

# Microeconometrics Using Stata

## LINEAR PANEL - DATA MODELS: BASICS

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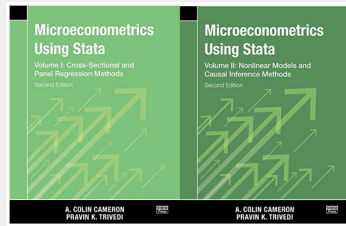
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# Exercise 1

# EXERCISE 1

## Exercise 1

For the data of **section 8.3**, use **xtsum** to describe the variation in **occ**, **smsa**, **ind**, **ms**, **union**, **fem**, and **blk**. Which of these variables are time invariant? Use **xttab** and **xttrans** to provide interpretations of how **occ** changes for individuals over the seven years. Provide a time-series plot of **exp** for the first 10 observations, and provide interpretation. Provide a scatterplot of **lwage** against **ed**. Is this plot showing within variation, between variation, or both?

## Exercise 2

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### Exercise 2

For the data of **section 8.3**, manually obtain the three standard deviations of **lwage** given by the **xtsum** command. For the overall standard deviation, use **summarize**. For the between standard deviation, compute **by id: egen meanwage = mean(lwage)**, and apply **summarize** to **(meanwage-grandmean)** for **t==1**, where grandmean is the grand mean over all observations. For the within standard deviation, apply **summarize** to **(lwage-meanwage)**. Compare your standard deviations with those from **xtsum**. Does

$$s_O^2 \simeq s_W^2 + s_B^2? \quad (1)$$

## Exercise 3

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### Exercise 3

For the model and data of [section 8.4](#), compare PFGLS estimators under the following assumptions about the error process: independent, exchangeable, **AR(2)**, and **MA(6)**. Also, compare the associated standard-error estimates obtained by using default standard errors and by using cluster-robust standard errors. You will find it easiest if you combine results using [estimates table](#). What happens if you try to fit the model with no structure placed on the error correlations?



## Exercise 4

## EXERCISE 4

### Exercise 4

For the model and data of **section 8.5**, obtain the within estimator by applying **regress** to **(8.7)**. Hint: For example, for variable  $x$ , type by **id: egen avex = mean(x)** followed by **summarize x** and then **generate mdx = x - avex + r(mean)**. Verify that you get the same estimated coefficients as you would with **xtreg, fe**.

# Exercise 5

## EXERCISE 5

### Exercise 5

For the model and data of **section 8.6**, compare the **RE** estimators that were obtained by using xtreg with the **re**, **mle**, and **pa** options and **xtgee** with the **corr(exchangeable)** option. Also, compare the associated standard-error estimates obtained by using default standard errors and by using cluster-robust standard errors. You will find it easiest if you combine results using **estimates table**.

# Exercise 6

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### Exercise 6

Consider the RE model output given in **section 8.7**. Verify that, given the estimated values of **e\_sigma** and **u\_sigma**, application of the formulas in that section leads to the estimated values of **rho** and **theta**.

# REFERENCES I



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**Microeconometrics Using Stata, Second Edition, Volume I: Cross-Sectional and Panel Regression Models.**

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