

Worksheet week # 9

1. Imagine that you want to estimate the race-specific crime rates. Given the data on over 2000 criminals (*crime2.gdt*), estimate the relationship between the race and the number of crimes committed. The dataset contains the following variables:

crime86 - number of crimes committed in 1986

race - race (=1 if black, =2 if Hispanic, =0 otherwise)

totttime - total number of months spent in prison since 18 years old

pcnv - proportion of prior convictions

qemp86 - number of quarters employed in 1986

inc86 - legal income in 1986, \$100s

- (a) Estimate the baseline model of the impact of race on number of crimes committed in 1986:

$$crime86_i = \alpha_0 + \alpha_1 race_i + \varepsilon_i .$$

- (b) Interpret the results. Do you believe that the coefficient α_1 is correctly estimated? Under what assumptions would it be?
- (c) Create two dummy variables for black and Hispanic individuals. Estimate the equation again with these two variables. Interpret the results.

$$crime86_i = \beta_0 + \beta_1 black_i + \beta_2 hispanic_i + v_i .$$

- (d) Is there anything that could still create a bias in this equation? If yes, how would you solve for this problem? What direction of bias do you expect?
- (e) Re-estimate the equation with variables controlling for crime history of a person:

$$crime86_i = \gamma_0 + \gamma_1 black_i + \gamma_2 hispanic_i + \gamma_3 tottime_i + \gamma_4 pcnv_i + e_i .$$

- (f) Control further for a current employment status and income of an individual:

$$crime86_i = \delta_0 + \delta_1 black_i + \delta_2 hispanic_i + \delta_3 tottime_i + \delta_4 pcnv_i + \delta_5 qemp86_i + \delta_6 inc86_i + u_i .$$

- (g) Interpret the results from part e and f (in comparison with c). How did the coefficients of *black* and *hispanic* change? Did you expect this direction of potential bias? Would you conclude that the additional variables indeed belong to the model?
- (h) Test the hypothesis that no relevant explanatory variables have been omitted using the RESET test in Gretl (test for the model from part f).