

A Review and Critique of the CAB's Domestic Passenger-Fare Investigation: Docket No. 21866-8, the Rate of Return

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INTRODUCTION

On April 9, 1971, at the conclusion of Phase 8 of the *Domestic Passenger-Fare Investigation*¹ (DPFI), the Civil Aeronautics Board (CAB) set the "fair rate of return," or so-called cost of capital, to the U.S. domestic air carriers at 12.0%, increasing that return from the 10.5% standard determined in the 1960 *General Passenger-Fare Investigation* (GPFI).² In doing so, the Board weighed expert testimony which sought to set that return as low as 10.5% and as high as 13.5%. The purpose of this article is to review the evidence and the CAB methodology used in setting the 12.0% return and to argue that sound testimony urging a higher return was rejected incorrectly.

The rate of return will be defined first. Then the article will examine in detail the CAB specification of that return, the testimony and evidence on

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1. CIVIL AERONAUTICS BOARD, DOMESTIC PASSENGER-FARE INVESTIGATION, 673-758, (1970-1974) (*Phase 8, The Rate of Return*, Docket No. 21866-8, CAB Order No. 71-4-58 (April 9, 1971)) [hereinafter cited as *DPFI*]. Phase 8 also considered the rate of return to the local service carriers. This article, however, will deal exclusively with the trunklines.

2. Docket No. 8008, 32 C.A.B. 291 (1960).

the component costs, and the capital structure employed to derive it. A critique, including the effects of present conditions on the rate of return, will follow. The implications for CAB policy in the areas of fare levels, route awards, and mergers, will be reserved for the conclusion.³

I. THE RATE OF RETURN

In economic theory, all the factors of production, land, labor, capital, and management, have required returns. The returns to land are rents; to labor, wages; and to management, salaries. The return to capital, or the cost of funds, is called the cost of capital. In public utility economics, this cost is referred to as the "fair rate of return."

The "fair rate of return" under regulation has been defined as, "that percentage which when applied to the investment rate based will return enough in current dollars to cover fixed charges on debt and preferred stock and will provide a 'fair and reasonable' compensation to common equity holders."⁴

This return must meet three fundamental economic criteria. It must be:

- (1) sufficient to enable a regulated industry to attract new capital at a reasonable cost,
- (2) sufficient to enable a regulated industry to maintain its credit standing and financial integrity,
- (3) commensurate with returns being earned on investments in other industries facing corresponding risks.⁵

The proper specification of this return is critical to carrier profitability, because this return is an important input into the total dollar required revenue, itself a determinant of fare levels.⁶ If an industry cannot earn a "fair rate of return," or if that return is not properly set, that is, not

3. Lest the reader be persuaded that this article will argue for higher fares, this caution must be made. A higher return does not necessarily imply higher fare levels as will be argued in the conclusion of the article.

4. *Domestic Passenger Fare Investigation*, Docket No. 21866-8, Exhibit BE-T-1 at 5 (testimony of Victor H. Brown) [All the exhibits are hereinafter cited as part of the *DPMI*, Docket No. 21866-8]. Note that these exhibits are not included in the CAB orders which made up the final report, but are part of the record under Docket No. 21866-8. These exhibits are available in the CAB Public Reference Room, Washington D.C., or from the author's files.

5. *Id.* The final criterion was well established in *Federal Power Commission v. Hope Natural Gas Co.*, 320 U.S. 591 (1944).

6. The cost of capital as an input into the total dollar revenue required (R) can be stated as follows:

$$R = O + r(V-D)$$

where O represents normal operating costs, r is the rate of return, and V and D are the gross value of property and the accrued depreciation on that property, respectively. Obviously, if the rate of return is not properly specified, the total dollar required returns will either be understated

commensurate with risks and returns in other industries (criterion 3), then investors will avoid that industry and invest elsewhere. The industry will find itself unable to raise funds at a reasonable cost and, therefore, incapable of attracting the capital necessary for expansion (criterion 1). The net result will be the financial deterioration of the industry and its member firms (criterion 2).

In practice, the "fair rate of return" is defined as the weighted average of the costs of debt (long-term bonds) and equity (common stock), using as weights the proportion of those sources of funds to total capital.⁷ That is,

$$\begin{array}{rclcl}
 \text{Cost (in percent)} & \times & \text{Weight} & = & \text{Weighted Cost} \\
 \text{cost of debt} & \times & \text{debt/total capital} & = & \\
 \text{cost of equity} & \times & \text{equity/total capital} & = & \\
 & & & & \text{Cost of Capital}
 \end{array}$$

The cost of debt capital is deemed to be the "embedded" or historical cost of debt, while the cost of common equity is the required rate of return that stockholders' are demanding.⁸

In Phase 8, the CAB set the rate of return at 12.0%. Using the above methodology, the Board derived that return as follows:⁹

$$\begin{array}{rclcl}
 & \text{Cost} & \times & \text{Weight} & = & \text{Weighted Cost} \\
 \text{Debt} & 6.20\% & \times & .45 & \times & 2.79\% \\
 \text{Equity} & 16.75\% & \times & .55 & = & 9.21\% \\
 & & & & & \underline{12.00\%}
 \end{array}$$

Furthermore, the Final Examiner, Whitney Gilliland ruled that:

- (1) The cost of debt shall be based on the present embedded cost with no allowance for costs related to future debt financing.
- (2) Convertible debt should be recognized as debt rather than equity and their recognized cost should be based on their coupon rate.
- (3) In view of the unsoundness of the actual industry average debt ratio (60% debt and 40% equity), a hypothetical ratio shall be employed.
- (4) A single rate of return should be established for the domestic truck-line industry as a whole.¹⁰

The Board thus rejected testimony by witnesses Victor H. Brown (for the Bureau Counsel), J. Rhoades Foster (representing Braniff, Continental, National, and Western), and David A. Kosh (representing American,

or overstated. See Davis & Swimmer, *A Methodological Approach for Evaluating Transportation Rate Increases*, 40 ICC PRAC. J. 310 (1973).

7. W. WESTON & E. BRIGHAM, *MANAGERIAL FINANCE* 605-06 (5th ed. 1975). Preferred stock is usually included in the calculation where it is a significant source of funds. It is a very small part of airline total capital and as a result, preferred stock is excluded from the Board's formula.

8. The latter cost is a function of dividend yields and investor expectation of growth in the future. It is therefore difficult to estimate as will be brought out later in this article.

9. *DPFI*, *supra* note 1, at 673 (CAB Order No. 71-4-58 at 1).

10. *Id.*

Delta, Eastern, Northwest, TWA, and United), as well as the recommendations of Harry H. Schneider, the Initial Examiner, seeking to set the return in the range of 10.5%-13.5%. Table I summarizes the calculations as submitted by these four.¹¹ The following three sections outline their testimony on the key inputs, the cost of debt and equity, and on the capital structure to be employed in the weighting process.

A. THE COST OF DEBT

The embedded cost of debt is defined as the dollar amount of interest divided by funded debt (long-term debt plus current portions due), and its estimation is usually objective and non-controversial.¹² As evident from Table I, however, the estimates for the costs of debt capital ranged from 5.7% to 7.6%:

Foster	7.0%-7.6%
Initial Examiner	7.0%
Kosh	6.9%
Final Examiner	6.2%
Brown	5.7%

The breakdown by carrier are listed on Table II as presented by Brown, Foster, and Kosh. The calculations employed by Gilliland and Schneider were for aggregate groups and are too detailed to be presented here.¹³

The range of estimates on the Table is the result of two separate controversies. The first concerned the problem of how to treat convertible bonds, (that is, bonds which could be converted into common stock at the bondholder's option). The second centered on the extent to which future financing costs should be included in the embedded cost of debt capital.

At the low end, Brown argued for a cost of 5.7% based on the actual embedded cost of debt as of December 31, 1969, with *no* adjustment for future financing costs. In addition, Brown contended that convertible bonds should be included at their coupon rates, reasoning that there

11. Two of the three expert witnesses input one specific figure. J. Rhoades Foster, however, estimated the rate of return as a range from 12.2%-13.9% over the years 1969-1973. See *DFFI*, Docket No. 21866-8, Exhibit FA-1 at 44 testimony of J. Rhoades Foster). The figure on Table I is his range for the year 1971 as of the date that he testified. When asked to input *one* figure, Foster set that return as 13.0%, the mid-point of his range for 1971. It should be noted here that the total range of 10.5%-13.5% input by the different witnesses is highly significant to the air carriers. An incremental 1% return on the rate base of the trunklines (\$9.6 billion in 1970 and \$13.7 billion by 1976) is a very sizable incremental profit.

12. It is derived from historical data and thus does not normally involve the subjective estimates inherent in specifying the cost of equity. For an example of the calculation of the embedded cost of debt capital, see *id.* JC-K-Exhibits at 1 (exhibits of David A. Kosh).

13. See *DFFI*, *supra* note 1, Apps. A & B.

TABLE I

The Cost of Capital to the U.S. Domestic Airlines Docket No. 21866-8,
Domestic Passenger-Fare Investigation

<i>BROWN:</i>					
	Cost of <u>Capital</u>	x	Capital <u>Structure</u>	=	Weighted <u>Average</u>
Debt	5.7%	x	.59	=	3.4%
Equity	16.0%	x	.41	=	6.6%
					10.0%
			adjustment ¹	=	+ .5%
			Total	=	<u>10.5%</u>
<i>FOSTER:</i>					
	Cost of <u>Capital</u> ²	x	Capital <u>Structure</u>	=	Weighted <u>Average</u>
Debt	7.0%	x	.45	=	3.1%
Equity	17%-19%	x	.55	=	9.4%-10.4%
			Total	=	<u>12.5%-13.5%</u>
<i>KOSH:</i>					
	Cost of <u>Capital</u>	x	Capital <u>Structure</u>	=	Weighted <u>Average</u>
Debt	6.9%	x	.40	=	2.7%
Equity	18.0%	x	.60	=	10.8%
			Total	=	<u>13.5%</u>
<i>SCHNEIDER:</i>					
	Cost of <u>Capital</u>	x	Capital <u>Structure</u>	=	Weighted <u>Average</u>
Debt	7.0%	x	.60	=	4.2%
Equity	17.0%	x	.40	=	6.8%
			Total	=	<u>11.0%</u>

¹ Brown arbitrarily added 0.5% to his estimate as an adjustment for future conditions.

² Foster actually used a range of estimates for the cost of equity capital and therefore derived the total cost of capital as a range. He also employed a range of debt costs (7.0%-7.6%) to include financing costs in the future. His estimate for 12/31/71 is the 7.0% above. (See Table II, especially footnote 3).

SOURCE: *DPFI*, Docket No. 21866-8, Exhibit BE-133 at 1, Exhibit FA-1 at 44, JC-K-Exhibit at 29, cited in, CAB Order No. 71-4-58 (Appendix D).

TABLE II

The Embedded Cost of Debt Capital to the U.S. Domestic Airlines
Docket 21866-8, Domestic Passenger-Fare Investigation

	<i>BROWN</i> ¹	<i>KOSH</i> ²	<i>FOSTER</i> ³	
	Cost of Debt (Incl. Convertibles) 12/31/69	Cost of Debt (Excl. Convertibles) 12/31/70	Cost of Debt (Incl. Convertibles) 12/31/69	Cost of Debt (Excl. Convertibles) 12/31/69
AMERICAN	4.8%	5.3%	4.9%	5.1%
EASTERN	5.2%	6.3%	5.9%	6.0%
TWA	5.5%	6.2%	5.6%	6.1%
UNITED	6.4%	6.0%	5.6%	5.9%
BRANIFF	6.1%	6.2%	6.0%	6.1%
CONTINENTAL	4.9%	6.3%	5.5%	5.9%
DELTA	7.2%	8.0%	8.0%	8.0%
NATIONAL	5.7%	7.1%	6.9%	6.9%
NORTHWEST	6.7%	7.5%	7.0%	7.0%
WESTERN	6.9%	7.4%	7.1%	7.4%
BIG 4	5.5%	6.6%	5.5%	5.8%
OTHER 6	6.2%	7.4%	—	—
TOTAL	5.7%	6.9%	5.8%	6.2%

¹ With no adjustments for future financing costs.

² Adjusted for 10% increase in future financing costs on new debt and 8.25% on debt refinanced in 1970.

³ Adjusted for future financing costs which would drive up the embedded cost of debt capital computed by Foster as follows:

	(Incl. Conv.)	(Excl. Conv.)
12/31/71	6.6%	7.0%
12/31/72	6.9%	7.3%
12/31/73	7.2%	7.6%

Foster's range of estimates into the future for the cost of debt is therefore 7.0%-7.6%.

SOURCE: *DPFI*, Docket No. 21866-8, Exhibit BE-101 at 1-2, Exhibit FA-2 at 2 (Schedule 1), JC-K-Exhibit at 1.

was little likelihood of their conversion in the foreseeable future.¹⁴ Although Brown admitted that future financing costs could be included in the cost of debt, he rejected this approach on two grounds. First, he believed that the reliability of estimates of interest rates for more than six months in the future was open to question. Second, he felt if future rates exceeded current embedded costs, their inclusion would yield "windfall" profits to the carriers.¹⁵

Kosh defined the cost of debt capital as being composed of two elements: the embedded cost of outstanding debt *and* the cost of additional debt to be raised in the near term.¹⁶ In arriving at the total cost, he therefore adjusted the embedded cost of December 31, 1970 for a rate of 8.25% to reflect refinancing of debt maturing in 1970 and for 10.0% for additional debt to be floated in that year.¹⁷ Kosh also argued, in opposition to Brown, that to fail to consider the future costs of debts would be to understate returns necessary to ensure the financial health of the industry. Further, Kosh excluded the cost of convertible debt in his estimate on the grounds that to include them would distort the true cost of debt capital. He reasoned that the actual dilution in stockholders' equity, when conversion took place, would be significant. His estimate with convertible debt included was 6.5%.

The final expert witness, J. Rhoades Foster, argued for a 7.0%-7.6% range as the best estimate of the cost of debt.¹⁸ He computed the final estimates based on the embedded cost adjusted for future financing costs which he estimated would drive the embedded cost to 7.0% by 1971 (6.6% including convertibles) and 7.6% by 1973 (7.2% with convertibles). (See Table II, especially footnote 3). Foster thus agreed with Kosh about the need to consider future financing costs and the impact of convertible debt as equity.

Schneider, the Initial Examiner, took a compromise view. Relying on Brown's testimony, he asserted that convertible debt should be treated as debt and included at the coupon rate on that debt. However, he also found the Kosh and Foster arguments about future costs convincing and in effect accepted Foster's 7.0% estimate.¹⁹ In doing so, he strongly rejected Brown's arguments concerning the subjectivity of future financ-

14. *DPFI*, Docket No. 21866-8, Exhibit BE-T-1 at 7 (testimony of Victor H. Brown).

15. *Id.* at 8.

16. *Id.* JC-K-Testimony at 10 (testimony of David A. Kosh).

17. Kosh pointed to recent increases in general interest rates and specifically to an 11% bond offering (in 1971) by American as indicative of developing trends in capital costs. *Id.* at 10-11, JC-K-Exhibit at 1, and App. at 1-4.

18. *Id.* Exhibit FA-1 at 8-16, Exhibit FA-2 and Schedule 1 at 1-11.

19. *DPFI*, *supra* note 1 at 716-19 (CAB Order No. 71-4-58, App. D at 41-48) (Excerpts from the Initial Decision by Harry H. Schneider).

ing costs saying, "While it is conceded that the determining of future trends in borrowing and debt costs involve to a large extent areas of judgment, nevertheless the issues in this case involve rate making and specifically encompass the reasonably foreseeable future costs of debt."²⁰

The Final Examiner, Whitney Gilliland, set the cost of debt capital at 6.2%. He defined his return as the actual embedded cost of debt as of December 31, 1970. He thus accepted Schneider's finding that convertible debt be treated as debt, but rejected the Initial Examiner's claim that future financing costs be considered.²¹

B. THE COST OF EQUITY

The cost of common equity can be defined in financial theory as the rate of return that stockholders, in the aggregate, expect from their investment.²² Its estimation in practice is difficult and subjective because the cost necessarily deals with stockholder expectations concerning future growth in returns.

Three basic methods have been employed in regulatory hearings to arrive at a good proxy for this expected rate of return. They are:

- (1) The earnings yield or earnings/price ratio approach.
- (2) The comparative earnings or "opportunity cost of capital" method.
- (3) The discounted cash flow (DCF) technique.

All the witnesses at the proceedings dismissed the first method as inapplicable to the airline industry as a technique for setting the level of returns.²³ Witnesses Brown and Foster employed the second approach,

20. *DPFI*, Prehearing Conference Report (Issue VIc, April 7, 1970). Schneider went on to reject four cases cited by Victor H. Brown in the Brief of Bureau Counsel. *Natural Gas Pipe Line Co.*, 40 F.P.C. 81 (1968); *Panhandle Eastern Pipeline Co.*, 40 F.P.C. 98 (1968); *Pennsylvania P.U.C. v. The Peoples' Natural Gas Co.*, 77 P.U.R.3d 445 (1969); *In Re The Detroit Edison Co.* 83 P.U.R.3d 463 (Mich. Pub. Serv. Comm'n 1970) Brown had contended that these four cases reflected an overriding principle of rejection by regulatory agencies of future cost trends. Schneider was not so persuaded. See *DPFI*, *supra* note 1, at 717 (CAB Order No. 71-4-58, App. D at 43-44).

21. Gilliland did so on the grounds that he was recommending an "optimal" or "hypothetical" capital structure and that therefore to employ future costs was inconsistent. His 6.2% estimate differed from Brown's 5.7% only in that Gilliland advanced the calculation of the cost of debt capital to 1970. See *DPFI*, *supra* note 1, at 684 (CAB Order No. 71-4-58 at 18).

22. J. WESTON & E. BRIGHAM, *supra* note 7, at 548.

23. Under this method, the cost of common equity is considered to be approximated by the industry's (or firm's) average earnings/price ratio over some time period. The earnings/price ratio method is widely used in public utility hearings where the earnings/price ratios are more stable. Foster dismissed airline earnings/price ratios, however, as too variable to be used as estimators of the cost of equity capital to the carriers. That the earnings/price ratio approach can be used to show shifts in equity costs was not denied, however. See *DPFI*, Docket No.

while Kosh used the third methodology. Their estimates can be seen on Table I. In sum, these estimates for the cost of equity range from 16.0%-19.0%:

Foster	17.0%-19.0%
Kosh	18.0%
Initial Examiner	17.0%
Final Examiner	16.75%
Brown	16.0%

The comparable earnings approach assumes that the greater the attendant investment risk, the greater the expected return must be in order to attract new equity capital. This approach incorporates the concept that because all companies must compete in the same market place for capital, regulated companies should earn at least the same return on book equity as industries with comparable risk.²⁴ (This flows from criterion 3 above).

Brown used the comparable earnings approach and again, (as in the case of the cost of debt), entered the lowest estimate of the cost of equity. Brown's 16.0% return was derived from the historical correlation between risks and returns on book equity for different industry groupings. He justified his approach on the grounds that an analysis of this relationship would provide an indication of the rate of return necessary to float new equity capital if future conditions did not deviate significantly from the historical period analyzed.

For his study, Brown selected four composite groups: The Moody's 125 Industrials, the Moody's 24 Electric Utilities, the Standard and Poor's 3 Telephone Companies, and the Standard and Poor's 11 Gas Utilities.²⁵ Risks measured were business risk, financial risk, profitability risk and investor reaction. Brown used log-linear regressions ("least-squares" fits) to compute trends, stability, and growth in earnings, returns on equity, dividends, and returns on sales.²⁶ His ultimate conclusion was that investment in the airline industry was greater in risk than it is in the electric, gas, and telephone utilities but approximately equal in risk to the Moody's 125 Industrials. Breaking down the composite industrials into 15 sub-groups, he arrived at the following average (1960-1969) rates of return on equity:

21866-8, Exhibit FA-1 at 25, BE-T-1 at 13-14. Later in this article the earnings yield will be used to show increases in the cost of equity capital over time.

24. *Id.* Exhibit BE-T-1 at 10.

25. Brown argued that just to compare airline returns with other regulated industries would be to introduce a circularity problem. The earnings of other regulated groups might be too high or low. *Id.* at 17. For a list of the firms used by Brown, see *Id.* Exhibit BE-131 at 1-4.

26. Brown's evidence on risk and return measures is much too detailed to be presented here. See *DPII*, Docket No. 21866-8, Exhibits BE-T-1, BE-102, BE-103.

Chemical and Allied Products	18.2%
Motor Vehicle Manufacturers	15.9%
Construction Equipment	15.4%
Metal Mining	14.5%
Cigarette Tobacco	14.1%
Business Machines	13.5%
Food Products	13.4%
Aircraft-Manufacturers	13.3%
Retail Stores	13.0%
Food Stores	11.4%
Petroleum	11.3%
Non-Ferrous Metals	10.1%
Glass Products	9.9%
Paper Products	9.6%
Steel	8.6%

SOURCE: Exhibit No. BE-131, pg. 1-3.

Basing his conclusion on a risk-return trade-off, Brown maintained that the carriers were equal in investment risk to the Motor Vehicle Manufacturers and that therefore they should be entitled to earn the same return. Table III shows his comparison. As the Motor Vehicle Manufacturers had

TABLE III

The Cost of Equity Capital to the U.S. Domestic Airlines
Evidence of Victor H. Brown Docket 21866-8, Domestic
Passenger-Fare Investigation

	1961-1969					Return on Equity ⁶
	Profitability Risk Indicators					
	Stability Indices in %					
	<u>EPS</u> ¹	<u>ROE</u> ²	<u>DPS</u> ³	<u>ROS</u> ⁴	<u>DEPS</u> ⁵	
Motor Vehicle Manufacturers	68.8	69.6	22.3	58.4	51.9	15.9%
Domestic Big Four Airlines	60.1	64.1	20.8	64.1	47.2	?
Domestic Eleven Airlines	68.3	80.4	37.6	75.2	47.4	?

Brown's Estimate of the cost of equity = 15.9 \cong 16.0%

¹ The Stability Index is a measure of the variability around a log-linear trend line for the 1961-1969 time horizon for each of the above variables. It therefore directly measures risk. EPS is earnings per share on common stock.

² Stability of the return on average common equity.

³ Stability of dividends per share.

⁴ Stability of the return (net profit after taxes) on sales.

⁵ Number of decreases from preceding year in earnings per share as a percent of total possible decreases.

⁶ Return (net profit after tax) to average common equity as a proxy for the cost of capital of equity.

SOURCE: *DPMI*, Docket No. 21866-8 Exhibit No. BE-131 at 4.

an average return on equity of 15.9%, Brown set the cost of equity capital to the airlines at 16.0%.²⁷

Foster followed a similar methodology with a different sample to arrive at a cost of equity of 17.0%-19.0%.²⁸ He chose as samples for comparative purposes, the largest 10 electric utilities, the next 12 largest electrics, 9 gas pipelines, 11 food processors, and 10 trucking firms. He noted the following average returns (1965-1969) for the groups:

largest 10 electrics	12.5%
next 12 largest electrics	13.5%
gas pipelines	14.8%
11 food processors	13.9%
10 truckers	16.1%

SOURCE: Exhibit No. FA-1 at 42.

Foster then contrasted, *inter alia*, financial risk and operating risk factors for the air carriers with these groups. These factors were: (1) The rate of capital turnover, (2) the net income to revenue ratio, (3) the operating ratio, (4) the intensity of competition, (5) the sensitivity of revenue changes to changes in economic activity, and (6) the labor costs as a percent of total costs. Using these indicators, Foster demonstrated that the variability in earnings and related factors for the trunklines was far greater than for any of the above groups. The variability of trunkline earnings, for example, was 6-15 times greater than that of the electric utilities, 3.5-6.5 times greater than that of the gas pipelines, and somewhat greater than that of the trucking firms. From this data, relying heavily on the truckers as a base, Foster concluded that true carrier returns to equity were in the 17.0%-19.0% range.²⁹

The final expert witness, David A. Kosh, employed the discounted cash flow (DCF) method in estimating the cost of equity capital at 18.0%.³⁰ From financial theory, Kosh argued that the stockholders' desired rate of return (k_e) is the cost of equity capital. This return is expressed:³¹

27. *Id.* Exhibit BE-T-1 at 32.

28. *Id.* Exhibit FA-1 at 24-43, especially 40-43.

29. Foster maintained that "the investment risk of the truckers is far greater than that of the electric utilities so that the truckers are more directly comparable with the trunklines." Trucker returns had been as high as 23.3% over the 1965-1969 period, so Foster used their 16.1% (average for 1965-1969) return as the base. He concluded, however, that "this conclusion (as to an airline equity cost of capital of 17%-19%) is necessarily the result of an exercise of judgment." *Id.* at 42.

30. *Id.* JC-K-Testimony at 24.

31. This formulation is based on a fundamental stock valuation model. Financial theory holds that the price of a share of common stock, P , is equal to the present value of dividends to be received in the future. Stockholders, of course, expect these dividends to grow at some rate, g , in the future. The price of a share of common stock can be shown to equal (assuming a long time horizon):

$$P = \sum_{t=1}^{n=\infty} \frac{D(1+g)^t}{(1+k_e)^t} = \frac{D}{k_e - g}$$

$$k_e = \frac{D}{P} + g$$

where D/P is the dividend yield on the common stock (dividends per share/stock price) and g is the rate of growth that investors expect in those dividends. Kosh estimated that the dividend yields for the carriers were the 1967-1969 average yields, and he derived g by computing a log-linear regression fit ("least-squares" fit) on dividends, earnings, and book value per share over the 1957-1969 period. Due to instability in earnings and dividends for several of the carriers, Kosh employed the growth in book value as a proxy for the growth in dividends per share in these cases.³² Table IV shows the resulting 18.0% return.

TABLE IV

The Cost of Equity Capital to the U.S. Domestic Airlines Evidence of David A. Kosh Docket 21866-8, Domestic Passenger-Fare Investigation

	Growth ¹		Average Dividend Yield ²
	Dividends Per Share	Book Value Per Share	1967-1969
American	13.9%	13.9%	2.9%
TWA	13.2%	13.2%	2.0%
United	13.3%	13.3%	2.4%
Braniff	13.5%	13.5%	2.0%
Continental	16.4%	16.4%	2.5%
Delta	23.9%	20.6%	1.4%
National	21.6%	21.6%	1.0%
Northwest	19.4%	20.0%	1.2%
Western	11.6%	11.6%	2.6%
Big 3	13.5%	13.5%	2.4%
Other 6	17.7%	17.3%	1.8%
TOTAL	16.3%	16.0%	2.0%

$$k_e = \frac{D}{P} + g$$

$$k_e = 2.0\% + 16.0\%$$

$$k_e = 18.0\%$$

¹ Growth is the compound rate of growth in dividend per share over the period, 1957-1969 (or 1963-1969 for TWA, United, and Braniff). It is based on log-linear trend line fitted to the raw data. Because of erratic data for American, TWA, United, Braniff, Continental, National, and Western, Kosh used growth in book value per share as a proxy for the growth in dividends per share in those cases.

² The average dividend yield is the arithmetic mean for the years, 1967-1969, adjusted by 15% for the costs of financing.

SOURCE: DPFI, Docket No. 21866-8 JC-K-Exhibit at 14.

Solving for k_e , the resulting cost of equity capital model is:

$$k_e = \frac{D}{P} + g$$

For a good discussion of the model and its limitations, see J. WESTON & E. BRIGHAM, *supra* note 7, at 548-49.

32. Kosh argued that the growth in book value per share was a good proxy for the growth

To confirm his estimation of the cost of capital, Kosh employed a cross-check. Using a sample of electric firms, gas pipelines, gas distribution companies, water utilities, truckers, independent telephone companies, and AT&T, he computed the cost of equity capital using the above formulation. In addition, he calculated a variability index for the rate of return on book equity for each firm and industry grouping and correlated risk with return (using a log-linear regression).³³ Kosh found a significant positive correlation between the variability in rates of return and the level of those returns. This methodology suggested a cost of equity to the carriers of 17.3%, which was very close to the 18.0% derived directly, and thus it served as a confirmation of that estimate.³⁴

Schneider, the Initial Examiner, set the cost of equity capital at 17.0%, ruling that while the exact specification of this cost was a matter of judgment, (and that therefore all techniques should be considered), Brown's estimate of 16.0% was too low and Kosh's 18.0% was too high.³⁵ Schneider's major arguments against Kosh's testimony stemmed from his uneasiness with use of the DCF technique in an industry with the volatility of the airlines, and with Kosh's use of the growth in book value per share as a proxy for the growth in dividends per share.³⁶ In addition, the Initial Examiner ruled that Kosh's cross-check approach was too subjective. Schneider criticized Brown's use of the Motor Vehicle Manufacturers 15.9% return on equity as the most comparable to that of the air carriers, because clearly the group was somewhat lower in risk. Schneider favored Foster's evidence, (and mindful of the fact that 17.0% was a compromise mid-point between the 16.0% and 18.0% inputs), and set the return on equity at 17.0%.³⁷

In the Final Decision, Whitney Gilliland allowed a 16.75% return. Like Schneider, he felt that Brown's estimate was on the low side, but, unlike Schneider, he was strongly influenced by Kosh's methodology. Specifically, Gilliland overruled the Initial Examiner's finding as to Kosh's evidence.³⁸ He found no problem with the assumptions made by Kosh regarding the growth in book value as a proxy for the growth in dividends per share. Further he held that the cross-check variability study used by Kosh was a valid aid in verifying the cost of equity.³⁹

in dividends per share because it was an indicator to analysts in estimating the latter. *DPFI*, Docket No. 21866-8, JC-K-Testimony at 12.

33. For data on the firms, see *Id.* at 17-21.

34. *Id.* at 21.

35. *DPFI*, *supra* note 1, at 719-20 (CAB Order No. 71-4-58, App. D at 48-49) (Excerpts from the Initial Decision by Harry H. Schneider).

36. *Id.* at 721. (CAB Order No. 71-4-58, App. D at 50-53)

37. *Id.* at 720-26 (CAB Order No. 71-4-58 at 50).

38. *Id.* at 685-86 (CAB Order No. 71-4-58 at 20-21).

39. *Id.* at 684-86 (CAB Order No. 71-4-58 at 19-32).

Gilliland, however, set the final estimate .25% lower on technical grounds.⁴⁰

C. THE CAPITAL STRUCTURE

While there was much discussion concerning the costs of debt and equity, and while the witnesses did differ somewhat in their estimates of both components, the most intense debate in Phase 8 of the *DPFI* centered on the appropriate weighting system or capital structure that should be used in arriving at the final estimate of the overall "fair rate of return." It is the differences in the weights of debt and equity which produced the largest proportion of the differences in the total return.⁴¹ The weights from Table I are summarized below:

	<u>Debt</u>	<u>Equity</u>
Kosh	40%	60%
Foster	45%	55%
Final Examiner	45%	55%
Initial Examiner	60%	40%
Brown	60%	40%

Brown testified that the actual capital structure (as of December 31, 1969) was the preferable weighting system for the proceeding on the grounds that it did represent the objective existing structure, and that it bore some relationship to the data employed in the cost of capital calculations based on the historical analysis.⁴²

Foster also argued for the actual capital structure, but with a subtle difference. He maintained, consistent with his plea to exclude convertible debt from the cost of debt capital calculation, that convertible debt should be treated as equity in the weighting system. This treatment was proper, Foster reasoned, because:

- (1) The issuer believed they would become part of equity.
- (2) A contrary treatment would perpetuate inadequate earnings.
- (3) It would permit a reduction of debt, because even a 45/55 debt/equity ratio includes too much debt in relation to the capital structures typical of utility and industrial groups, including in the latter for example manufacturers which had debt ratios of about 20.0% for 1969, although their earnings are stated to be generally more stable than those of the airlines.
- (4) Indebtedness should be kept as a level which maintains flexibility of financial policy under adverse conditions.⁴³

40. The reason was that Gilliland was about to employ "optimal" capital structure weights as discussed *infra*.

41. One could, for example, accept Brown's estimates of 5.7% and 16.0% for the costs of debt and equity, respectively, but use Kosh's weights (40% debt and 60% equity). The return thus would be derived as 11.88%, almost 1.5% higher than Brown recommended.

42. *DPFI*, Docket No. 21866-8, Exhibit BE-T-1 at 15.

43. *Id.* Exhibit FA-1 at 16-23, Exhibit FA-2.

Adjusting the actual capital structures on December 31, 1969 for convertible debt as equity, the "actual" structure as derived by Foster was 45% debt and 55% equity.

Kosh broke completely with CAB tradition regarding the trunklines, (as actual weights had been employed in the 1960 *GPII*), and with the other witnesses at the *DPII*. He maintained that sound regulation should be based on the "optimal" capital structure. "Optimal" was, in his definition, that capital structure which would provide capital at the minimum cost consistent with the safety of the investment.⁴⁴ Any other ratio, he argued, would result in such low earnings that it would: (1) Make it impossible to improve the capital structure, and (2) cause volatile earnings on equity which would render it more difficult to attract equity capital. Ultimately, volatile earnings would push the carriers into more and more debt finance, spelling the financial ruin of many and actually pushing fare levels up in the future.⁴⁵ In the long-run, both the carriers and the consumer would lose.

Having argued for an "optimal" capital structure ratio, Kosh turned to an estimate of what was "optimal" for the carriers. He reasoned that the interest coverage ratio (operating profit/interest) was the best overall measure of safety and that the "optimal" debt weight should be based on its effect on coverage ratios given the effects of revenue instability on coverage.⁴⁶ Kosh maintained that the airlines should have the same protection against a decline in coverage below minimum levels as was available to the electric utilities. Arguing that the electric utilities needed a coverage ratio of at least 2:1 under the most adverse circumstances, (the 2:1 coverage criterion is often used by states in determining whether securities are eligible for legal investment by fiduciary institutions, etc.), Kosh used variability measures to contrast the airlines to the electric companies and arrived at a coverage ratio of 4.9:1. At this coverage, the carriers would have the same coverage protection against declines in revenues as the electric utilities would have at a 2:1 ratio.⁴⁷ Working backwards, Kosh found that for the air carriers such a coverage supported an "optimal" structure of 40% debt and 60% equity.⁴⁸

44. *Id.* JC-K-Testimony at 28.

45. *Id.* at 28-29.

46. The entire mechanics of Kosh's arguments is complex and very detailed. Suffice it to say, that his logic is tight-knit and convincing from an empirical standpoint. See *id.* at 32-38 and JC-K-Exhibit at 23-28.

47. *Id.* JC-K-Testimony at 31.

48. Actually, Kosh argued for a range of capital structures of 30%-35%-40% debt depending on the treatment of leased aircraft. He maintained that if leased aircraft were included in the rate base, a proper debt/equity ratio for the carriers was 40% debt and 60% equity. If leasing were excluded, the "optimal" debt ratio would be lowered to 30%-35% in debt. Leasing was excluded from the rate based after Kosh's testimony had been heard at the conclusion of

The Initial Examiner, Harry H. Schneider, rejected the evidence on capital structure presented by both Foster and Kosh.⁴⁹ In specifying weights of 60% debt and 40% equity, the actual capital structure of the industry, he dismissed Foster's treatment of convertible debt as equity, citing the Board's earlier rejection of this idea in the *Local Service Class Subsidy Rate Investigation* and precedent set by other regulatory commissions.⁵⁰ Concerning the use of the "optimal" capital structure urged by Kosh, Schneider also cited precedent by the Board in the 1960 *GPFI*, when the CAB had rejected Kosh's arguments for a 25%-30% debt component.⁵¹ Furthermore, Schneider pointed out that an examination of cases decided since 1960 indicated that in *no* case did a regulatory body use a hypothetical structure containing more debt than actually existed.⁵²

The decision of the Final Examiner reversed Schneider's ruling against the use of the "optimal" capital structure. In doing so, Gilliland declared,⁵³

We have concluded that the sounder course, in light of all present circumstances affecting the industry, is to utilize an optimal capital structure of 45% debt and 55% equity which will strike a reasonable balance between the actual capital structure, the interest in maintaining a reasonable amount of low cost debt capital, and the interest in maintaining a soundly financed industry. Our determination is based on the following considerations. First, there is no doubt that the present capital structure of the industry as a whole is so heavily weighted with debt as to jeopardize the financial stability of many of the carriers, and that the ratio will have to improve if the industry is to obtain capital on reasonable terms. Second, the policy of using the so-called actual capital structure can only serve to perpetuate the present unsound structure. . . . And finally, we believe

Phase 2 of the *DPFI*. See Civil Aeronautics Board Policy Statement, Docket No. 21866-2 (September 10, 1970). Thus, Kosh's debt ratio of 40% would be a high estimate in his opinion. See *DPFI*, Docket No. 21866-8, JC-K-Testimony at 38.

49. *DPFI*, *supra* note 1, at 726-28 (CAB Order No. 71-4-58, App. D at 60-66) (Excerpts from Initial Decision by Harry H. Schneider).

50. 41 C.A.B. 138 (1964). These precedents included: *In Re Potomac Electric Power Co.*, 83 P.U.R.3d 113, 139-40 (D.C. Pub. Serv. Comm'n 1970); *El Paso Natural Gas Co.*, 28 F.P.C. 688 (1962). See *DPFI*, *supra* note 1, at 727 (CAB Order No. 71-4-58, App. D at 63).

51. 32 C.A.B. 291, 307 (1960).

52. Schneider cited the following cases: *Southern Bell Telephone & Telegraph Co. v. Louisiana Public Service Comm'n*, 118 So. 2d 372, 376, 380-82 (La. 1960); *In Re AT&T Co.*, 9 F.C.C.2d 30, 83-85 (1967). Kosh had presented cases supporting the use of an "optimal" ratio. Reopened *Delta C&S Mail Rate Case*, 28 C.A.B. 820 (1939); *South Carolina Generating Co.*, 19 F.P.C. 855 (1958); *Riverton Consolidated Water Co.*, 140 A.2d 114 (Pa. Super. Ct. 1958). Schneider, however, rejected these cases on the grounds that special problems of a subsidiary were involved in the *Riverton* case and that the other cases involved subsidiaries of parent companies whose capital structure was employed for the subsidiary. For a complete discussion, see *DPFI*, *supra* note 1, (CAB Order No. 71-4-58, App. A, especially n.128).

53. *DPFI*, *supra* note 1, at 676-77 (CAB Order No. 71-4-58 at 5).

that the use of an optimal structure is more appropriate when dealing with a wide range of carriers whose actual capital structures vary widely and where, as here, the actual structure is clearly unsound.

Citing the possibility of future debt finance by the industry as remote, and acknowledging the seriousness of the situation that found several carriers no longer meeting the legal requirements for investments of insurance companies, (who have historically purchased a large portion of airline debt), the Final Examiner used the *Rate of Return, Local Service Carriers Investigation* as a precedent for employing a lower debt ratio than actual in the case of the trunklines.⁵⁴ To employ the actual capital structure would do no more "than freeze the financial structures of the carriers into an undersirable mold."⁵⁵

Gilliland, in weighing what the level of the optimal ratio should be, settled on somewhat of a compromise. Kosh had argued for a 40% debt ratio, (and actually for as low a ratio as 30%-35%—see footnote 45), and while the Final Examiner found his arguments convincing, he reasoned that a 45% debt ratio fell at a reasonable point within the range of the actual carriers ratios (33%-74%) and would represent a fair balance between the actual ratio (60% debt) and a theoretical optimal.⁵⁶

II. CRITIQUE OF THE CAB APPROACH

Phase 8 of the *DPFI* went far in attempting to recognize the changing conditions that affected the airline industry in the decade after the 1960 *GPMI*, and in raising the "fair rate of return" from the 10.5% to 12.0% to reflect those changing conditions. It can be argued, however, that the Board did not go far enough.⁵⁷ Specifically, it can be asserted that:

- (1) The overall rate was set too low in 1971.

54. In that case, the CAB held that, "the use of a 70% debt ratio would . . . create a substantial obstacle in the way of the reduction of debt ratios to more manageable proportions." 31 C.A.B. 685, 689 (1960).

55. Gilliland also pointed out that the carriers' high debt/equity ratios were not the result of management imprudence in the use of debt finance. Rather, they were the result of "high capital requirements combined with inadequate levels of earnings to support the maintenance of satisfactory equity ratios." Therefore, he argued that they could not be blamed for their own plight. See *DPFI*, *supra* note 1, at 678 (CAB Order No. 71-4-58 at 8).

56. *Id.* at 681-82 (CAB Order No. 71-4-58 at 14).

57. In reading the Initial and Final Decisions, one gets the definite impression that the examiners realized the industry was on the brink of serious trouble and the overall "fair rate of return" would have to be increased to recognize the sharply increased risk levels in the industry, but they were reluctant to increase that return too much. The 12.0% return therefore seems to be a kind of compromise. The important point, however, is that a regulatory body, such as the CAB, cannot change the reality of sharply increased risks perceived by investors (at least in the short run) and the probability of financial ruin, no matter at what level it sets the "fair rate of return". All that it can do is try to specify that return which is commensurate with the real riskiness of the industry.

- (2) As time has passed that return has become even more obsolete but no adjustment has been made.
- (3) The specification of one rate of return for all the carriers has discriminated against the higher risk carriers.

Each point will be taken up in order.

A. THE RETURN SET TOO LOW

The contention that the Board erred in understating the true cost of capital to the trunklines is based on three separate points:

- (1) The embedded cost of debt was set too low.
- (2) The cost of equity capital was likewise understated.
- (3) The "optimal" amount of long-term debt was incorrectly input at too high a level—45% debt.

Concerning the cost of debt capital (point 1), the Final Examiner correctly rejected the exclusion of convertible bond interest from the calculation of the embedded cost, as a means of increasing this cost.⁵⁸ Gilliland, however, should not have reversed the Initial Examiner's conclusion that future debt costs were properly to be included in the final estimation. The Board itself, in fact, in the *GPI* had recognized that to the extent "that current and future trends would reasonably affect the embedded cost of debt, it was *proper and necessary* to reflect such trends."⁵⁹ To fail to recognize the tightening state of the capital markets in the 1970's and the carriers' heavy demands for funds during that period was to fail to properly specify the true cost of debt capital.⁶⁰ On this basis, Foster's estimates of the embedded cost adjusted for future conditions (but with convertibles included) ranging from 6.6% in 1971 to 7.2% in 1973, or Kosh's 6.5% (with convertibles), seemed proper and should have been allowed.⁶¹

The estimation of the cost of equity capital (point 2) was also set too low. Both examiners seemed to be preoccupied with 16.0%-18.0% as the limits on the high and low side (Brown versus Kosh). Treating both estimates as if they were valid barriers, the Initial and Final Examiners

58. No one really challenged the argument that the conversion of existing convertible debt was highly unlikely. Depressed airline stock prices made conversion a virtual impossibility.

59. 32 C.A.B. 291-99 (1960).

60. Part of Gilliland's reasoning rested on the fact that he was employing "optimal" capital structure weights and that therefore to consider the future costs of debt was inappropriate. See note 21 *supra*. This contention, however, is not necessarily true. See note 62 *infra*.

61. In fact, subsequent increases in interest rates in 1973-1976 were higher than even Kosh or Foster had anticipated, thus making their estimates seem low. And Kosh pointed out that the cost of new debt in 1970 was nearly double the embedded cost used by Brown. See *DPI*, Docket No. 21688-8, JC-K-Testimony at 1.

then proceeded to specify the return at 16.75% and 17.0%, very close to the middle of the witnesses' range.⁶² Both estimates, however, were biased *downward* by the methodology which Brown and Kosh used to derive them. As to the former's evidence, Brown completely excluded the top 10% (in terms of rates of return on book equity) of the industrials and in particular, he excluded the Chemical Group with its 18.2% average rate of return.⁶³ He also contrasted the Motor Vehicle Manufacturers to the air carriers when, in fact, the carriers were clearly higher in risk (see Table IV). Finally, the risk measures that Brown used biased the airline stability indices downward, because he excluded both Eastern and TWA (as a result of negative data), the highest risk carriers, from his analysis.⁶⁴ Thus, his 16.0% return cannot meaningfully be considered as the lower boundary of the cost of equity.

A very similar bias is contained in Kosh's DCF evidence on air carriers. Due to negative and erratic data, Kosh excluded Eastern, thus understating the true required return.⁶⁵ Rather than representing a high barrier, the 18.0% return he derived probably more closely approximated the true cost. In any case, his cross-check estimate of 17.3%, and Foster's data arguing for a return in the 17.0%-19.0% range, clearly indicated that the true return on equity was higher than that input by

62. Gilliland subtracted 0.25% from the Initial Examiner's estimate of the cost of equity of 17% (thus arriving at his input of 16.75%) because he reasoned that since he was using "optimal" weights which were lower than the actual capital structure weights (40% debt/60% equity versus an actual 60% debt/40% equity) the cost of equity should be decreased somewhat. The key question therefore centers on whether the cost of equity will decline as the debt/equity ratio is decreased. Under normal circumstances, a significant decrease in the debt ratio would result in a decrease in the cost of equity. However, the airline industry debt burden is so high compared to what is normal, that it is doubtful that a decrease to 45% debt ratio would affect equity costs much, if at all. Kosh presented evidence that it would not. See *id.* at 28-29.

63. The list of industrial firms on page 9 of this article (from Brown's Exhibit BE-131 at 1-3) is only a partial listing of all the firms used by the witness. Other groups, having returns ranging from -7.9% to 45.2%, were arbitrarily excluded by Brown from that Exhibit. He utilized only the middle 80% of his sub-sample, dropping the top and bottom 10% of the firms (in terms of rates of return on equity). Brown also proceeded to arbitrarily eliminate the Chemical and Allied Products Group with its 18.2% average return. No justification was given for any of the exclusions. The elimination of the Chemical Group is particularly suspect since it is clear from Table IV that Brown's next comparative group (the Motor Vehicle Manufacturers Group) is clearly less risky than the air carriers. See *id.* Exhibit BE-T-1, at 30, JC-K-Rebuttal Testimony at 3-4.

64. Brown's risk indicators were computed using the Standard and Poor's variance formula which is log-linear in form. Since a log-linear regression *cannot* be run on negative data, TWA and Eastern had to be excluded in several cases. The net effect of excluding these two carriers was to further bias the estimates downward. For the formula, see *id.* Exhibit No BE-103 at 1-2.

65. This is because the estimate of *g*, the compound rate of growth in dividends expected by investors, is the result of a log-linear regression.

Gilliland in the Final Decision. A range of 17.0% to 17.5% at the minimum would have seemed proper and should have been found so.⁶⁶

Finally, the controversy over the weighting system (point 3) was resolved in favor of using too much debt in the final calculation. Gilliland did go a long way in allowing the use of the "optimal" capital structure, but he failed to set properly that "optimal." Again, as above, he seemed to be preoccupied with a range between the actual capital structures of the carriers. Kosh's testimony was intrinsically powerful in its argument for no more than 40% debt.⁶⁷ Research by this author would support a debt ratio even lower than Kosh's 40%. In a study of risk and return, it was found that the airline industry's after-tax profitability was explosively volatile and that therefore a debt ratio approximating that of the average of industrial firms was more appropriate. That ratio was in the 20%-30% range.⁶⁸ In any event, 40% would seem to be the maximum debt ratio consistent with safety and should have been used.

Having specified the minimum cost of debt (6.5%) and equity (17.0%), and having argued for a weighting system of 40% debt and 60% equity, the final estimate of the overall cost of capital arrived at thus becomes:

	<u>Cost</u>	×	<u>Weight</u>	=	<u>Weighted Cost</u>
Debt	6.5%	×	.4	=	2.60%
Equity	17.0%	×	.6	=	10.20%
			Total	=	<u>12.80%</u>

This return is almost a full 1% above that allowed by the Board in the Final Decision, and it should be noted, is a conservative estimate of the true cost of equity capital to the carriers.⁶⁹

66. Data generated by this author in a study published in this *Journal* would tend to argue for a return greater than 16.0%. While not strictly comparable (because the study spanned the years, 1964-1974), the results were suggestive. The author used mean rates of return on book equity versus a variability measure on those rates of return. In that study, the airlines, with lower rates of returns, had higher risk measures than any of the industrial, utility, or other groups, including one group with a 16.2% return. The sample included those firms utilized by Brown in his study. See Gritta, *Profitability and Risk in Air Transport*, 7 *TRANSP. L.J.* 197 (1975).

67. Kosh reasoned that if leasing were excluded from the rate base then the proper debt ratio for the industry was below 40%. See note 48 *supra*.

68. The author worked again with the same sample of firms as in the Brown study because it was the broadest cross-sectional study submitted. Instead of using interest coverage ratios, as Kosh had, debt ratios and computed measures for business and financial and total risk were employed. See Gritta, *An Unresolved Issue in Setting the Cost of Capital to the U.S. Domestic Airlines*, 41 *J. AIR. L. & COM.* 65(1975).

69. The reader is left to assess the changes in the cost of capital, as the costs of debt and equity are increased. Certainly, both Kosh's 13.5% and Foster's 13.0%-13.5% are not over-estimates of the true "fair rate of return", given the above evidence.

B. THE RATE OF RETURN OVER TIME

Economic and financial conditions do change over time. In the long-run, changes in the capital markets may operate to substantially alter the cost of capital to a firm or industry. Interest rates may increase or decrease, thus significantly affecting the cost of debt capital, and investor expectations may be altered, thus changing the cost of equity. Regulatory bodies, such as the CAB, must therefore be cognizant of such changes and their impact on capital needs and costs. To permit too high a return to the carriers in the face of easing capital market conditions would be to injure the public interest. To fail to adjust rates of return upward in the light of tightened conditions would be to harm the financial condition of the carriers. The failure of the CAB to provide for changing circumstances is a major flaw in the CAB regulatory approach as formulated in the *DPFI*.

TABLE V

The Cost of Capital of Debt and Equity to the
U.S. Domestic Airlines: Trends, 1970-1976

	Embedded Cost of Debt Capital ¹		Cost of Common Equity Capital ²	
	12/31/70	12/31/76	1967-1970 E/P	1973-1976 E/P
AMERICAN	4.0%	5.0%	8.1%	21.9%
EASTERN	5.0%	6.4%	6.6%	19.8%
TWA	4.2%	6.8%	6.7%	31.7%
UNITED	5.3%	6.7%	7.8%	8.0%
BRANIFF	5.7%	7.5%	2.5%	12.5%
CONTINENTAL	7.6%	8.0%	2.6%	9.1%
DELTA	8.8%	8.6%	6.4%	7.6%
NATIONAL	3.3%	8.8%	4.5%	8.3%
NORTHWEST	2.3%	11.2%	7.4%	10.5%
WESTERN	7.4%	7.0%	10.0%	8.8%
BIG 4	4.6%	6.2%	7.3%	20.4%
OTHER 6	5.9%	8.5%	8.4%	9.5%
<u>TOTAL</u>	<u>5.4%</u>	<u>7.6%</u>	<u>6.3%</u>	<u>13.8%</u>

¹ Defined as interest/debt (long term debt × current portion maturing) as of 12/31/70 and 12/31/76. As the purpose of this exhibit is to show trends in cost components, no estimation of future financing costs has been included in the figures.

² The cost of equity has been estimated by computing the average earnings/price yields for the two four year periods. The earnings/price ratio is simply the reciprocal of the price/earnings ratio, used by many analysts as a crude measure of the cost of equity capital. Again, as the purpose of this exhibit is to show trends, the use of the E/P ratio is relevant.

SOURCE: All costs are computed from raw data in airline *Annual Reports* and from data contained in the *Value Line Investment Survey*.

Table V presents data for the air carriers' costs of debt and equity for the period after the 1971 decision. (Care must be exercised, however, in interpreting the exhibit. These figures do not suggest the *level* of the cost of debt and equity, but only the *direction* of those costs over time. The actual calculation of the embedded cost of debt is far more complicated and requires data which is not available to this writer. In addition, as noted previously, earnings/price yields are not suitable in the air transportation industry as estimators of the level of the cost of equity. Average ratios over time, however, do indicate trends in this cost.)⁷⁰

The Table contains some interesting data. Embedded costs of debt have risen by an average of over 2.0% to the ten carriers over the seven year period. This has largely been the result of tight monetary policies by the Federal Reserve System in the mid-1970's and the sagging credit ratings of airline debt. Likewise, earnings/price ratios have increased quite sharply as a comparison to the 1967-1970 ratios shows. The average earnings yield for the ten carriers has increased by 7.5%. The following "spot" (or instant) ratios, as of August 22, 1977, indicate that the trend has continued to date:⁷¹

American	25.0%
Eastern	25.0%
TWA	25.0%
United	12.5%
Braniff	16.7%
Continental	14.3%
Delta	14.3%
National	3.1%
Northwest	14.3%
<u>Western</u>	<u>14.3%</u>
Average	16.5%

SOURCE: *Wall Street Journal*, Monday, August 22, 1977.

In sum, both debt and equity costs appear to be significantly higher than those measured in 1971. If therefore, it is assumed that the "fair rate of return" was properly specified in 1970-1971, it is debatable whether that return was still a relevant standard for the carriers by the mid-1970's. Certainly, the CAB's failure to monitor economic developments as related to capital costs is notable, as is their failure to provide a mechanism to adjust returns to changing conditions. In rejecting pleas to reconvene

70. Some financial analysts, in fact, compute the cost of equity as the earnings yield (E/P) + g. See, e.g., M. FINDLAY & E. WILLIAMS, AN INTEGRATED ANALYSIS FOR MANAGERIAL FINANCE 163 (1970).

71. Earnings yields (E/P ratios) are very high today because airline stock prices are very depressed. Investors perceive the industry as very speculative and this has resulted in a lack of interest in airline common stocks.

hearings in the future, Whitney Gilliland ruled that such a approach was impractical.⁷² He was wrong in this finding.

C. THE SINGLE RATE OF RETURN

The final problem with the CAB specification of the rate of return revolves around the Final Examiner's ruling that, "A single rate of return should be established for the domestic trunkline industry as a whole."⁷³ The application of "one rate of return" to all the carriers implies a homogeneity of risks within the industry, because it is only if all the carriers are equivalent in risk that the same "fair rate of return" can be properly applied to all.⁷⁴ To the extent that sharp risk differentials do exist *intra*-industry (because of economic variables, differences in route structures, and different levels of competition), they must be compensated for in setting the "fair rate of return." Failing to do so discriminates against the higher risk carriers, which are those airlines most in need of higher returns.⁷⁵

Table VI isolates two important measures of the major types of risks facing any firm. Business risk (or operating risk) stems from competitive factors such as the industry's vulnerability to economic cycles. It is the volatility of operating profits experienced by a firm as revenues change. Financial risk encompasses both the risk of insolvency and the increased variability in returns to common stock resulting from the commitment to pay a fixed charge, interest, which does not vary as operating profits change. Business risk can be measured by the operating ratio and financial risk can be gauged by the debt ratio. High operating ratios and high debt ratios indicate greater risk exposure.⁷⁶ Two popular meas-

72. Actually, board members Minetti and Murphy argued for an ongoing review of the rate of return. See *DPFI*, *supra* note 1, at 741, 747 (CAB Order No. 71-4-58, dissenting opinion).

73. The various witnesses and the examiners did compute the cost components for the "Big 4" and the "Other 6", but these figures were always combined to arrive at one rate of return for all. They were not employed to suggest differential returns to the different groups of carriers.

74. This notion is well grounded in financial theory and is often referred to as the "homogeneous risk class assumption". See Modigliani & Miller, *The Cost of Capital, Corporation Finance, and the Theory of Investment*, 48 AM. ECON. REV. 261 (1958).

75. See text accompanying notes 4, 5 (economic criterion number 3).

76. The operating ratio (operating expenses/operating revenues) directly measures the variability in operating profit as revenues change. The relationship can be expressed in the following formula:

$$\frac{\% \text{ change in}}{\text{operating profit}} = \frac{1\%(1-\text{Tax Rate})}{1-\text{oper. ratio}}$$

For example, if the firm's tax rate is 48%, and if the operating ratio is 80%, then a 1% change in revenues will result in a 2.6% change in operating profits. (That is, $2.6\% = 1\%(1-48)/(1-80)$). As the operating ratio increases, the volatility in operating profits is increasing. If the operating ratio is 88%, then operating profits will change by 4.2% for every 1% change in revenue; if 95%, by 10.0%, etc. For a full discussion, see *DPFI*, Docket No. 21688-8 JC-K-Exhibits at 27-28.

ures of rates of return are included in the exhibit.⁷⁷

TABLE VI

Risk and Rates of Return to the U.S. Domestic Airlines

	Business Risk	Financial Risk	Returns	
	Operating Ratio ¹	Debt Ratio ¹	Rate of Return ²	Profit Margin ²
AMERICAN	92.1% (5)	64.1% (3)	7.8% (7)	4.5% (6)
EASTERN	101.7% (1)	70.5% (1)	2.0% (10)	-0.2% (10)
TWA	97.9% (2)	65.5% (2)	6.8% (9)	2.7% (9)
UNITED	94.3% (3)	56.7% (6)	6.9% (8)	3.5% (8)
BRANIFF	92.5% (4)	57.0% (5)	8.2% (6)	3.8% (7)
CONTINENTAL	87.8% (8)	60.4% (4)	10.9% (5)	5.2% (4)
DELTA	84.9% (9)	43.6% (9)	17.5% (1)	8.0% (2)
NATIONAL	88.1% (7)	48.3% (8)	12.9% (3)	7.1% (3)
NORTHWEST	84.7% (10)	39.3% (10)	15.9% (2)	11.8% (1)
WESTERN	88.7% (6)	48.4% (7)	11.4% (4)	4.7% (5)

¹ Defined as the average (mean) ratio for each carrier for the years, 1960-1969. The Operating Ratio is the ratio of operating expenses to operating revenues. The Debt Ratio is the ratio of long-term debt to total capital (long-term debt+equity). Ranks in risk are in parentheses. A higher rank means greater risk exposure.

² Defined as the average (mean) ratio for each carrier for the years, 1960-1969. The Rate of Return is the actual rate of return on invested capital, as defined by the CAB. Profit Margin is the rate of return on sales (profit after taxes/sales). Ranks in returns are in parentheses. A higher rank measures a higher return.

SOURCE: All ratios are computed from raw data contained in the HANDBOOK OF AIRLINE STATISTICS (1969 & 1973 eds.).

The Table (columns 1 and 2) clearly demonstrates that the industry is not homogeneous in risk. (Ranks in risk are in parentheses). Significant risk differentials do exist between the carriers, with airlines such as Eastern and TWA much higher in risk than Northwest and Delta. Operating and debt ratios for Eastern are 101.7% and 70.5%, respectively, while for TWA they are 97.9% and 65.5%. Contrast these to the ratios of 84.9% and 43.6% for Delta, 84.7% and 39.3% for Northwest, and 88.7% and 48.4% for Western. The dichotomy of the "Big Four" and the "Other Six" established in the 1960 *GPI* seems inappropriate. The average operating and debt ratios of the "Four" (96.5% and 64.2%) are significantly above those of the "Six" (87.8% and 49.5%). The implicit assumption of *intra*-industry homogeneous risk made by the CAB is therefore questionable.⁷⁸

⁷⁷ For a more complete definition of business and financial risk and their causes, see Gritta, *Risk and the 'Fair Rate of Return' in Air Transportation*, 13 *TRANSP. J.* 41 (1974).

⁷⁸ It is interesting to note that most airline analysts and the CAB have long viewed the so-called "Big 4" (American, Eastern, United, and TWA) as less risky than the smaller "Other 6" carriers.

How the failure to recognize these risk differentials in 1960 has affected carrier returns can be seen from a correlation of past financial performance (1960-1969) of the carriers with the risk measures in Table VI. Financial theory, suggests that risk and return should be positively correlated. That is, high returns should be compensation for greater risk exposure. But correlations for the carriers are strongly *negative*. The correlation coefficient between the rate of return and profit margin ratios, on the one hand, and the operating ratio, on the other, are -0.94 and -0.89, respectively. The correlation coefficients between the rate of return and profit margin ratios and the debt ratio are -0.90 and -0.89. (All are statistically significant at the .01 level).⁷⁹ Carriers higher in risk therefore have lower returns. In each case, the negative correlations run counter to those expected. The CAB assumption behind the "one rate of return" thus clearly violates both sound financial theory and the requirement that there be a "fair rate of return."⁸⁰

CONCLUSION

This article has surveyed and critiqued the CAB specification of the 12.0% "fair rate of return" to the domestic air carriers. The expert testimony presented in Phase 8 of the *Domestic Passenger-Fare Investigation* was analyzed in detail and it was found that the CAB understated the true return, that it has failed to adjust that return as changing conditions have warranted, and that it improperly employed a single rate of return for all the carriers despite significant intra-industry risk differentials. In sum, it can be argued that the 12.0% return set by the Board in 1971 did not then, and does not now, meet the three fundamental criteria for a "fair rate of return." The effects of this misspecification can be seen in the poor financial performance of the industry. The carriers are still overburdened with debt, actual rates of return have been sub-par and highly volatile, and several carriers have experienced severe financial pressures in recent years.⁸¹

79. These correlations are the result of linear regressions run on operating ratios and rates of return, operating ratios and profit margin ratios, etc. In statistical testing, a finding of significance at the .01 level, indicates that the probability of error (in holding that there is a significant correlation, when in fact there is none) is 1 in 100.

80. See text accompanying note 5 *supra* (discussion; fundamental economic criteria). It runs counter to the mandate in the Federal Aviation Act of 1958, as amended, to take into consideration in rate-making, "the need of *each* carrier for revenues sufficient to enable such carrier under honest, economical, and efficient management, to provide adequate and efficient air carrier service." 49 U.S.C. § 1482(e) (1970).

81. TWA, in fact, came very close to defaulting on a series of its long-term bonds. Eastern and Pan Am have also had to endure severe liquidity crises in the mid-1970's. For a general discussion of the industry's debt burden and solvency problems, see Gritta, *Debt Finance and Volatility in Rates of Return in Air Transport*, 6 *TRANSP. L.J.* 73 (1974); Gritta, *Solvency and Financial Stress in Air Transportation*, 6 *TRANSP. L.J.* 139 (1974).

What can be done to correct this situation? First, a higher "fair rate of return" must be recognized as reality. The industry is extremely risky and in order for it to attract the capital necessary to finance future growth, investors must perceive the opportunity to earn returns commensurate with risks. To "attract capital at a reasonable cost" overall industry risk levels will have to be reduced. If investors cannot earn adequate returns, or if risk levels are not decreased in line with returns, the industry's situation will only worsen and carrier financial positions and credit standings will deteriorate further. However, the recognition of a higher rate of return does not, and should not, mean higher fares. In fact, higher fare levels in the current economic environment would be counter-productive. Evidence strongly suggests that the price elasticity of demand for air travel is highly elastic.⁸² Thus, fare increases would merely serve to injure new traffic generation, which is a necessary ingredient for improving the financial health of the industry. Rather, the CAB must act to increase profitability via other means: its new route awards and merger policies and its competitive strategies. By eliminating excessive competition in over-certified markets, and by restricting entry into new markets, carrier rates of return could be increased without fare increases (and possibly with fare reductions). In addition, overall risk levels caused by the excess competition would be decreased.⁸³ Finally, potential mergers could be analyzed in light of effects on over-competitive markets.

Second, a mechanism must be provided by which the "fair rate of return" can be appraised and revised as necessary. The evidence above demonstrates that such a review is important. Much of the data necessary for a complete analysis of component costs, and other factors, is now available to the Board. Therefore, continuous monitoring of capital market conditions would not be that difficult or expensive. Input on current conditions could be constantly submitted (as is cost data currently), and would be useful in decision-making on fare increases, route awards, and other matters. Such an approach is superior to the "fire-fighting" approach of a major *DPFI* or *GPI* every ten years. The latter involves massive commitments of time and resources.

82. The Board itself uses a price elasticity of demand equal to -0.7 in its fare level computations. Thus, a 10% fare increase would result in a *decline* in traffic of 7.0%! And evidence presented in Phase 7 of the *DPFI* suggests an elasticity of demand of -1.25 . See *DPFI-Phase 7, Fare Level*, Docket No. 21866-7, at 521 (CAB Order No. 71-4-59, 71-4-60).

83. Gill and Bates have identified the degree to which a carrier faces competition as an important determinant of cost levels; F. GILL & G. BATES, AIRLINE COMPETITION 519 (1949). By reducing overall competitive levels, costs would be decreased (via the elimination of duplicative advertising, and other costly promotional gimmicks). This decrease in cost levels would decrease overall risk because unstable costs are one key element in business risk. In addition, the restoration of profits therefrom would allow the carriers to decrease their debt burdens and further indirectly decrease the long-run cost of capital.

Third, the problem of differential risks must be resolved in a fair manner. While the carriers themselves have been responsible in part for their own problems, there can be no doubt that the risk differentials evident in Table VI are not strictly subject to carrier control. Indeed, through its past competitive strategies, the CAB has contributed to the problem and therefore must bear part of the burden to correct the situation.⁸⁴ Any solution to this problem will be complex, however, for if differential rates of return are proper, in practice their implementation will be difficult. Differential returns would imply differential fare levels, but for carriers in direct competition this would be impossible. Instead, the CAB might recognize these risk differentials in other ways. New route awards and merger policies could be utilized as a means of balancing and reducing overall intra-industry risks, thereby attacking the problem at its root causes.

The airline industry faces a challenge as it approaches the next decade. Many carriers are weak and all are confronted now with huge demands for funds at a time when conditions are unfavorable. In the period 1977-1985, these demands will total \$32.5 billion.⁸⁵ In the face of this challenge, if several of the weaker carriers are to survive, and if all are to prosper, the CAB must act to restore the industry's lost profitability. This restoration must start with recognition of the true risk-return reality confronting the carriers. Unless the Board comes to terms with this problem, it may well find itself presented with a crisis similar to that of Penn-Central.⁸⁶

84. That the carriers were not to blame for the high debt levels evident on Table VI was readily admitted by Gilliland. See note 55 *supra*. And the failure of the CAB competitive strategy in the 1960's has been blamed by some as the cause of the very high business risk in the industry. The CAB attempted to drive fares down via an increase in competition. One senior official, however, admitted that the strategy only served to injure carrier financial positions! Personal Interview, August 17, 1970, at the CAB. (Further information as to the official involved is in the author's files).

85. ECONOMICS EVALUATION DIVISION, BUREAU OF ACCOUNTS AND STATISTICS, CIVIL AERONAUTICS BOARD, AIRLINE EQUIPMENT NEEDS AND FINANCING THROUGH 1985 (1976).

86. It is interesting to note in conclusion that when Kosh predicted some severe financial problems for the industry in 1970 should the rate of return not be based on an "optimal" capital structure, the Initial Examiner found his remarks "totally devoid of support" and concluded that such references were reflective of a "parade of horrors" and should be disregarded. The subsequent liquidity crises at TWA, Eastern, and Pan Am, however, have demonstrated that the industry is not immune to a bankruptcy. For Kosh's remarks, see *DFFI*, Docket No. 21866-8, JC-K-Testimony at 25. For Schneider's reply, see *DFFI*, *supra* note 1, at 741 (CAB Order No. 71-4-58, App. A, dissent at 1) (Excerpts from the Initial Decision by Harry H. Schneider). For a bankruptcy model applied to air transport, see Gritta, *Solvency and Financial Stress in Air Transportation*, 6 *TRANSP. L.J.* 140 (1974).

