debt ratio of 20.5 per cent in 1973 and an average coverage ratio of 32.88 for the 1961-73 period) as expected.¹⁶ But the carriers, though similar in business risk to the industrials, evidence debt burdens as large as those of the groups far lower in business risk. The ten thus stand as the only group high in both levels of risk and therefore as the only group high in combined or total risk.¹⁷

¹⁵ The excellent operating ratios of the latter three groups, and their stability in revenues, are directly related to the stability of demand for their products and the lack of competitive conditions in their industries (they are natural monopolies). The airlines and industrials unfortunately do not enjoy such advantages.

¹⁶ Being natural monopolies facing stable markets for their output, the gas, electric, and telephone firms can afford more debt finance.

¹⁷ The high debt ratios are the result of the carriers' excessive dependence on long-term debt over the past decade. For a full discussion, see Gritta, *Debt Finance and Volatility in Rates of Return*, TRANSPORTATION L.J. 73 (1974).

The net result of the high combined risk to the airlines is evident directly from the magnitude of the carriers' SI in rates of returns on equity, the measure of combined risk. The carriers' SI (86.6) is significantly higher than those of the industrials (22.4), electrics (5.7), gas (6.2), and telephone companies (6.8). The evidence demonstrates that a good deal of the incremental variability between the carriers and the industrials is due to the high debt loads of the former.

To achieve the total balance evidenced by the industrials, the carriers' debt burdens should therefore be markedly lower than the actual (50.0 per cent in 1973) and the hypothetical (45 per cent) set in 1971 by the CAB. If the ten are approximately the equal of the industrials in business risk, then the airlines' debt ratios should tend more to approach those of the industrials (20.5 per cent) than those of the telephones (48.8 per cent), gas (51.0 per cent), or electrics (50.8 per cent). While an exact figure for the "optimal" debt-to-equity ratio cannot be derived directly from the above comparisons on the exhibit, an estimate of 30-40 per cent for debt would seem reasonable. Testimony by one expert witness in the 1971 investigation has supported this range as "optimal" for the ten.¹⁸

THE EFFECT OF CAPITAL STRUCTURE ON THE COST OF CAPITAL

Considering the "optimal" capital structure to lie in the 30-40 per cent range, the following summarizes the estimation of the cost of capital for three possible structures, given the cost of debt (6.2 per cent) and equity (16.75 per cent) used by the CAB.¹⁹

	Cost	×	Weight	=	Weighted Cost
debt	6.20%	×	.30	=	1.86%
equity	16.75%	×	.70	=	11.73%
					<hr/> 13.69%
	6.20%	×	.35	=	2.17%
	16.75%	×	.65	=	10.89%
					<hr/> 13.06%

¹⁸ Kosh, however, based his estimates largely on optimal interest coverage ratios rather than on comparative capital structures. See DOMESTIC PASSENGER FARE INVESTIGATIONS at 25-26. Exhibits of David A. Kosh.

¹⁹ It might be argued here that should a lower debt/equity ratio be assumed as "optimal," it would be necessary to adjust downward the costs of both debt

$$\begin{array}{rclcl}
 6.20\% & \times & .40 & = & 2.48\% \\
 16.75\% & \times & .60 & = & 10.05\% \\
 & & & & \hline
 & & & & 12.53\%
 \end{array}$$

The lowest estimate above exceeds the 12.0 per cent set in 1971 by over 0.5 per cent. The highest represents 1.7 per cent greater than that current allowed by the Board. Neither is insignificant when considered with the overall rate base of the ten in 1973-74 (total assets were approximately \$13.0 billion).

CONCLUSIONS

The evidence strongly suggests that the CAB has understated the cost of capital, a key input into total costs to the ten carriers, by failing to specify correctly the "optimal" capital structure for the industry. The data clearly show the ten to be similar to the sample of 74 industrial firms in business risk and therefore to be significantly overleveraged, given the actual debt load (50.0 per cent in 1973) or the hypothetical (45 per cent) set by the CAB in 1971. The direct result of this has been to deny the airlines returns adequate enough to promote reasonable profits, thus injuring their ability to attract new capital.²⁰

A balance of total risk is essential in a regulated industry.²¹ If

and equity as the failure to do so would result in "windfall" profits to the carriers. Two counter arguments can be advanced, however. First, the 16.2 per cent set in 1971 was an underestimate of the cost of equity. The CAB placed heavy weight on the testimony of Victor Brown. Brown, based on a comparative study of industrial sub-samples, estimated the cost of equity to be 16.0 per cent. His data, however, actually suggests that the true cost of equity capital to the airlines was closer to 18.0 per cent. Brown mysteriously excluded the most comparative of his sub-samples in his final estimates, thus biasing his estimate downward. See DOMESTIC PASSENGER FARE INVESTIGATION. Testimony and exhibits of Victor H. Brown. Second, the costs of both debt and equity have risen in mid-1974. Average airline earnings price ratios, often used as estimators of the cost of equity capital, were in the 18-20 per cent range, and the cost of new debt had risen steeply as the Federal Reserve tightened the money supply. Yields on some airline debt were in the 10-12 per cent range. Adjusted for taxes, these yields are far higher than the 6.2 per cent after-tax cost used by the CAB in 1971.

²⁰ While virtually all stocks slid sharply in 1974, the airlines as a group have been depressed for several years. This is the direct result of investor apathy to securities whose returns are far too low in comparison with other groups equal in total risk.

²¹ Increasing the allowable return is necessary now to restore profitability to the carriers. As economic conditions improve, and especially as *actual* debt/equity ratios decrease into more normal ranges, however, the CAB might intervene to readjust the cost of capital downward. The CAB in the past seems to have fol-

the CAB is to meet its mandate to "foster sound financial conditions in air transportation," it must recognize the need for this balance in setting the cost of capital to the carriers.²²

lowed a "fire-fighting" approach to airlines' financial problems, convening major investigations only in response to crises. This author believes the Board would be more effective in fostering sound conditions within the industry if it continuously monitored the cost of capital, adjusting it as conditions demanded. Even a two or three year review would seem superior to the current approach.

²² It must be noted here that increasing the allowable return does *not* necessarily imply higher fare levels. This author views a change in CAB competitive policies as the superior strategy aimed at boosting rates of return. An overall reduced level of competition would accomplish this end result far better than fare increases, which might only serve to hinder new traffic generation.