Questions and Exercises - Tutorial #10

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Simple Panel Data Methods (Chapter 13)

1. Why is it necessary to use two subscripts, i and t, to describe panel data? What does i refer to? What does t refer to? *[From Stock and Watson, Review the Concepts 10.1]*
2. Assume that the average of all factors other than *educ* have remained constant over time and that the average level of education is 12.2 for the 1972 sample and 13.3 in the 1984 sample. Using the estimates in Table 13.1, find the estimated change in average fertility between 1972 and 1984. (Be sure to account for the intercept change and the change in average education.).

Table 13.1

Determinants of Women's Fertility

Dependent Variable: *kids*		
Independent Variables	**Coefficients**	**Standard Errors**
educ	−.128	.018
age	.532	.138
age^2	−.0058	.0016
black	1.076	.174
east	.217	.133
northcen	.363	.121
west	.198	.167
farm	−.053	.147
othrural	−.163	.175
town	.084	.124
smcity	.212	.160
y74	.268	.173
y76	−.097	.179
y78	−.069	.182
y80	−.071	.183
y82	−.522	.172
y84	−.545	.175
constant	−7.742	3.052
$n = 1{,}129$ $R^2 = .1295$ $\bar{R}^2 = .1162$		

3. *[From Stock and Watson, Exercise 10.1]*
This question refers to the drunk driving panel data regression summarized in Table 10.1.

a. New Jersey has a population of 8.1 million people. Suppose lhat New Jersey increased the tax on a case of beer by $1 (in $1988). Use the results in column (4) to predict the number of lives that would be saved over ihe next year. Construct a 9 5 % confidence interval for your answer.

b. Suppose that real income per capita in New Jersey increases by 1% in the next year. Use the results in column (4) to predict the change in the number of traffic fatalities in the next year. Construct a 9 0 % confidence interval for your answer.

c. The estimate of the coefficient on beer tax in column (5) is significant at the 1% level. The estimate in column (4) is significant at the 5% level. Does this mean that the estimate in (5) is more reliable?

TABLE 8.1 Regression Analysis of the Effect of Drunk Driving Laws on Traffic Deaths

Dependent Variable: Traffic Fatality Rate (Deaths Per 10,000).

Regressor	(1)	(2)	(3)	(4)	(5)	(6)
Beer tax	0.36** (0.05)	−0.66** (0.20)	−0.64* (0.25)	−0.45* (0.22)	−0.70** (0.25)	−0.46* (0.22)
Drinking age 18				0.028 (0.066)	−0.011 (0.064)	
Drinking age 19				−0.019 (0.040)	−0.078 (0.049)	
Drinking age 20				0.031 (0.046)	−0.102* (0.046)	
Drinking age						−0.002 (0.017)
Mandatory jail?				0.013 (0.032)	−0.026 (0.065)	
Mandatory community service?				0.033 (0.115)	0.147 (0.137)	
Mandatory jail or community service?						0.031 (0.076)
Average vehicle miles per driver				0.008 (0.008)	0.017 (0.010)	0.009 (0.008)
Unemployment rate				−0.063** (0.012)		−0.063** (0.012)
Real income per capita (logarithm)				1.81** (0.47)		1.79** (0.45)
State effects?	no	yes	yes	yes	yes	yes
Time effects?	no	no	yes	yes	yes	yes

These regressions were estimated using panel data for 48 U.S. states from 1982 to 1988 (336 observations total), described in Appendix 8.1. Standard errors are given in parentheses under the coefficients, and *p*-values are given in parentheses under the *F*-statistics. The individual coefficient is statistically significant at the *5% level or **1% significance level.

Advanced Panel Data Methods (Chapter 14)

1. *[From Wooldridge, Computer Exercise C7]*

For this exercise, we use JTRAIN.RAW to determine the effect of the job training grant on hours of job training per employee. The basic model for the three years is

$$hrsemp_{it} = \beta_0 + \delta_1 d88_t + \delta_2 d89_t + \beta_1 grant_{it} + \beta_2 grant_{i,t-1} + \beta_3 \log(employ_{it}) + a_i + u_{it}.$$

(i) Estimate the equation using fixed effects. How many firms are used in the FE estimation? How many total observations would be used if each firm had data on all variables (in particular, *hrsemp*) for all three years?
(ii) Interpret the coefficient on *grant* and comment on its significance.
(iii) Is it surprising that $grant_{-1}$ is insignificant? Explain.
(iv) Do larger firms provide their employees with more or less training, on average? How big are the differences? (For example, if a firm has 10% more employees, what is the change in average hours of training?)

Partial solution:

(i) The estimated equation is the following:

$$\underset{}{hrsemp_{it}} = \underset{(1.98)}{-1.10\, d88_t} + \underset{(2.48)}{4.09\, d89_t} + \underset{(2.86)}{34.23\, grant_{it}} + \underset{(4.127)}{.504\, grant_{i,t-1}} - \underset{(4.288)}{.176 \log(employ_{it})}$$

$n = 390, \quad N = 135, \quad T = 3.$