Implied Equity Premiums

As an alternative to historical data, we can use a basic discounted cash flow model and current stock index levels to estimate the future risk premium implied by current stock prices.

For instance, if stock prices are determined by the Dividend Discount Model with constant growth:

\[
CurrentValue = \frac{Div_{\text{end}}}{R - g}
\]

or

\[
R = g + \frac{Div_{\text{end}}}{CurrentValue}
\]

Given an assumption about future growth, plugging in the current price and dividend for a stock index will give an implied expected return on stocks.

- Dividends can be generalized to include stock buybacks.
- The model can also be extended to include a high growth period.

Example: The Implied Equity Premium

Consider the following information for the U.S. Market as of December 31, 2006:
- S&P 500 index level = 1418.30
- 10-year T-Bond rate = 4.71%
- Dividend payments in 2006 = 1.91% of index value
- Expected dividend growth rate = 5% (based on average GDP growth)

Estimate the implied equity premium assuming constant growth at 5%:

\[
Div = 1418.30(0.0191)(1.05) = 28.44
\]

\[
R = g + \frac{Div}{CurrentValue} = .05 + \frac{28.44}{1418.30} = .05 + .0201 = 7.01%
\]

Implied Risk Premium = 7.01 - 4.71 = 2.30%
Example: The Implied Equity Premium

- The previous example probably understates the market risk premium because it does not allow for a period of high growth.
  - The consensus estimate of long-term growth for S&P stocks is approximately 12%.

- Reestimate the implied equity premium assuming 5 years of 12% growth and constant growth at 5% thereafter.

\[
D_{iv} = 1418.30(0.0191)(1.12) = 30.34
\]

\[
1248.29 = \frac{30.34}{(1+R)} + \frac{33.98}{(1+R)^2} + \frac{38.06}{(1+R)^3} + \frac{42.63}{(1+R)^4} + \frac{47.74}{(1+R)^5} + \frac{50.13}{(1+R)^6}
\]

\[
R = 7.73\%
\]

Implied Risk Premium = 7.73 – 4.71 = 3.02%

Example: The Implied Equity Premium

- During 2006, stock repurchases increased the actual payout from 1.91% to over 4.0%. How does your estimate of the implied premium change if you incorporate stock repurchases?

- Estimate the implied equity premium assuming:
  - Constant growth at 5% with no high growth period

\[
D_{iv} = 1418.30(0.04)(1.05) = 59.57
\]

\[
R = g + \frac{D_{iv}}{Current\ Value} = .05 + \frac{59.57}{1418.30} = .05 + .042 = 9.20\%
\]

Implied Risk Premium = 9.20 – 4.71 = 4.49%

- 5 years of high growth and constant growth at 5% thereafter

\[
R = 10.63\% \quad \text{and Implied Risk Premium} = 10.63 – 4.71 = 5.92\%
\]
Example: The Implied Equity Premium

- The implied equity risk premium calculation on the prior page requires information on dividend payments (and repurchases) for the stocks in the index.

- As an alternative, we could estimate the implied premium assuming the payout is a function of earnings, expected growth, and ROE. This would give:

\[
R = g + \frac{Earnings_{t-1} \left(1 - \frac{g}{ROE}\right)}{CurrentValue} = g + \left(\frac{E}{P}\right) \left(1 - \frac{g}{ROE}\right)
\]

- Note that this formula allows us to calculate the implied equity premium based on the (inverse of the) P/E ratio.

Example: The Implied Equity Premium

- Estimate the implied equity premium based on the following inputs:
  - 10-year Treasury bond rate = 4.71%
  - Expected long-term growth = 5% (based on average GDP growth)
  - ROE for the S&P 500 = 19.6%
  - Forward P/E ratio for the S&P 500 = 17.1

\[
R = g + \left(\frac{E}{P}\right) \left(1 - \frac{g}{ROE}\right) = .05 + \left(\frac{1}{17.1}\right) \left(1 - \frac{.05}{.196}\right)
\]

\[
= .05 + (.0585)(.7449) = .05 + .0436 = 9.36\%
\]

Implied Risk Premium = 9.36 - 4.71 = 4.65%