EXAM 2

Convocatoria Extraordinaria

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Use the SMOKE file attached for this exercise.

A model to estimate the effects of smoking on annual income (perhaps through lost working days due to illness, or productivity effect) is

$$\log(income) = \beta_0 + \beta_1 cigs + \beta_2 educ + \beta_3 age + \beta_4 age^2 + U_1, \tag{1}$$

where $cigs$ is the number of cigarettes smoked per day, on average, $educ$ are years of education, and age the age of the individual. To reflect the fact that cigarette consumption might be jointly determined with income, a demand for cigarettes equation is

$$cigs = \gamma_0 + \gamma_1 \log(income) + \gamma_2 educ + \gamma_3 age + \gamma_4 age^2 + \gamma_5 \log(cigpric) + \gamma_6 restaurn + U_2, \tag{2}$$

where $cigpric$ is the price of a pack of cigarettes (in cens) and $restaurn$ is a binary variable equal to unity if the person lives in a state with restaurant smoking restrictions.

Question 1 (20%): Interpret β_1 and γ_1 (5%). Show that $cigs$ is an endogenous variable in equation (1) (15%).

Question 2 (20%): Assuming that $cigpric$ and $restaurn$ are exogenous to the individual, under what assumption is the income equation (1) identified (10%). Then test that $\log(cigpric)$ and $restaurn$ are relevant instruments using the reduced form equation of $cigs$ (10%).

Question 3 (35%): Estimate, using two stage least squares (2SLS) with the available instruments, the value of *age* such that the income elasticity changes sign (10%). Then provide a 95% confidence interval for the income elasticity with respect to *age* for a 20 years old person (25%).

QUESTION 4 (25%): Explain how to test that log(*cigpric*) and *restaurn* are uncorrelated with U_1 (10%). Then, test the hypothesis using GRETL.

Variables in SMOKE

1. *educ* : years of schooling
2. *cigpric*: state cigarette price, cents per pack
3. *white* =1 if white
4. *age* : in years
5. *income* : annual income, $
6. *cigs* : cigs. smoked per day
7. *restaurn* =1 if state restaurant smoking restrictions
8. *lincome* : log(income)
9. *agesq*: age^2
10. *lcigpric*: log(cigprice)