

Problem Set 2
Simple Regression

INTRODUCTORY ECONOMETRICS, UCM3

1. (Exercise 2.4, Wooldridge (2006)). The data set BWGHT.RAW contains data on births to women in the United States. Two variables of interest are the dependent variable, infant birth weight in ounces (*bwght*), and an explanatory variable, average number of cigarettes the mother smoked per day during pregnancy (*cigs*). The following simple regression was estimated using data on $n = 1388$ births:

$$\widehat{bwght} = 119.77 - 0.514cigs$$

- a) What is the predicted birth weight when $cigs = 0$? What about when $cigs = 20$ (one pack per day)? Comment on the difference.
- b) Does this simple regression necessarily capture a causal relationship between the child's birth weight and the mother's smoking habits? Explain.
- c) To obtain a weight prediction of 125 ounces, how many cigarettes should a mother smoke? Comment.
- d) What is the fraction of women who do not smoke while pregnant? Does this result help explain the result in c)?

2. (Exercise 2.5, Wooldridge (2006)). In the linear consumption function

$$\widehat{cons} = \hat{\beta}_0 + \hat{\beta}_1 inc,$$

the (estimated) *marginal propensity to consume* (MPC) out of income is simply the slope, $\hat{\beta}_1$, while the *average propensity to consume* (APC) is $\widehat{cons} / inc = \hat{\beta}_0 / inc + \hat{\beta}_1$.

Using observations for 100 families on annual income and consumption (both measured in dollars), the following equation is obtained:

$$\begin{aligned}\widehat{cons} &= -124.84 + 0.853inc \\ n &= 100, R^2 = 0.692\end{aligned}$$

- a) Interpret the intercept in this equation and comment on its sign and magnitude.
- b) What is predicted consumption when family income is \$30,000?
- c) With *inc* on the x -axis, draw a graph of the estimated MPC and APC.