UNIVERSITÉ TOULOUSE 1 CAPITOLE

MASTER 1 in ECONOMICS
MASTER 1 ECONOMIE ET STATISTIQUE
MASTER 1 ECONOMIE ET DROIT

Applied econometrics / code : M1S23

Lundi 1ᵉʳ juillet 2013

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➥ durée conseillée pour traiter **ce** sujet : 1 heure

➥ **ATTENTION** : le nom de la matière et son code doivent être **IMPERATIVEMENT** recopiés sur la copie d'examen

- No document allowed -

Answers can be written in French or English.

The exam is composed of questions related to the 3 topics.

You have to answer to the questions related to topics 1 (Regulation and Industrial Organization) and 2 (Education and Labor Economics).

Then, you have to **choose** the topic covered in the lectures you attended, between topic 3a (Health and Environment) and topic 3b (Econométrie de la production, estimation des fonctions de coût).

PLEASE, WRITE YOUR ANSWERS ON A SEPARATE SHEET FOR EACH TOPIC.

Topic 1: Regulation and Industrial Organization

1. (*2 mn*) Briefly say why in the aircraft construction industry one would expect a significant learning curve effect.

2. (*9 mn*) Using time series data on the US vessel construction industry you regress the log of (deflated) average cost on a constant and cumulated production and find that when cumulated production increases by 100%, average cost increases by only 22%. Derive a measure of the learning curve effect and argue that this measure may suffer a variable omission (upward) bias.

3. (*9 mn*) Consider the following translog cost function estimated for access to a Bell telephone company's local network at a central office level:[1]

$$
\begin{aligned}
\ln C = \ &0.29658 &&+0.87063 \ln q &&-0.04250 \ln BU &&+0.28709 \ln CU \\
&(0.04153) &&(0.03252) &&(0.05638) &&(0.19719) \\[6pt]
&+1.24645 \ln AL &&-0.21727 \times DU &&-0.21643 \times DS &&-0.00958(1/2)(\ln q)^2 \\
&(0.56085) &&(0.07515) &&(0.04542) &&(0.01637) \\[6pt]
&+0.00754(1/2)(\ln BU)^2 &&+1.30963(1/2)(\ln CU)^2 &&+1.88690(1/2)(\ln AL)^2 &&+0.00132(\ln q)(\ln BU) \\
&(0.01092) &&(0.44359) &&(2.62105) &&(0.00970) \\[6pt]
&+0.02594(\ln q)(\ln CU) &&-0.16780(\ln q)(\ln AL) &&-0.08918(\ln BU)(\ln CU) &&+0.55704(\ln BU)(\ln AL) \\
&(0.07451) &&(0.22977) &&(0.03299) &&(0.31342) \\[6pt]
&-1.73765(\ln CU)(\ln AL) \\
&(1.60730)
\end{aligned}
$$

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[1] The values in parentheses represent standard errors.

where

C   - total cost of local network at the central office level
q   - number of subscriber access lines at a central office
BU   - lines that are business (%)
CU   - capacity utilization of a central office (%)
AL   - average local loop length (miles of cable per access line)

$$DU = \begin{cases} 1 & \text{if the central office is in an urban area} \\ 0 & \text{otherwise} \end{cases}$$

$$DS = \begin{cases} 1 & \text{if the central office is in a suburban area} \\ 0 & \text{otherwise} \end{cases}$$

Ignoring the second-order coefficients which are not significant, give an estimate of the scale elasticity and discuss a policy implication of your answer.

Topic 2: Education and Labor Economics

Consider the following wage equation:

$$\ln w_i = \alpha_1 + \alpha_2 s_i + \alpha_3 x_i + \alpha_4 x_i^2 + \epsilon_i$$

where w is earnings, s is the number of years of schooling, x is the number of years of experience and ϵ is an error term.

Questions:

1. Explain (briefly) why one can suspect the number of years of schooling to be endogenous.

2. Is the OLS estimate of α_2 overestimating or underestimating the causal impact of schooling on earnings?

3. Give the intuition why, in the article of Angrist and Krueger (1991),[2] the quarter of birth is an appropriate instrument to correct for the endogeneity of schooling?

4. Propose one other instrumental variable that could be used to address the endogeneity problem?

Topic 3a: Health and Environment

Your are studying the relationship between property prices (P) and the level of quiet (Q) (i.e. absence of noise). In the correct specification of your hedonic price regression you also include the size of the property (S), number of bedrooms (R), a neighborhood dummy (D), and air pollution from traffic (A) as explanatory variables. Your price regressions is specified as follows:

$$\ln(P_i) = \beta_0 + \beta_1 Q_i + \beta_2 S_i + \beta_3 D_i + \beta_4 A + \varepsilon_i$$

However, in your analysis you do not have access to the variable A. Thus, your analysis is conducted without including air pollution as an explanatory variable in your regression. We assume that air pollution (A) is correlated with the level of quiet (Q), but uncorrelated with the number of bedrooms (R), and in which neighborhood the property is located (D).

Questions:

[2] Angrist, J., Krueger, A., 1991, "Does Compulsory School Attendance Affect Schooling and Earnings?", *The Quarterly Journal of Economics*, vol. 106, pp. 979-1014

1. In this regression, what do you expect the sign of β_4 (the coefficient on air pollution) to be? (2p)

2. What do you think is the sign of the correlation between quiet and air pollution from traffic? (2p)

3. If we estimate the regression function with air pollution included, do you think that the estimated value of β_1 will be greater or less than what it was in the regression without air pollution? Explain <u>and</u> show. (6p)

Topic 3b: Econométrie de la production, estimation des fonctions de coût

Dans un article intitulé "Flexible functional form and global curvature conditions", W.E. Diewert et T.J. Wales étudient le problème de la concavité des formes flexibles. Cette question a également été étudiée en cours. Pouvez-vous brièvement rappeler quelle est la nature de ce problème et le type de solution proposée par les auteurs de l'article.