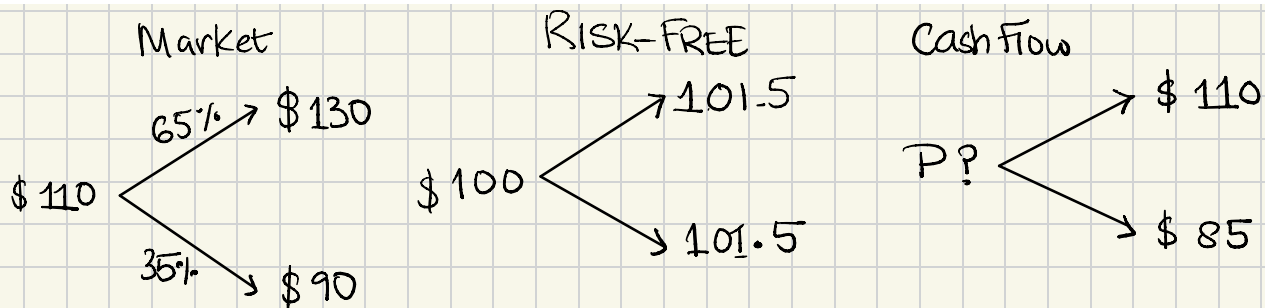


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Tutorial Assignment #4 - Wednesday 2nd October 2024

The current market index price is \$110. In the next time period, the market can either go up to \$130, with a probability of 65%, or down to \$90. The risk-free rate is 1.5% per time period. You have an opportunity to buy a cash flow scenario where if the market goes up, you will receive \$110.00 and if the market goes down, you will receive \$85. Determine a fair market price for this scenario. What is the beta for this scenario?



Fair Market Price for P? → No arbitrage

UP: $110 = 130a + 101.5b$

DOWN: $85 = 90a + 101.5b$

Solving Simultaneously → $a = \frac{5}{8} = 0.625$

$$b = \frac{115}{406} = 0.28325 \approx 0.283$$

So fair price: $P = 110 \times a \times b$
 $= \left(110 \times \frac{5}{8}\right) + \left(110 \times \frac{115}{406}\right)$

$$= 97.075 \approx \$97.08$$

$$\beta = \frac{\text{Cash Flow RR} - \text{RF}}{\text{Market RR} - \text{RF}} \quad \text{RF} \rightarrow 1.5\%$$

$$\mathbb{E}(R_{CF}) = \frac{(110 \times 0.65) + (85 \times 0.35)}{97.075} - 1 = 0.043008$$

$$\mathbb{E}(R_{MP}) = \frac{(130 \times 0.65) + (90 \times 0.35)}{110} - 1 = 0.05455$$

$$\beta = \frac{\left[\frac{(110 \times 0.65) + (85 \times 0.35)}{97.075} - 1 \right] - 0.015}{\left[\frac{(130 \times 0.65) + (90 \times 0.35)}{110} - 1 \right] - 0.015} = \frac{0.043008 - 0.015}{0.05455 - 0.015}$$

$$\beta = 0.7082$$