

EE 325 ☺☺ STATA Session I

1. Table 5.11 provides data on the lung cancer mortality index (100 = average) and the smoking index (100 = average) for 25 occupational groups.
 - a. Plot the cancer mortality index against the smoking index. What general pattern do you observe?
 - b. Letting Y = cancer mortality index and X = smoking index, estimate a linear regression model
 - c. Test the hypothesis that smoking has no influence on lung cancer at $\alpha = 5\%$

2. Table 5.5 gives data on average public teacher pay (annual salary in dollars) and spending on public school per pupil (dollars) in 1985 for 50 states and the District of Columbia

To find out if there is any relationship between teacher's pay and per pupil expenditure in public schools, the following model was suggested:

$$Pay_i = \beta_1 + \beta_2 Spend_i + u_i$$

, where Pay stands for teacher's salary and $Spend$ stands for per pupil expenditure.

- a. Plot the data and eyeball a regression line.
 - b. Suppose on the basis of (a) you decide to estimate the above regression model. Obtain the estimates of the parameters, their standard errors, r^2 , RSS and ESS.
 - c. Interpret the regression. Does it make economic sense?
 - d. Establish a 95 percent confidence interval for β_2 . Would you reject the hypothesis that the true slope coefficient is 3.0?
3. **Construct regression model and hypothesis testing (p-value method)**

Table 3.3 gives data on the number of cell phone subscribers and the number of personal computers (PCs), both per 100 persons, and the purchasing-power adjusted per capita income in dollars for a sample of 34 countries.

3.1 To see if per capita income is a factor in the use of cell phones, we regressed each of these means of communication on per capita income using the sample of 34 countries. Construct a regression line and interpret the meaning. Is the estimated intercept coefficient different from zero at the 5 percent significance level? Is the estimated slope coefficient different from zero at the 5 percent significance level?

3.2 To see if per capita income is a factor in the use of PCs, we regressed each of these means of communication on per capita income using the sample of 34 countries. Construct a regression line and interpret the meaning. Is the estimated intercept coefficient different from zero at the 5 percent significance level? Is the estimated slope coefficient different from zero at the 5 percent significance level?

4. **Construct regression model (The Log-Linear Model)**

Expenditure on Durable Goods in relation to total personal consumption expenditure

Table 6.3 presents data on total personal consumption expenditure (PCEXP), expenditure on durable goods (EXPDUR), expenditure on nondurable goods (EXPNONDUR), and expenditure on services (EXPSERVICES), all measured in 2000 billions of dollars.

Suppose we wish to find **the elasticity of expenditure on durable goods with respect to total personal consumption expenditure**. . Construct a regression line and interpret the meaning

5. The demand for roses. Table 7.6 gives quarterly data on these variables:

Y = quantity of roses sold, dozens

X_2 = average wholesale price of roses, \$/dozen

X_3 = average wholesale price of carnations, \$/dozen

X_4 = average weekly family disposable income, \$/week

X_5 = the trend Variable taking values of 1, 2, and so on,, for the period
1971–III to 1975–II in the Detroit Metropolitan area

You are asked to consider the following demand functions:

$$Y_t = \alpha_1 + \alpha_2 X_{2t} + \alpha_3 X_{3t} + \alpha_4 X_{4t} + \alpha_5 X_{5t} + u_t$$

$$\ln Y_t = \beta_1 + \beta_2 \ln X_{2t} + \beta_3 \ln X_{3t} + \beta_4 \ln X_{4t} + \beta_5 X_{5t} + u_t$$

- Estimate the parameters of the linear model and interpret the results.
- Estimate the parameters of the log-linear model and interpret the results.
- β_2, β_3 , and β_4 give, respectively, the own-price, cross-price, and income elasticities of demand. What are their a priori signs? Do the results concur with the a priori expectations?

6. Table 7.12 gives data for real consumption expenditure, real income, real wealth, and real interest rates for the U.S. for the years 1947-2000.

- Given the data in the table, estimate the linear consumption function using income, wealth, and interest rate. What is the fitted equation?
- What do you estimated coefficients indicate about the variables' relationships to consumption expenditure?

7. Table 7.11 gives data for the manufacturing sector of the Greek economy for the period 1961-1987

- a. See if the Cobb-Douglas production function fits the data given in the table and interpret the results. What general conclusion do you draw?
- b. Now consider the following model:

$$\text{Output / labor} = A(K / L)^{\beta} e^u$$

where the regressand represents labor productivity and the regressor represents the capital labor ratio. What is the economic significance of such a relationship, if any? Estimate the parameters of this model and interpret your results.

8. Table 8.9 Savings and Personal Disposable income (billions of dollars), United States, 1970-1995.

- a. Given the data in the table, estimate the following linear savings function using personal disposable income

$$\text{Time period 1970-1981: } Y_t = \lambda_1 + \lambda_2 X_t + u_{1t} \quad n_1 = 12$$

$$\text{Time period 1982-1995: } Y_t = \gamma_1 + \gamma_2 X_t + u_{2t} \quad n_2 = 14$$

$$\text{Time period 1970-1995: } Y_t = \alpha_1 + \alpha_2 X_t + u_{3t} \quad n_1 + n_2 = 26$$

- b. On the basis of the Chow test that there was a difference in the regression of savings on income between the two periods. Consider and estimate the following model with the dummy variable:

$$Y_t = \alpha_1 + \alpha_2 D_t + \beta_1 X_t + \beta_2 (D_t X_t) + u_t$$

Where Y = Savings

X = Personal disposable income

t = time

D = 1 for observations in 1982-1995

= 0 otherwise

- (i) Test the coefficients individually statistically significant at the 5 percent level? From this test, how would you describe the difference in the two regressions (coincident regression, parallel regression, concurrent regression, dissimilar regression)?

- (ii) Write down the mean personal savings function for 1970-1981 and the mean personal savings function for 1982-2005.