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Any forward-looking cost of capital calculation already embodies tax effects since investors price securities on the basis of after-tax returns. Besides, a very large proportion of trading is conducted by tax-exempt financial institutions (pension funds, mutual funds, 401K, etc.) for whom tax issues are largely immaterial.

The existence of a negative risk premium is highly unlikely, as it is at serious odds with the basic tenets of finance, economics, and law. Using proper definitions for expected rates of return of equity and debt, the preponderance of the evidence indicates that the negative risk premium does not exist. Several risk premium studies cited in this chapter have found positive risk premiums well in excess of 5% over the last decade. Risk premiums do narrow during unusually turbulent and volatile interest rate environments, but then return to normal levels. They are most unlikely to ever become negative.

4.7 Risk Premium Determinants

Fundamentally, the primary determinant of expected returns is risk. To wit, the various paradigms of financial theory, including the Capital Asset Pricing Model and the Arbitrage Pricing Model covered in subsequent chapters, posit fundamental relationships between return and risk. There are also secondary influences on the relative magnitude of the risk premium, however, including the level of interest rates, default risk, and taxes.

Interest Rates

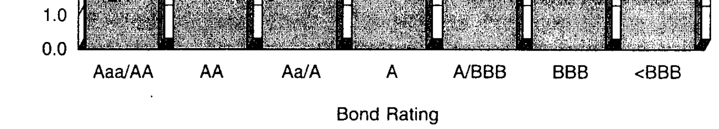
Published studies by Brigham, Shome, and Vinson (1985), Harris (1986), Harris and Marston (1992, 1993), Carleton, Chambers, and Lakonishok (1983), Morin, (2005), and McShane (2005), and others demonstrate that, beginning in 1980, risk premiums varied inversely with the level of interest rates—rising when rates fell and declining when interest rates rose. The reason for this relationship is that when interest rates rise, bondholders suffer a capital loss. This is referred to as interest rate risk. Stockholders, on the other hand, are more concerned with the firm's earning power. So, if bondholders' fear of interest rate risk exceeds shareholders' fear of loss of earning power, the risk differential will narrow and hence the risk premium will shrink. This is particularly true in high inflation environments. Interest rates rise as a result of accelerating inflation, and the interest rate risk of bonds intensifies more than the earnings risk of common stocks, which are partially hedged from the ravages of inflation. This phenomenon has been termed as a "lock-in" premium. Conversely in low interest rate environments, when bondholders' interest rate fears subside and shareholders' fears of loss of earning power dominate, the risk differential will widen and hence the risk premium will increase.

Harris (1986) showed that for every 100 basis point change in government bond yields, the equity risk premium for utilities changes 51 basis points in the opposite direction, for a net change in the cost of equity of 49 basis points. For example, a 100 basis point decline in government bond yields would lead to a 51 basis point increase in the equity risk premium and therefore an overall decrease in the cost of equity of 49 basis points, a result almost identical to the estimate reported in Morin (2005). As discussed earlier, similar results were uncovered by McShane (2005), who examined the statistical relationship between DCF-derived risk premiums and interest rates using a sample of natural gas distribution utilities.

The gist of the empirical research on this subject is that the cost of equity has changed only half as much as interest rates have changed in the past. The knowledge that risk premiums vary inversely to the level of interest rates can be used to adjust historical risk premiums to better reflect current market conditions. Thus, when interest rates are unusually high (low), the appropriate current risk premium is somewhat below (above) that long-run average. The empirical research cited above provides guidance as to the magnitude of the adjustment.

Risk premiums also tend to fluctuate with changes in investor risk aversion. Such changes can be tracked by observing the yield spreads between different bond rating categories over time. Brigham, Shome, and Vinson (1985) examined the relationship between risk premium and bond rating and found, unsurprisingly, that the risk premiums are higher for lower rated firms than for higher rated firms. Figure 4-5 shows the results graphically.

FIGURE 4-5
RISK PREMIUMS VS BOND RATINGS
ELECTRIC UTILITIES



Source: Brigham, Shome, and Vinson (1985).

to the DCF method, which may be sluggish in detecting changes in return requirements, especially when based on historical data.

One advantage of risk premium over DCF is that the former is a period-by-period (time-series) study of the cost of equity over the cost of debt, in contrast to the latter which is a point-in-time cross-sectional estimate. In other words, the risk premium approach takes a broader time-series perspective rather than a snapshot point-in-time viewpoint, and is therefore less vulnerable to the vagaries of any one particular capital market environment. A prospective risk premium test relies on a succession of DCF observations over long periods, and is not as vulnerable to a given capital market environment as a spot DCF test.

Of course, the estimation of the appropriate risk premium for either the equity market as a whole or for a specific utility company, is not an exact science. Therefore, it is necessary to evaluate a broad spectrum of data and apply alternative risk premium estimation approaches in order to derive a fair and reasonable estimate of the required equity risk premium. Equal emphasis should be accorded to risk premium results based on history and those based on prospective data. Each proxy for expected risk premium brings information to the judgment process from a different light. Neither proxy is without blemish, each has advantages and shortcomings. Historical risk premiums over long periods are available and verifiable, but may no longer be applicable if structural shifts have occurred. Prospective risk premiums may be more relevant since they encompass both history and current changes, but are nevertheless imperfect proxies and are subject to measurement error and to the vagaries of the DCF input proxies.

References

Bodie, Z., Kane, A., and Marcus, A.J. *Investments*, New York: McGraw-Hill Irwin, 6th ed., 2005.

Brealey, R., Myers, S., and Allen, P. *Principles of Corporate Finance,* 8th ed., New York: McGraw-Hill, 2006.

Brigham, E.F. and Ehrhardt, M. *Financial Management: Theory and Practice,* 8th ed., Hinsdale, IL: Dryden Press, 2005.

Brigham, E.F. and Shome, D.K. "Equity Risk Premium in the 1980's." Washington DC: Institute for Study of Regulation, 1982.

Brigham, E.F., Shome, D.K., and Vinson, S.R. "The Risk Premium Approach to Measuring a Utility's Cost of Equity." *Financial Management,* Spring 1985, 33–45.

Bruner, R.F., Eades, K.M., Harris, R.S., and Higgins R.C. "Best Practices in Estimating the Cost of Capital: Survey and Synthesis," *Financial Practice and Education*, Spring/Summer 1998, pp. 13–28.

Carleton, W.T. "Rate of Return, Rate Base, and Regulatory Lag Under Conditions of Changing Capital Costs." *Land Economics,* May 1974, 145–151.

Carleton, W.T., Chambers, W., and Lakonishok, J. "Inflation Risk and Regulatory Lag." *Journal of Finance,* May 1983.

Dimson, E., Marsh. P., and Staunton, M. *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton, NJ: Princeton University Press, 2002.

Harris, R.S. "Using Analysts' Growth Forecasts to Estimate Shareholder Required Rates of Return." *Financial Management,* Spring 1986, 58–67.

Harris, R.S. and Marston, F.C. "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts." *Financial Management,* Summer 1992, 63–70.

Harris, R.S. and Marston, F.C. "Risk and Return: A Revisit Using Expected Returns." *The Financial Review,* Vol. 28 No. 1, February 1993, 117–137.

Homer, S. and Leibowitz, M.L. *Inside the Yield Book: New Tools for Bond Market Strategy.* Englewood Cliffs, NJ: Prentice-Hall, 1972.

Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation, 2004 Yearbook (Valuation Edition).* Chicago, 2005.

McShane, K.C. Prepared Testimony on Fair Return on Equity for Hydro-Quebec, Foster Associates, Inc., 2005.

Morin, R.A. Prepared Testimony on Fair Return on Equity for Hydro-Quebec, Utility Research International, 2005.

Vander Weide, J.H. "Direct Testimony of James H. Vander Weide" before the Florida Public Service Commission, Docket No. 050078, April 2005.