

Intro to Econometric Theory
Heinz School, Carnegie Mellon University
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Homework #2

1. You have collected a dataset on consumers' purchases of wine and cars. In particular, for each of 100 consumers, you know the price of their most recent bottle of wine and the price of their most recent car.

$$\begin{aligned}\overline{P_{\text{wine}}} &= 6\text{in\$} \\ \hat{\sigma}_{\text{wine}}^2 &= 10\end{aligned}$$

$$\begin{aligned}\overline{P_{\text{car}}} &= 18\text{in\$} \\ \hat{\sigma}_{\text{car}}^2 &= 10\end{aligned}$$

$$\widehat{\text{Cov}}(P_w, P_c) = 5$$

Now, suppose we wish to model the relationship between these two prices as:

$$P_c = \beta_0 + \beta_1 P_w + \epsilon \tag{1}$$

What are the OLS estimates for β_0 and β_1 ?

2. Should the clever people at General Motors start distributing expensive wine?
3. Suppose instead we model:

$$P_w = \beta_2 + \beta_3 P_c + \epsilon \tag{2}$$

What are the OLS estimates for β_2 and β_3 ?

4. One might expect that $\beta_{1,OLS} = \frac{1}{\beta_{3,OLS}}$. True? Why or why not?
5. Exercise 6 on page 63 of Greene.