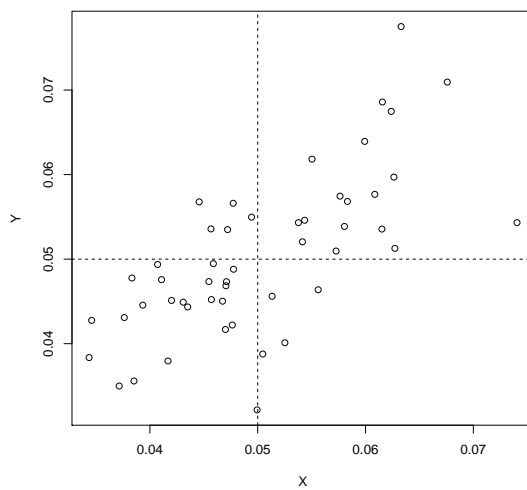


(d) What are the expected gains from the strategies you devised in part (c)?

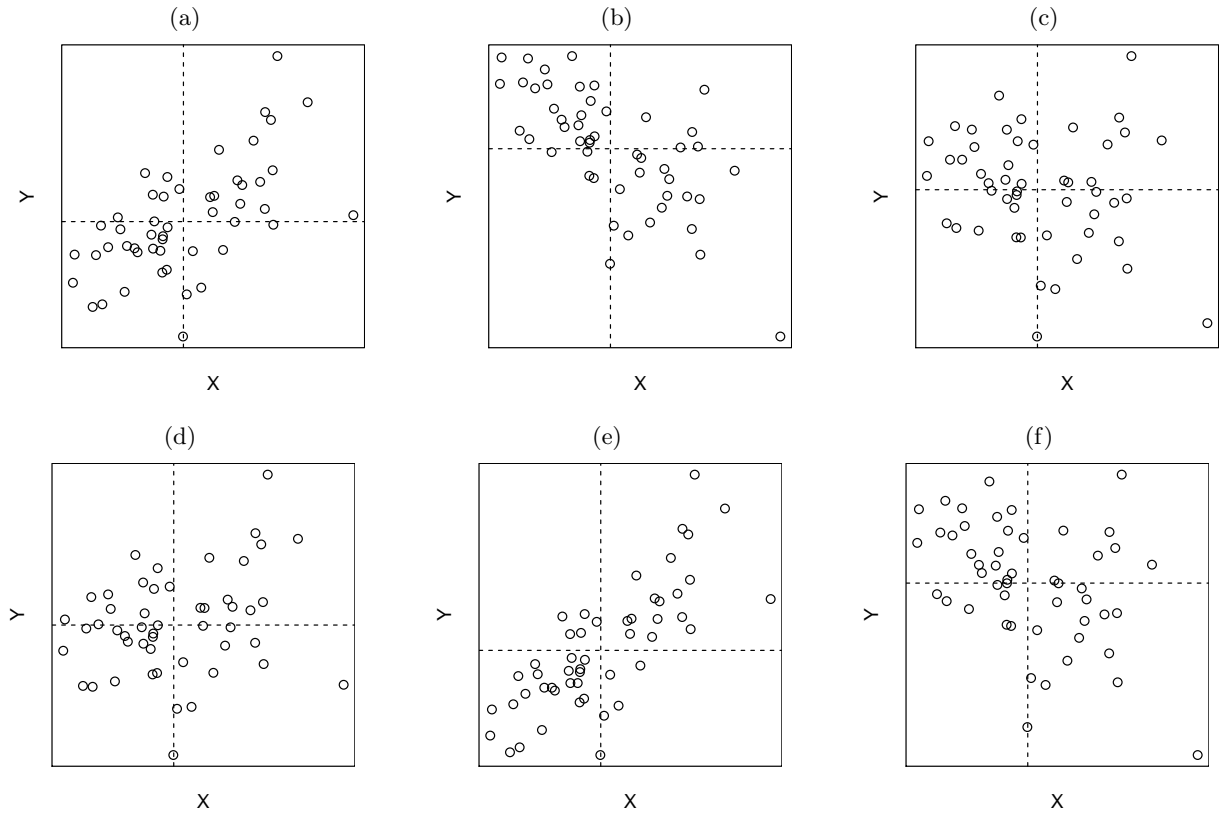
(e) Is there any difference between these investment strategies? Which one should you choose?

(f) Here is a plot of the annual returns for stocks X and Y for the last fifty years. The means for the two stocks are shown by the dashed lines. Does this plot indicate any problems with the assumptions above?



Covariance

2. Parts (a)–(f) show plots of 50 random variable (X, Y) pairs sampled from four different 2-dimensional distributions. Dashed lines indicate the expectations of X and Y . In each part, decide if the covariance between X and Y seems to be positive, negative, or negligible.



3. Suppose X and Y are random variables with $\text{var}(X) = 4$, $\text{var}(Y) = 3$, and $\text{cov}(X, Y) = -2$.
(a) Find $\text{var}(X + Y)$.

(b) Find $\text{var}(2X + 5Y)$.

(c) Find $\text{var}(3X - Y)$.

4. Suppose X and Y are random variables with means $\mu_X = 10$, $\mu_Y = 5$, standard deviations $\sigma_X = 2$, $\sigma_Y = 4$, and correlation $\rho_{XY} = -.40$. Find $\text{var}(X + Y)$.

5. Suppose X and Y are random variables with means $\mu_X = -10$, $\mu_Y = 3$, standard deviations $\sigma_X = 4$, $\sigma_Y = 1$, and correlation $\rho_{XY} = .50$. Find $\text{var}(X - 2Y)$.