SYSTEMATIC RISK

AND THE

CAPM

TOPICS COVERED

- Measuring Systematic Risk: Beta
- The Security Market Line

MEASURING SYSTEMATIC RISK

- There are two components of risk:
  - Systematic
  - Non-Systematic
- Systematic risk is measured by a stock's beta
- Beta (β) is estimated over a period of time through a regression

SECURITY MARKET LINE

- Under CAPM, diversifiable risk is completely eliminated
- Only the systematic risk determines the required rate of return
- A stock's risk premium is proportional to the market risk premium
- Beta measures this proportion:

$$\frac{E(R_i) - R_F}{\beta_i} = \frac{E(R_m) - R_F}{\beta_m}$$

$$\frac{E(R_i) - R_F}{\beta_i} = \frac{E(R_m) - R_F}{1}$$

SECURITY MARKET LINE

Rearranging our equation gives us the Security Market Line (SML):

$$E(R_i) = R_F + \beta_i \times [E(R_m) - R_F]$$

EXAMPLE 1

Suppose a stock had a β of 0.74. The expected market return is 12% and the risk free rate is 4%. What is the expected return on the stock?

$$E(R_i) = 0.04 + 0.75 \times (0.12 - 0.04) = 0.10$$

EXAMPLE 2

Suppose the expected return on the market were 11%, the risk free 4%, and the stock's expected return 15%. What is the stock's beta coefficient?

$$0.15 = 0.04 + \beta_i \times (0.11 - 0.04)$$

$$\beta_i = 1.57$$

SUMMARY

- Beta
- The Security Market Line