

STP530 HW7 Solution

8.21

a.

- Hard hat:

$$E\{Y\} = \beta_0 + \beta_1 X_1 + \beta_2 * 1 + \beta_3 * 0 = \beta_0 + \beta_1 X_1 + \beta_2 = (\beta_0 + \beta_2) + \beta_1 X_1$$

- Bump cap:

$$E\{Y\} = \beta_0 + \beta_1 X_1 + \beta_2 * 0 + \beta_3 * 1 = \beta_0 + \beta_1 X_1 + \beta_3 = (\beta_0 + \beta_3) + \beta_1 X_1$$

- None:

$$E\{Y\} = \beta_0 + \beta_1 X_1 + \beta_2 * 0 + \beta_3 * 0 = \beta_0 + \beta_1 X_1$$

b.

(1)

$$H_0 : \beta_3 \geq 0 \quad H_a : \beta_3 < 0$$

(2)

$$H_0 : \beta_2 = \beta_3 \quad H_a : \beta_2 \neq \beta_3$$