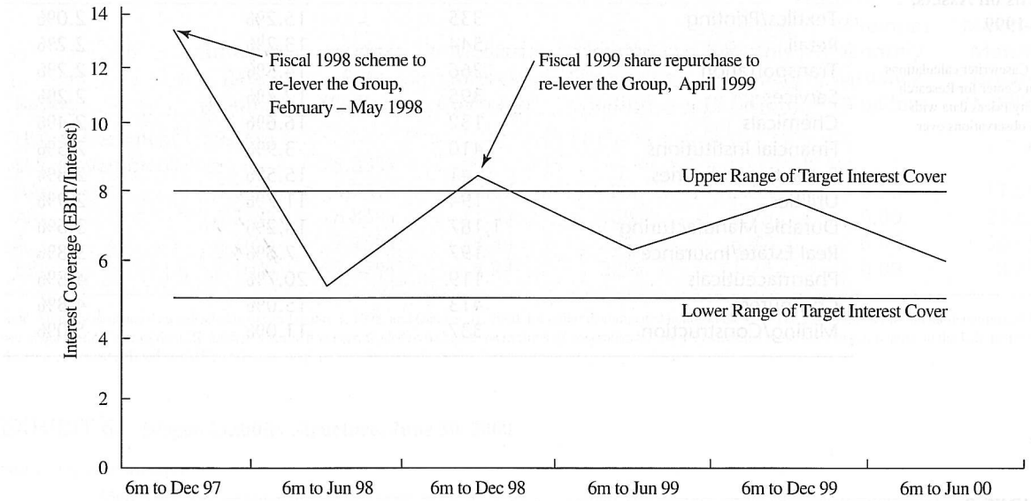
FIGURE I **Diageo Group Interest Coverage, 1997–2000**

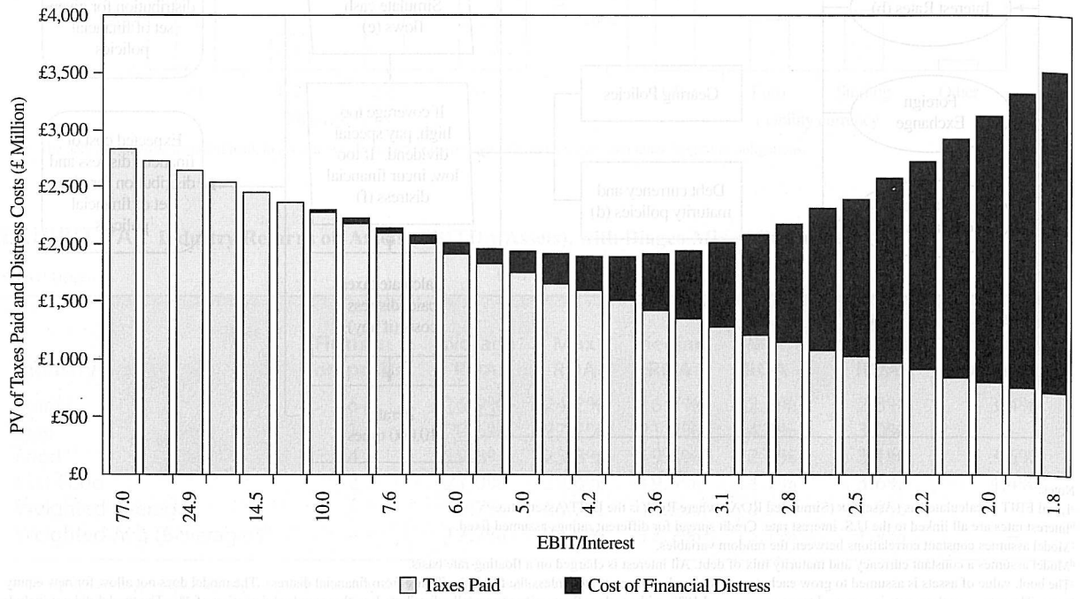
Source: Diageo



Notes: In the 1998 fiscal year, which ended on June 30, 1998, Diageo re-levered the firm by distributing 2.8 billion pounds to shareholders through a share repurchase scheme. In the 1999 fiscal year, Diageo purchased and cancelled 10.5 million shares in October 1998, and 161.5 million shares in April 1999, in addition to completing the earlier repurchase scheme. In total, transactions in the 1999 fiscal year cost 1.2 billion pounds and represented 5% of the issued capital base.

FIGURE II **Output Chart from Model**

Source: Diageo.



Note: Horizontal axis is decreasing in interest coverage, or increasing in gearing. The vertical axis is the present value of expected (average) taxes paid by Diageo plus the present value of the expected (average) cost of financial distress from the model.

Continental Carriers, Inc.

In May 1988, Elizabeth Thorp, treasurer of Continental Carriers, Inc. (CCI), was considering the advantages and disadvantages of several alternative methods of financing CCI's acquisition of Midland Freight, Inc. At a recent meeting of the board of directors, there had been substantial disagreement as to the best method of financing the acquisition. After the meeting, Ms. Thorp had been asked by John Evans, president of CCI, to assess the arguments presented by the various directors and to outline a position to be taken by management at the June directors' meeting.

CCI was a regulated general commodities motor carrier whose routes ran the length of the Pacific Coast, from Oregon and California to the industrial Midwest, and from Chicago to several points in Texas. Founded in 1952 by three brothers, the firm had experienced little growth until the mid-1970s. At that point, Mr. Evans joined the firm as president, after many years as an executive of a major eastern carrier. Mr. Evans first concentrated his efforts on expanding CCI's revenues on existing routes through an intensive marketing effort and a renewed emphasis on improving service. In 1982, utilizing the proceeds of CCI's initial public offering of common stock, Mr. Evans began a program designed to reduce operating costs through a combination of extensive computerization of operations and improvement in terminal facilities. As a result of these changes, CCI had become a large and profitable concern, widely respected in the industry for its aggressive management.

By 1988, Mr. Evans and the directors of the firm had concluded that the key to continued expansion in revenues and income was a policy of selective acquisitions. After a study of potential candidates for acquisition, negotiations began with Midland Freight, Inc., a common carrier serving Michigan and Indiana from Chicago. The owners of Midland agreed to sell the firm to CCI for $50 million in cash. Mr. Evans felt that Midland was an outstanding acquisition in that it would expand CCI's route system and seemed well suited for the type of marketing and cost-reduction programs that had fostered CCI's growth. The board had unanimously approved the merger.

CCI's lawyers felt that no difficulty would be encountered in gaining the approval of the Interstate Commerce Commission for the merger, and the closing date for the acquisition was set for October 1, 1988. Mr. Evans realized that the funds for the Midland acquisition would have to be raised from outside sources. Given that Midland would add $8.4 million in earnings before interest and taxes (EBIT) to CCI on an annual basis, he felt that such external financing would not be difficult to obtain.

CCI's management had followed a consistent policy of avoiding long-term debt. The company had met its needs through use of retained earnings supplemented with the proceeds of the 1982 stock offering and infrequent short-term bank loans. As of 1988, CCI's capitalization consisted of common stock and surplus with no debt of any kind. Most of the common stock was held by management. Ownership of the stock was widely distributed, and there was no real dominant interest other than management. The shares were traded infrequently in the over-the-counter market. Discussions with an investment banker led Ms. Thorp to believe that, barring a major market decline, new common stock could be sold to the public at $17.75 per share. After underwriting fees and expenses, the net proceeds to the company would be $16.75 per share. Thus, if common stock were used, the acquisition would require issuance of 3 million new shares.

For the past few years, Ms. Thorp and Mr. Evans had been disappointed in the market performance of CCI's common stock (see Exhibit 1). Thus, they decided to reconsider the firm's policy of avoiding long-term debt (see Exhibit 2). It was felt that such a change might be justified by the anticipated stability of CCI's future earnings. Ms. Thorp had determined that the firm could sell $50 million in bonds to a California insurance company. The interest rate on these bonds would be 10%, and they would mature in 15 years. An annual sinking fund of $2.5 million would be required, leaving $12.5 million outstanding at maturity. Although the bond terms would create a sizable need for cash, Ms. Thorp felt that they were the best that could be obtained.

In addition, Ms. Thorp had calculated that, given the tax deductibility of bond interest and CCI's current marginal tax rate of 40% (34% federal corporate income tax; 9% deductible state and local corporate income taxes), the 10% rate was the equivalent of 6% on an after-tax basis. In contrast, she thought the stock at $16.75 per share and a dividend of $1.50 per share would cost CCI nearly 9%. This cost comparison made the debt alternative seem desirable to Ms. Thorp.

At the May directors' meeting, the Midland acquisition received enthusiastic approval. Ms. Thorp then decided to sound out the board's opinions regarding the possibility of financing the acquisition with long-term debt rather than with common stock. She presented the foregoing cost calculations. To her concern, an acrimonious debate broke out among the directors concerning financing policy.

Ms. Thorp was immediately questioned as to the cost of the debt issue, since her figures did not include the annual payment to the sinking fund. One director argued that this represented 8% of the average size of the bond issue over its 15-year life, and he felt that the stock issue had a smaller cost than the bonds. In addition, he emphasized the cash outlay required by the bond alternative and the $12.5 million maturity, especially in view of CCI's already existing lease commitments. He felt that the use of debt added considerable risk to the company, making the common stock more speculative and causing greater variation in market price.

Another director argued for the issuance of common stock because "simple arithmetic" showed that CCI would net 10%, or $5 million, per year after taxes from the acquisition. Yet, if an additional 3 million shares of common stock were sold, the dividend requirements, at the current rate of $1.50 per share, would be only $4.5 million per year. Since management was not considering raising the dividend rate, she could not see how the sale of the common stock would hurt the interests of present stockholders. Further, if there were any immediate sacrifice by existing shareholders, she said, it would be overcome as expansion of the firm continued. Under these circumstances, she argued, the bond issue should be rejected, given the cash demands it would place on the firm.

On the other hand, one director became very agitated in arguing that the stock was a "steal" at $17.75 per share. He pointed out that CCI's policy of retaining earnings had built the book value of the firm to $45.00 per share as of December 1987. In addition, he felt that the true value of the company was understated, since the book value of CCI's assets was considerably below current replacement cost. This director was also worried by the substantial dilution of management's voting control of CCI that was implicit in the 3-million-share offering. Thus, he concluded, the sale of common stock at this time would be a "gift" to new shareholders of the substantial value held by current stockholders.

Two directors agreed that sale of stock would dilute the stock's value, but they measured this dilution in terms of earnings per share instead of book or replacement value. These directors anticipated that postacquisition earnings would equal $34 million before interest and taxes. If common stock were sold, earnings per share would be diluted to $2.72. In contrast, they argued, the sole use of debt would increase earnings per share to $3.87. The two directors felt that it was not important that the sinking fund equaled $.56 per share each year.

Finally, a director mentioned some personal observations he had made about financing in the trucking industry. First, he noted that CCI was one of the few major common carriers that had no long-term debt in their capital structures, while CCI's price-earnings ratio was among the lowest in the industry. Second, he wondered whether Ms. Thorp had given consideration to the possibility of issuing preferred stock. This director had determined that CCI could sell 500,000 shares of preferred stock bearing a dividend rate of $10.50 per share and a par value of $100. The director criticized Ms. Thorp for failing to deal with the issues he had raised.

This debate had caused the directors' meeting to run over its scheduled conclusion, and no signs of agreement had developed. Ms. Thorp asked that the discussion of financing alternatives be held over until the June meeting to allow her time to prepare additional material. Now, as the date for the meeting approached, Ms. Thorp once again turned her attention to the issues raised at the board meeting. She realized that a considerable number of issues raised by the directors needed to be considered, and she designed a chart to aid in the comparison of the debt and stock alternatives (Exhibit 3).

EXHIBIT 1 **Selected Income and Dividend Data, 1982–1988 (thousands of dollars except per share data)**

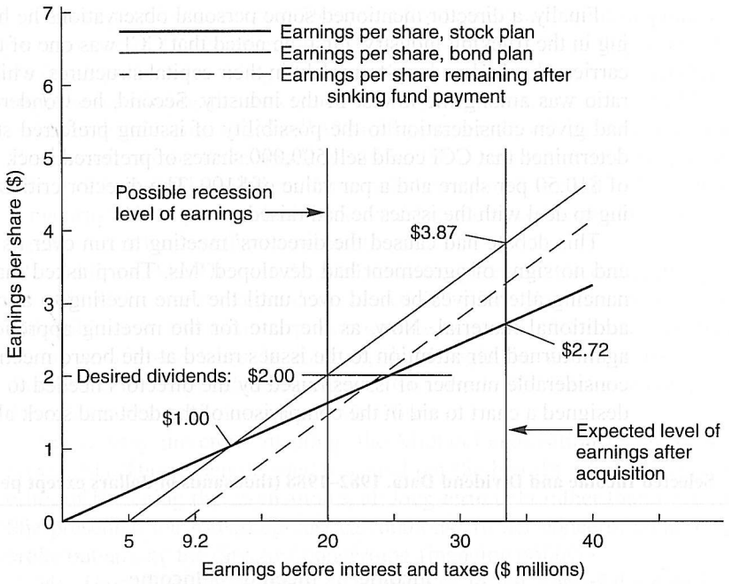
	Operating Revenue	Income before Taxes	Income after Taxes	Income per Share	Dividends per Share	Market Prices per Share of Common Stock	
						High	Low
1982	$ 630,000	$14,490	$ 7,245	$1.61	$1.00	16¼	11¼
1983	693,750	16,650	8,325	1.85	1.15	19	14¾
1984	737,305	19,170	9,585	2.13	1.25	20⅛	15
1985	858,460	22,320	11,160	2.48	1.25	23¾	17⅜
1986	926,665	25,020	12,510	2.78	1.25	27⅜	22¼
1987	1,028,570	28,800	15,725	3.49	1.50	25	18½
1988 est.[a]	1,080,000	25,600	15,360	3.41	1.50[b]	20[c]	16⅜[c]

[a]Excluding the proposed acquisition and its financing.
[b]Annual rate.
[c]To May 1 (May 1 prices were 18¾–19¼).

EXHIBIT 2
Summary Balance Sheet at December 31, 1987 (thousands of dollars)

Cash	$ 19,000
Accounts receivable	38,450
Inventory	8,100
Prepaid expenses	9,100
Current assets	74,650
Carrier operating property (cost)	236,650
Less: Accumulated depreciation	89,100
Net carrier operating property	147,550
Other assets	30,900
Total assets	$253,100
Accounts payable	$ 25,300
Miscellaneous payables and accruals	20,250
Taxes payable	5,050
Current liabilities	50,600
Common stock ($1 par)	4,500
Paid-in surplus	40,000
Retained earnings	158,100
Stockholders' equity	202,100
Total liabilities and stockholders' equity	$253,100

EXHIBIT 3
Analysis of Financing Alternatives



Calculation of Points to Determine Lines (thousands of dollars except per share data)

	Bonds	Stock	Bonds	Stock
EBIT	$12,500	$12,500	$34,000	$34,000
Interest, 1st year	5,000	—	5,000	—
Taxable earnings	7,500	12,500	29,000	34,000
Tax at 40%	3,000	5,000	11,600	13,600
After-tax earnings	4,500	7,500	17,400	20,400
Earnings per share				
÷ 4,500,000	$ 1.00	—	$ 3.87	—
÷ 7,500,000	—	$ 1.00	—	$ 2.72
Annual sinking fund	$ 2,500	—	$ 2,500	—

Note: The effects of leverage and dillution are indicated by the differing slopes of the lines, and can be expressed: "For each million dollar change of EBIT, the bond plan brings a change in earnings per share that is $.0535 greater than the stock plan. Leverage is favorable from EBIT of $12.5 million upward."

Fixed Income Valuation

1. On December 20, 1994 the Nippon Telegraph & Telephone Corporation (NTT) issued ¥1 billion of 10-year debentures due December 20, 2004. The debentures carried a 4¾% coupon. They were priced at par; that is, they cost the investor ¥100 per ¥100 of face value. The entire amount of borrowed principal would be repaid at maturity. Interest would be paid annually upon the anniversary date of the issuance (i.e., on December 20th of each year). The debentures carried a AAA credit rating.
   A. *What was the yield to maturity of NTT's debentures at the time of issuance? What would it have been if the bonds were priced at 99 instead of 100 (i.e., at 99% of face value)? at 101 instead of 100?*
   B. *By 1996 yields on AAA yen debt maturing in 8 years had dropped to 3.00%. Given this yield to maturity, at what price should the NTT debentures have been selling?*
2. Ms. Alumm is the portfolio manager for a large insurance company. She is considering investing $1 million to purchase some bonds of Patriot Enterprises, Inc.

   All of Patriot's bonds have market prices that imply a *yield to maturity* of 8% "bond equivalent yield" (that is 4% every 6-month period).[1] Each Patriot bond is described here, based on a $1,000 face value (par value), which is the promised payment at maturity.
   - Bond A matures in five years and pays a 9% coupon yield ($45 every 6 months on a $1,000 face value bond).
   - Bond B matures in 10 years, pays an 8% coupon yield ($40 seminannual payments), and is being offered at par.
   - Bond C is a zero-coupon bond that pays no explicit interest, but will pay the face amount of $1,000 per bond at maturity in 10 years.

   A. *At what price should each bond currently sell?*

   As an alternative, Ms. Alumm has been invited to invest $1 million in a 10-year Eurobond of a second firm, Nationaliste, S.A.[2] Nationaliste bonds are similar in risk to "Bond B" above: they promise an 8% coupon yield for 10 years, but coupons are paid annually, not semiannually. The Nationaliste bonds are priced at a 1% discount from par, or $990 per $1,000 face value.

[1]Most domestic U.S. bonds pay interest of half the coupon rate semiannually. The "bond-equivalent" yield to maturity is generally stated in terms of twice the semiannual yield, ignoring the compounding of the midyear coupon payment. Thus the yield-to-maturity as commonly stated for semiannual bonds actually understates the true annual effective yield.

[2]A Eurobond is a bond issued outside of the domestic market of the country in whose currency the bond is denominated. Historically, most such bonds were sold by London-based underwriters to European investors; hence, the prefix "Euro." In contrast to typical domestic U.S. bonds, which pay interest semiannually, most Eurobonds pay interest annually.

This case was prepared as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Problems 2 and 4 appear in the case "Valuation and Discounted Cash Flow" (HBS case no. 291-028) by Professor Michael E. Edleson and were revised for inclusion in this case. Problem 3 appears in the case "Introduction to Investment Evaluation Techniques" (HBS case no. 285-115) by Professor Dwight B. Crane and was also revised for inclusion in this case.

B. *What yield to maturity is implied by the Nationaliste Eurobond? Compare this yield to the 8% "bond-equivalent yield" of the Patriot semiannual coupon bond (Bond B) above. In which bond should Ms. Alumm invest?*

3. A prospective homeowner wants to determine how much she can borrow in the form of a fixed-rate 20-year mortgage. Mortgages of that maturity carry a fixed interest rate of 9.00%. She estimates that she can afford annual, pre-tax payments (interest plus principal) on her mortgage of $25,000 (for simplicity, assume that mortgage payments are made once a year at the end of the year).

   A. *How large a mortgage can she afford, assuming she makes steady payments of $25,000 per year for 20 years? How much total interest will be paid over the 20-year life of the mortgage? How much interest will be paid during the first year of the mortgage? How much principal will be repaid in the first year? How much of the final $25,000 payment at the end of 20 years will be interest and how much will be principal?*

   B. *Suppose the prospective home owner expects her income to grow such that she could afford $25,000 per year of total debt service in the first five years of a 20-year mortgage, $30,000 per year in the second five years, $35,000 in the third five years, and $40,000 in the last five years. How large a mortgage at 9.00% could she afford under these circumstances?*

4. To help ease a continuing need for financing, the Consolidated Chemical Company is considering borrowing from insurance companies through a so-called "private placement" of bonds in addition to issuing bonds in public debt markets. The company must choose between transactions suggested by two different insurance companies. In both transactions, Consolidated Chemical would receive $10,000,000 up front in exchange for issuing a bond promising a single (larger) maturity payment from Consolidated Chemical in 15 years at a promised interest rate. The two options open to Consolidated Chemical are as follows:

   - A 15-year bond to Pru-Johntower Life Insurance Company, promising an annual rate of interest of 10%;
   - A 15-year bond to Tom Paine Mutual Life Insurance Company, promising a rate of interest of 9.72% per year, compounded monthly.

   A. *What is the effective annual yield to maturity on each of the bonds?*

   B. *What is the future required payment that Consolidated Chemical will make 15 years later on each bond?*

   The Treasurer of Consolidated Chemical also explored with each insurance company the possibility of selling an identical dollar amount of 15-year bonds that would make regular semi-annual coupon payments each year and $10 million principal repayment at maturity rather than a single lump-sum payment. It was discovered in each case that the insurance company would require an effective annual yield on ordinary coupon bonds of equivalent default risk that was 50 basis points (i.e., 0.50%) *higher* than the effective annual yields on the bonds with no coupons.

   C. *What might explain why the insurance companies would require a slightly higher effective annual yield on the coupon bonds compared to the bonds with no coupons?*

5. In September of 1995, McDonalds Corporation issued $150 million of Senior Notes due in 2005. The notes were issued at par and bore interest of 6¾%. The debt was rated AA by Moodys. Interest payments on this debt were deductible for corporate tax purposes (you may assume that McDonalds's marginal corporate tax rate was 35%), though principal repayments were not. All principal would be repaid in September 2005.

   A. *From McDonalds's perspective, what is the effective after-tax cost of this debt (expressed as an annual percentage)?*

   B. *How many dollars of taxes will McDonalds save each year through the deduction of the interest expense on these notes from taxable income (you may assume that McDonalds will have sufficient taxable income in future years to cover the interest expense on this debt)? What is the present value of these future tax savings?*

6. In late 1993, the Weyerhauser Corporation was considering the use of a so-called "Industrial Development Bond" to help finance the construction of a facility in the state of North Carolina. Industrial Revenue Bonds (IRBs) and Pollution and Environmental Control Revenue Bonds (PCBs) were financial instruments issued by a state or local government authority—in this case, Martin County, North Carolina. The proceeds from these securities would be used to finance the development of facilities or the purchase of equipment that would be managed by a for-profit company, but that would serve a particular local public interest such as providing employment in a depressed region or reducing pollution. Because the bonds were technically issues of state or municipal authorities, interest income on the bonds was exempt from taxation. The issuing government authority was merely a conduit, however. The interest and principal on the debt was effectively repaid by the sponsoring corporations (e.g., Weyerhauser), which was designated in the bond's indenture as the guarantor of the bond and the ultimate source of funds from which the bond's interest and principal would be paid. Although the interest income received by IRB investors was exempt from taxation, the interest expense effectively paid on the IRBs by the corporate entity servicing and guaranteeing the bonds was deductible for tax purposes.

   In late 1993, $50 million of IRBs that would be guaranteed and serviced by the Weyerhauser Corporation could have been issued at par with an annual bond-equivalent yield of 5.65% (i.e., interest of $28.25 per $1,000 bond would be paid twice a year). They would mature 30 years later in the year 2023. If Weyerhauser were instead to issue bonds of equivalent maturity and risk as the IRBs but do so as a direct obligation of its own, the interest paid on such debt would *not* be exempt from taxation to investors. To be sold at par, such fully taxable bonds would have to provide a higher coupon yield in the vicinity of 7.25% (paid semiannually).

   A. *Why would Weyerhauser's IRBs have a lower effective annual yield than that of its direct obligations of equivalent maturity and risk?*

   B. *What is the present value of the savings Weyerhauser would realize if it arranged the IRB financing described above instead of a conventional corporate bond with a yield of 7.25%? For simplicity assume that only interest would be paid during the life of the bonds and that all principal would be paid at maturity. Also assume that Weyerhauser's marginal corporate tax rate was 35%.*