

Problem 6. Calculating Stock Betas (20pts)

We want to compute the β of AMZN with respect to SPY .

To do this, choose the largest overlapping time-period of the two time-series and compute daily logarithmic returns $r_i^{\text{amzn}}, r_i^{\text{spy}}$ given by

$$r_i = \log(P_i/P_{i-1})$$

where P_i is the price on day i .

Method i. Estimate the α and β by performing the regression:

$$r_i^{\text{amzn}} = \alpha + \beta r_i^{\text{spy}} + \epsilon_i$$

We call the estimated parameters $\hat{\alpha}$ and $\hat{\beta}$

$$\hat{\alpha} = \underline{\hspace{2cm}}$$

$$\hat{\beta} = \underline{\hspace{2cm}}$$

Method ii. Estimate calculate the correlation $\rho_{\text{amzn,spy}}$ between $AMZN$ and SPY , and well as the volatilities of $AMZN$ and SPY . Then calculate β using the formula:

$$\beta = \rho_{\text{amzn,spy}} \frac{\sigma^{\text{amzn}}}{\sigma^{\text{spy}}}$$

$$\rho_{\text{amzn,spy}} = \underline{\hspace{2cm}}$$

$$\sigma^{\text{amzn}} = \underline{\hspace{2cm}}$$

$$\sigma^{\text{spy}} = \underline{\hspace{2cm}}$$

$$\beta = \underline{\hspace{2cm}}$$