

Capital Asset Pricing Model

$$r_a = r_{\text{free}} + \beta_a(r_{\text{market}} - r_{\text{free}})$$

where:

r_a = expected rate of return for security "a"

r_{free} = risk free rate of return

β_a = beta of security a

r_{market} = expected market return

So according to CAPM, the expected return of any security (or basket of securities) is the sum of:

- The risk free rate of return
- The market premium times the beta of that security (or basket of securities)

Suppose you had a basket of stocks that was 20% more volatile than the market, the risk free rate (T-Bill) was 3%, and the market (S&P 500) return was 11%.

The market premium is 8% (the difference between the market and risk free returns) and the beta is 1.2.

$$r_a = r_{\text{free}} + \beta_a(r_{\text{market}} - r_{\text{free}})$$

$$r_a = 3 + 1.2(8)$$

$$r_a = 12.6\%$$

Over time, investors should expect a 12.6% rate of return for that security (or basket of securities). Conversely, a security that was 20% less volatile than the market would have an expected return of 9.4%.

Today we know that CAPM explains roughly 70% of the variability of market returns.