Risk and Expected Return Standard Model (CAPM)

Introduction to Investments
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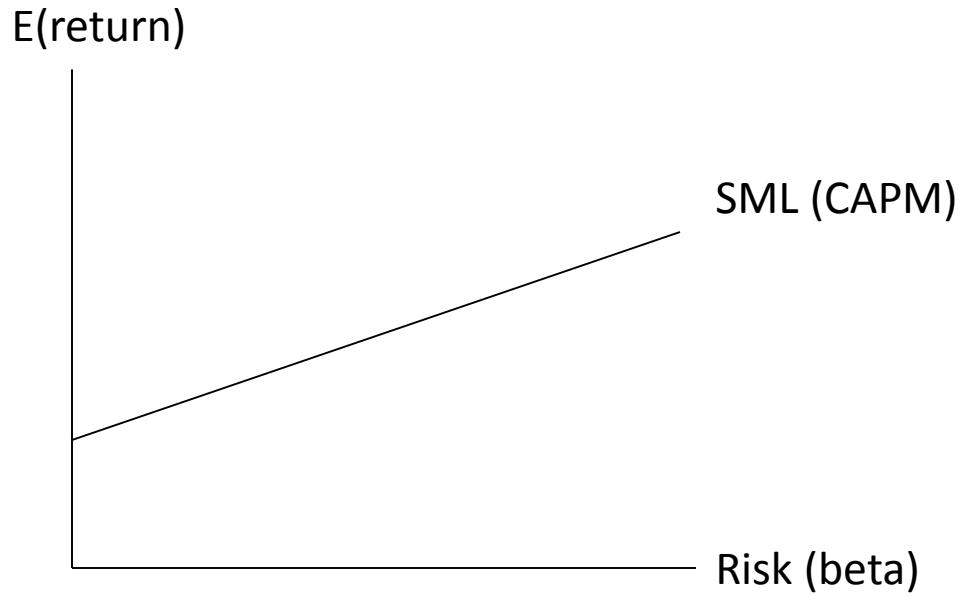
Tying Risk and Returns in Pricing Assets



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

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Where Does This Come From?

Asset	Current Price	Expected Return E(R)	Beta	Risk/reward [E(R)- Rf]/Beta
A	15	14%	1.5	6.67
B	50	12%	1.0	8.00
Rf		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% => 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,

- $[E(Rj) - Rf]/\beta j = [E(Rm) - Rf]/1.0 = 8$, Rearranging:
- $E(Rj) = Rf + \beta j\,[E(Rm) - Rf]$ 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.