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are asymmetric; cost savings from successful innovations are passed on to ratepayers, while unsuccessful ventures are disallowed and absorbed by investors. The net result is that utilities may use capital/labor ratios that are not cost-minimizing.

Several environmental issues increase regulatory risks and create the need for non-revenue producing investments. For example, the financial effects of the Clean Air Act on coal-fired generation plants are a source of cost and availability uncertainty for electric utilities with fossil electric generating units. Consumer resistance to distribution/transmission site noise level, appearance, and the specter of electro-magnetic fields (EMF) result in increased costs and construction delays. Another example is the uncertain final financial effects of the Safe Drinking Water Act on water utilities. Water utility companies will need to upgrade their facilities to comply with evolving environmental standards. Because the standards are still evolving and are yet to be determined, there are uncertainties related to upgrading and compliance costs. Future water quality regulations will increase retail water utility fixed costs and capital investment. This will in turn increase operating and financial leverage, thus increasing risk and required rate of return.⁴

Rate Subsidies, Regulation, and Business Risk

A rate structure that reflects public policy for utility services (residential service for example), rather than pricing based on economic costs, is fragile in a competitive environment. The ability to subsidize residential rates from above-cost industrial and commercial rates is destined to diminish in a competitive market environment. By providing residential service at rates below cost, a utility's long-term business risks are increased since the rates for other services may have to be priced in excess of the rates available from a competitor. In a competitive environment, prices must reflect the marginal cost of providing a service. If a company's prices exceed the marginal costs of providing service in a given market, competitors have an inherent advantage and will erode that company's market share.

Financial Risk (f)

Financial risk stems from the method used by the company to finance its investments and is reflected in its capital structure. It refers to the additional variability imparted to income available to common shareholders by the

⁴ For an examination of how changes in the operating environment of water utilities have increased their investment risk and their cost of capital, both in absolute terms and in relation to other utilities, and how increased capital and operating costs of complying with new and evolving water quality standards have an impact on their risk and required rate of return, see Morin (1992).

TABLE 2-1
IMPACT OF LEVERAGE ON EQUITY RETURNS

	All Equity (\$000)			50% Debt (\$000)		
	\$80	\$100	\$120	\$80	\$100	\$120
EBIT	\$80	\$100	\$120	\$80	\$100	\$120
Interest	\$0	\$0	\$0	\$30	\$30	\$30
Profit Before Tax	\$80	\$100	\$120	\$50	\$70	\$90
Taxes (50%)	\$40	\$50	\$60	\$25	\$35	\$45
Profit After Taxes	\$40	\$50	\$60	\$25	\$35	\$45
Return on Equity	6.7%	8.3%	10.0%	8.3%	11.7%	15.0%

employment of fixed-cost financing, that is, debt and preferred stock capital. Although the use of fixed-cost capital can offer financial advantages through the possibility of leverage of earnings (financial leverage), it creates additional risk due to the fixed contractual obligations associated with such capital. Debt and preferred stock carry fixed charge burdens that must be supported by the company's earnings before any return can be made available to the common shareholder. The greater the percentage of fixed charges to the total income of the company, the greater the financial risk. The use of fixed cost financing introduces additional variability into the pattern of net earnings over and above that already conferred by business risk, and may even introduce the possibility of default and bankruptcy in unusual cases.

One of the most important ideas in finance is that financial risk increases with leverage and that the greater the leverage, the greater the cost of equity. For example, consider a company with a total capitalization of \$600,000. The company can be financed either entirely through common equity contributed by the shareholders, or by issuing \$300,000 of debt at a 10% rate of interest and having an equity investment of just \$300,000. The corporate tax rate is 50% for ease of illustration. The expected earnings before interest and taxes (EBIT) are \$100,000. The financial results obtained for the two alternative capital structures are shown in Table 2-1 for three assumed levels of EBIT, \$80,000, \$100,000, and \$120,000.

At an EBIT level of \$100,000, the use of debt financing has increased the return on equity from 8.3% to 11.7%. The shareholders' gain is the result of raising funds on the debt market at an after-tax cost of 5% and investing these funds to yield a return in excess of that cost. But the risk to the shareholders is increased. The earnings available to common shareholders become more volatile, as the relative amount of debt used becomes greater. Note that leverage is a double-edged sword. Just as shareholders' gains are magnified in the case of favorable operating results, potential losses are also magnified in the case