

Other evidence on rates of return

1. This appendix gives a brief survey of some other evidence relevant to assessing RORs. It covers Government advice on public sector discount rates, theoretical approaches to the cost of capital and other RPI-X-regulated companies.

Government advice on public sector discount rates

2. In April 1989 the Government issued a statement on the discount rates to be used in the public sector.¹ The statement noted that the ROR had risen to around 11 per cent in the private sector since those rates had last been reviewed in 1978. The required rate of return (RRR) for nationalised industries and public sector trading organisations was raised from 5 to 8 per cent in real terms before tax. The new RRR would be an important factor in setting new financial targets but should not impact on pricing during the operation of existing financial targets.

3. The choice of discount rates to appraise individual projects would remain a matter for decision by individual nationalised industries in consultation with the Government. The Government's continuing concern was that such industries should achieve the RRR on their investment programme as a whole. Proper attention needed to be paid to risk (often implicitly equivalent to requiring a higher internal ROR on riskier projects). The discount rate to be used in the non-trading part of the public sector should be based on the cost of capital for low-risk purposes in the private sector which, in current conditions, indicated a rate of not less than 6 per cent in real terms. However, risk would need to be analysed separately, and more risky projects would be required to demonstrate correspondingly lower costs or higher benefits.

4. Subsequently, HM Treasury published guidance for central Government which explains the background to the new regime in more detail.² This restates that, for the non-trading public sector, the rate of discount would be 6 per cent, both as a cost of capital (for ensuring public resources were used no less efficiently, at the margin, than in the private sector) and as a rate of time preference for discounting to present values.

5. The guidance notes that data on the private sector's proportional use, and costs, of equity and debt could be interpreted to give a wide range of projections. Judgments were needed, for example, about whether variations in equity yields reflected smoother underlying trends, and the way in which a risk-free rate should be derived for comparison with equity yields. However, the average pre-tax return on equity over the long term had been between 5 and 6 per cent, and the expected cost of long-term risk-free debt, which was probably around 4 per cent in 1990, had in the past been lower than that.³ Implicit in a figure as high as 6 per cent as a low-risk cost of private capital, funded by a mix of debt and equity, was a presumption that future long-term equity and debt yields would on average be somewhat higher than in the past.

6. HM Treasury cautioned that the Government borrowing rate was not by itself a satisfactory basis for comparing the costs of public and private sector supply (for instance, it did not reflect different levels of tax). Mainly because of tax, a real discount rate of 6 per cent, for comparison with private sector supply, was considered consistent with a real long-term risk-free rate of 4 per cent. For the same reason the nominal equivalent of the 6 per cent real rate should be taken as 2 percentage points more than the National Loans Fund rate (which was very close to the Government borrowing rate).

¹ Answer by the Chief Secretary. *Hansard*, House of Commons, Vol 150, written answers, 5 April 1989, columns 187 to 188.

² *Economic appraisal in Central Government: a technical guide for Government Departments*, HM Treasury, April 1991, HMSO. In particular see Annex G *Discount rates and rates of return*.

³ Such empirical results are discussed in *Discount rates and rates of return in the public sector: economic issues*, M Spackman, Treasury Working Paper No 58, January 1991, HM Treasury. In particular see Annex C *Costs of capital and return on assets*.

7. The RRR for a central Government body selling its output in commercial markets would usually be set at 8 per cent. In accounting terms such a figure should be calculated on a current cost basis with profits before tax and interest. Setting an RRR higher than the cost of capital presumed that the average return of a commercial body's activities was above its marginal return, which in turn was broadly equivalent to its cost of capital. HM Treasury considered this consistent with the data on past private sector costs and returns on assets. Thus the figure of 8 per cent was higher than the 6 per cent because the former was an average return, as opposed to a marginal cut-off return.

8. HM Treasury noted that the real return on assets in ICCs' excluding the North Sea had risen from historically low levels of 3 to 7 per cent between 1974 and 1985 to over 9 per cent in the late 1980s.¹ The standard RRR of 8 per cent was set somewhat below the expected ICC return over the long term, to reflect, *inter alia*, the relatively low risk of many public sector activities.

9. In application to central Government bodies, an RRR was normally specified in terms of a required real return on the body's capital employed. However, for application to nationalised industries, the RRR was a required return on the industry's new investment programme and a separate financial target (usually expressed as a ROCE) often reflecting other factors specific to the industry. Although there was no standard discount rate for bodies controlled by an RRR, it would be common practice to use the body's RRR (or higher rate) as a discount rate on grounds of simplicity and, when applied to commercial returns on large projects, to help to ensure that the RRR would be achieved on average.

10. An example of the application of these guidelines was given in the MMC's 1990 report on the CAA.² The Government had set the CAA a financial target to obtain an average annual return of 8 per cent before interest and tax on average capital employed on a CCA basis for the years 1989/90 to 1991/92 for all its activities except United Kingdom airspace traffic services and Highlands and Islands Airports Ltd. The CAA told us that the Government recognised that the achievement of financial self-sufficiency on excepted activities was dependent on circumstances beyond the CAA's control. The discount rate of 8 per cent used by the CAA in financial appraisal was set after consultation with DTp and HM Treasury.

Theoretical approaches to the cost of capital

11. Standard financial textbooks suggest a number of ways in which the cost of capital can be estimated. Typically it will be argued that the cost of capital is a weighted average of the cost of debt and the cost of equity finance with weights dependent on the relative use of these forms of finance (gearing). Whilst it is usually possible to observe the cost of debt, the cost of equity (including the opportunity cost of retained earnings) cannot be readily observed as investors buying equity expect both dividend income and capital appreciation. The latter element can only be inferred. MA PLC drew such an approach, based on the CAPM, to our attention (see paragraph 10.229). MA PLC told us that the results suggested its post-tax cost of capital was 8.5 per cent (or 10 per cent pre-tax).

12. CAPM is a method for estimating the cost of capital for a firm. A particularly attractive feature of CAPM is that it makes explicit the evaluation of the degree of risk associated with a business and so represents an attempt to systemise the treatment of risk differences. Essentially CAPM splits the cost of equity for a business into a notional element that is risk-free and an element that reflects market risk. The

¹The difference between the 9 per cent real return on assets and the 5 to 6 per cent real return on equity may seem puzzling. However, a study of the 1963 to 1987 period shows that profit retentions accounted for almost one-third of all company pre-tax income and that, after taking account of tax differences, most of the difference between RORs and the cost of finance was accounted for by retained earnings. See *On a puzzle of returns to physical and financial assets in the United Kingdom company sector 1963 to 1987*, C Mellis, Treasury Working Paper No 59, May 1991, HM Treasury.

²Monopolies and Mergers Commission: Civil Aviation Authority: *a report on an inquiry into the supply of navigation and air traffic control services to civil aircraft*, Cm 1122, July 1990.

risk-free element can be measured by reference to the lowest risk investment available to investors (eg the long-term yield on Government bonds). The market element is hypothesised to reflect a combination of the average premium that equity investments give over the risk-free investment and a factor, β , that reflects the sensitivity of a particular company's share price to average share price movements. A β of 1 indicates strong correlation between the business's share price and market prices indicating that the business displays risks similar to the market as a whole. β s of less than 1 indicate lower risk and higher than 1 greater than average risk. A company's equity cost of capital may then be expressed as:

$$C = \text{risk-free rate} + \beta \times \text{market equity premium}$$

This equity cost of capital can then be combined with the cost of debt to yield the weighted average cost of capital.

13. An alternative method to CAPM is application of the Dividend Growth Model (DGM). Essentially the DGM suggests that the cost of equity could be decomposed into the sum of the dividend yield and the expected growth of dividends.

14. In the case of MA PLC there is no traded share price and so it is not possible directly to apply methods such as CAPM or DGM. MA PLC's evidence, reported above, on CAPM was based on calibrating results by reference to the position of BAA. Such results had been previously considered by the MMC in their BAA report. However, MA PLC's position differs from BAA in two respects: it has direct access to debt funding from the PWLB and it is much more highly geared. Most large firms, even with a good credit rating, will expect to pay a premium of 1 per cent or more over Government borrowing rates, in order to raise debt; MA PLC has direct access to funds at near to Government borrowing rates. MA PLC's gearing of about 100 per cent is more than twice that of BAA and higher than that of many other commercial companies. At this level of gearing MA PLC's weighted average cost of capital is about equally split between the cost of debt and the cost of equity. This may be compared with BAA which, in the BAA report, was assessed on a debt/equity ratio of 17:83. Overall, because MA PLC has access to lower cost debt and it employs a greater proportion of that debt rather than higher cost equity, application of such theoretical approaches gives estimates of the weighted cost of capital for MA PLC below those for most other companies. These last two factors are largely independent of the method used for estimating the cost of equity.

15. The application of CAPM as a basis for inferring the cost of equity requires estimates of the parameters (risk-free rate, β and the risk premium) in the CAPM model. There is much academic disagreement over such estimates. For instance, MA PLC told us that its estimate of 10 per cent pre-tax cost of capital could, with alternative assumptions, lie in the range 5.25 to 10.9 per cent.

Other RPI-X regulated companies

Water

16. For water the regulatory regime is set on a real CCA basis. At the time of privatisation the Secretaries of State worked on a basis of a 7 per cent pre-tax return for the water and sewerage companies (with 8 per cent for the water-only companies and 8.5 per cent for the smallest companies). The 7 per cent rate was adopted against the background of the 8 per cent RRR for nationalised industries and other public sector trading bodies, and reflected a judgment that water and sewerage companies were of below-average risk. Its use was supported by the application of procedures such as CAPM, taking a judgment about likely β values on the basis of evidence from other countries and other United Kingdom utilities.

17. A recent Office of Water Services (OFWAT) consultation paper considered what cost of capital should be applied in setting the water price cap in 1995 or beyond.¹ OFWAT suggested that an appropriate ROR on equity in the water industry was of the order of 5 to 7 per cent in real terms. The cost of debt could be 3 to 5 per cent including a 1 per cent premium over the gilt rate to reflect the risk characteristics of water and sewage companies. Taken together, and with assumed gearing of 25 to 75 per cent this implied a

¹OFWAT: *Cost of capital: a consultation paper*, 2 volumes, July 1991.

weighted average cost of capital of 5 to 6 per cent (perhaps slightly higher for small independent water-only companies). In coming to this conclusion a preference was expressed for the results of the DGM rather than CAPM. It was noted that the gearing of water companies could increase to 50 per cent and, in some circumstances, could be allowed to rise to as high as 75 per cent. OFWAT restated its intention to use until 1995 a 7 per cent pre-tax real ROR that had been initially assumed when price limits were set. The water industry is vigorously contesting OFWAT's conclusions.¹

Gas

18. OFGAS reset the British Gas price cap in mid-1991. It published its views on the ROR at the same time.² OFGAS first considered RORs achieved by companies that could be considered comparable to British Gas (utilities and companies with a similar level of risk in the United Kingdom, Europe, North America and Australia). The comparison centred on the return on net assets on a current cost basis given that British Gas produced its main accounts in that way. Return on net assets in the accounts (where possible on a CCA basis) indicated that an appropriate range was 16 to 18 per cent in historic cost terms and around 4 to 6 per cent in current cost terms for the gas supply business as a whole. OFGAS also considered the ROR apparently sought by investors given their perceptions of risk as seen in the company share price. This employed a CAPM approach. Its consultants identified a market return in the range 7 to 9 per cent. OFGAS noted technical difficulties which required adjustment to translate a market ROR into an accounting ROR, which was necessary in order to use the figures in relation to price-setting via the tariff formulae.³ This produced an equivalent accounting figure of around 6 per cent although with a wide margin of uncertainty. Overall OFGAS concluded that a CCA rate of return of 5 to 7 per cent would be appropriate in relation to the new formula. It noted that the new formula, particularly the gas price index, exposed British Gas to greater risks than previously.

British Telecommunications

19. In 1986 the Office of Telecommunications (OFTEL) had estimated that an acceptable historic cost ROR for BT fell in the range 17.5 to 19 per cent. In its recent consultation paper on *BT's cost of capital*, OFTEL examined both DGM and CAPM approaches.⁴ From the DGM it estimated that BT's post-tax cost of equity ranged from 14 to 15 per cent (which it estimated be equivalent to 21 to 23 per cent before tax). The use of CAPM suggested that investors were looking for a post-tax equity ROR from BT of 12.3 to 14.5 per cent. That would be equivalent to 19 to 22.4 per cent pre-tax. OFTEL concluded that with a gearing of 20 per cent BT's weighted average cost of capital, applying both the DGM and CAPM, lay in the range 17 to 20 per cent. OFTEL did not quote its results in CCA terms.

Airports

20. The rate of return for BAA's South-East Airports was recently considered by the MMC and the CAA. The MMC considered a number of comparators for the airports including National Accounts data on

¹ See *The cost of capital in the water industry: a response by the Water Services Association and the Water Companies Association*, 3 volumes, November 1991.

² *New tariff gas formula: economic aspects*, Malcolm Keay, OFGAS, 1991.

³ These included that the risk indicated by the β parameter in CAPM reflected the total business results (including recent diversifications and unregulated activities), and the ROR implied by the shareholder valuation of assets implicit in the initial privatisation (with pre-privatisation assets deserving a lower ROR).

⁴ *BT's cost of capital*, a consultative document issued by the Director General of Telecommunications, January 1992.

RORs before interest and tax at current replacement cost.¹ The MMC thought it difficult to regard BAA as either particularly low- or high-risk. It was largely protected from competitive risks, its long-term investments were subject to traffic risk, and there was a regulatory risk. On balance the MMC regarded the level of risk of South-East airports in the next quinquennium as below average. BAA had argued, using a CAPM approach, that a return of 8 to 10 per cent would be comparable with that for the economy generally. The MMC took the view that, given returns in the economy generally and the particular circumstances of BAA, a figure of 8 per cent would be reasonable. The MMC also noted that the Government had set the RRR for investment by nationalised industries at 8 per cent, based on average returns on assets achieved in the private sector for activities with low cyclical year-by-year variability (discussed above). The CAA, whilst avoiding any attempt to be overprecise, thought that BAA should achieve a real ROR on capital employed of 7 per cent; it regarded this as derived from the MMC's conclusions that BAA's risk in the next quinquennium was below average and from the industry-wide RORs quoted in the MMC report. The CAA subsequently stated that the price cap it set for BAA for 1992 to 1997 was expected to yield a 7.5 per cent return.

¹Reference was made to data similar to that in Table 7.21. However, the data in Table 7.21 are updated; it includes 1990 data and its basis has changed slightly as the CSO uses a different basis of recording of assets acquired on finance leases (see Table 13.1 in the MMC's BAA report).