

Quiz B for 1:15 Class: 7/20/12

Name Key

Note: There are no points for solving this problem. All points are for setting up the equations, plugging in the relevant numbers, and stating what you want to solve for.

Given the following returns over the past four years (June 1 through June 1 of each year), calculate the beta of Proctor & Gamble (PG) and the beta of a portfolio where you invest \$100,000 in Proctor & Gamble and \$400,000 in BlackRock which has a beta of 1.37.

Year	PG	S&P500
2012	0%	+3%
2011	+9%	+28%
2010	+21%	+12%
2009	-14%	-28%

Return on:

$$+5 \left(\beta_p = X_{PG} \beta_{PG} + X_{BR} (1.37) \right) \quad (7)$$

$$+5 \left(X_{PG} = \frac{100,000}{100,000 + 400,000} \right); \quad X_{BR} = \frac{400,000}{100,000 + 400,000} \quad (9)$$

$$+5 \left(\beta_{PG} = \frac{COV_{PG-S\&P}}{VAR_{S\&P}} \right) \quad (5)$$

$$+5 \left(COV_{PG-S\&P} = \frac{1}{3} \left((0 - \bar{R}_{PG})(3 - \bar{R}_{S\&P}) + (9 - \bar{R}_{PG})(28 - \bar{R}_{S\&P}) + (21 - \bar{R}_{PG})(12 - \bar{R}_{S\&P}) + (-14 - \bar{R}_{PG})(-28 - \bar{R}_{S\&P}) \right) \right) \quad (20)$$

$$+2 \left(\bar{R}_{PG} = \frac{1}{4} (0 + 9 + 21 + (-14)) \right) \quad (10)$$

$$+2 \left(\bar{R}_{S\&P} = \frac{1}{4} (3 + 28 + 12 + (-28)) \right) \quad (10)$$

$$+5 \left(VAR_{S\&P} = \frac{1}{3} \left((3 - \bar{R}_{S\&P})^2 + (28 - \bar{R}_{S\&P})^2 + (12 - \bar{R}_{S\&P})^2 + (-28 - \bar{R}_{S\&P})^2 \right) \right) \quad (13)$$