Assignment 7: CAPM
Due: April 22 (Thursday)

Cost of capital using CAPM. You are the chief financial officer of the conglomerate, Southeast Industries, Incorporated. The board of directors has asked you to estimate the opportunity cost of capital (capitalization rate) for one of the company’s two main divisions: the computer division (the other one is the family restaurant division). The costs of capital will be used to evaluate subsequent projects in the divisions.

Toward this end, you have collected stock return data for five peer group companies in the computer industry. An Excel spreadsheet file (Assignment #7 data) is available from the web address: http://web.mit.edu/15.415cd.

The spreadsheet contains monthly excess return data (i.e., returns in excess of the one-month T-bill return) on a market portfolio (MARKET); a corporate bond portfolio (CB); the five peer group companies (IBM, TI, APPLE, HP, DEC); and S&P (S&P). It also contains monthly return on a portfolio of small companies in excess of S&P portfolio return (SMALL) and return on a portfolio of stocks with high book-to-market ratios in excess of the return on a portfolio with low book-to-market ratios (HML). The data cover the period January 1984 to December 1994.

For now, assume both Southeast and firms in the peer group are entirely equity financed. Ignore the effect of taxes (assuming zero marginal tax rates for all the companies under consideration; we will reconsider this problem with debt in the capital structure—in the presence of taxes—in the problem set on Financing).

1. Use Excel (or whatever package you are most comfortable with) to calculate the market betas $\beta_m$ for the common equity of each of the peer group companies. You can just regress the security excess returns on the market excess return. That is, run the following regression:

$$ r_{it} - r_{ft} = \alpha_i + \beta_{im} (r_{mt} - r_{ft}) + \epsilon_{it} $$

The slope coefficient is the estimate of the market beta of the stock. The excess returns, $r_{it} - r_{ft}$, are included in the file under the name of the asset. The excess returns, $r_{mt} - r_{ft}$, are included in the file under column labeled MARKET.

2. Estimate the cost of capital for the computer division using CAPM and the average of the peer group asset betas calculated above. Assume the riskless return is currently 4.0% and that the risk premium on the market, $(\bar{r}_m - r_p)$, is 7%.