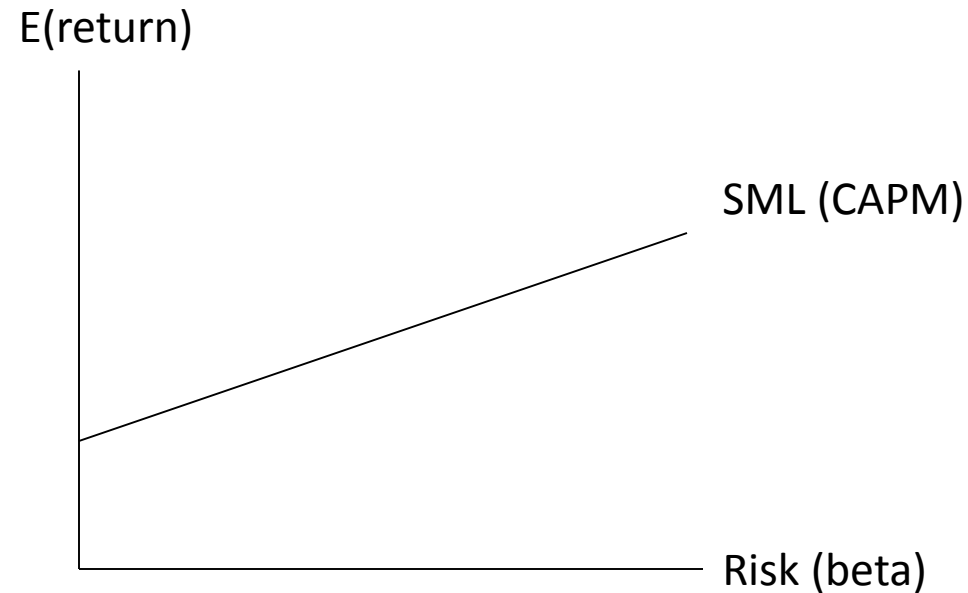


Risk and Expected Return Standard Model (CAPM)

Introduction to Investments
Prof S G Badrinath
Tying Risk and Returns in Pricing Assets



- $E(R_j) = R_f + [E(R_m) - R_f] * \beta_j = 2 + 6 \beta_j$
- Slope of line = 6 reward per unit risk
- Intercept of line = risk free rate = 2%

Where Does This Come From?

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Asset	Current Price	Expected Return $E(R)$	Beta	Risk/reward $[E(R) - R_f]/\text{Beta}$
A	15	14%	1.5	6.67
B	50	12%	1.0	8.00
R_f		4%	0.0	0

- For A, the expected return of 14% from current price levels implies an expected future price of $15 * (1.14) = \$17.1$
- For B, expected return of 12% \Rightarrow expected future price of $50 * 1.12 = \$56$

Case(i): Suppose B is priced correctly with a risk-reward of 8

- A is priced incorrectly. Investors will buy B, those owning A will sell it and move to B until A's risk-reward is same as B.
- A's price will fall and its expected return will rise.
- What expected return for A is consistent with a risk-reward of 8?
- $[E(R) - 4]/1.5 = 8$, $E(R) = 16\%$ (increases)
- What current price (based on future expected price of 17.1)?
- Current Price * (1.16) = 17.1, implies Current price for A = 14.74 (decreases from 15).
- NOTE: This is a bit contrived to make the point, we have to keep something fixed!

Case (ii): Suppose instead that A is priced correctly

- Then B is undervalued and its price will increase to 50.601, its expected return will drop to 10.67% and its risk-reward ratio will be 6.67. Confirm it!
- Often, both can happen especially if the market risk-reward is 7 (say). The example illustrates a process of how assets get priced and repriced in markets.

The message is that prices will (should) move this way to equate risk/reward ratios across all assets. Or, prices should be set so that the risk/reward ratio for all assets are equal.

Here the risk-reward ratio has a specific form and using it,

- $[E(R_j) - R_f]/\beta_j = [E(R_m) - R_f]/1.0 = 8$, Rearranging:
- $E(R_j) = R_f + \beta_j [E(R_m) - R_f]$ or the CAPM.

In **life**, the **risk-reward** is probably more **complicated** than that assumed for the **CAPM and other models** for valuing assets exist.

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