UNIVERSIDAD CARLOS III DE MADRID
ECONOMETRICS
FINAL EXAM (Type C)

DURATION: 2 HOURS and 15 MINUTES

Directions:

1. This is an example of a exam that you can use to self-evaluate about the contents of the course Econometrics in OCW, Universidad Carlos III de Madrid, except the two last topics (Heterokedasticity and Autocorrelation).
2. This document is self contained. Your are not allowed to use any other material.
3. Read the problem text and the questions carefully. Each question, unless otherwise stated, requires a complete analysis of all the outputs shown in the corresponding problem.
   For example, to answer those questions referring to "appropriate estimates", or "given the estimates" or "given the problem conditions", the results based on the consistent and more efficient among outputs, must be used.
4. Each output includes all the explanatory variables used in the corresponding estimation.
5. Some results in the output shown may have been omitted.
6. The dependent variable can vary among outputs within the same problem.
7. For the sake of brevity, we will say that a model is well specified if it is linear in the conditioning variables (as they appear in the model) and its error term is mean-independent of such variables.
8. OLS, and 2SLS or TSLS, are the corresponding abbreviations of ordinary least squares and two stage least squares, respectively.
9. Statistical tables are included at the end of the problem, before the questions.
10. Each question only has one correct answer.
11. At the end of this document you will find the answer keys of this exam type. Do the exam as if you were sitting it for grade. After that check your answers with the keys given at the end. Do obtain your grade use the following formula:

$$[0{,}27 \times (\#\text{ correct answer}) - 0{,}09 \times (\#\text{ incorrect answers})] + 0{,}01$$

YOUR ANSWERS

	(a)	(b)	(c)	(d)		(a)	(b)	(c)	(d)		(a)	(b)	(c)	(d)
1.					**14.**					**27.**				
2.					**15.**					**28.**				
3.					**16.**					**29.**				
4.					**17.**					**30.**				
5.					**18.**					**31.**				
6.					**19.**					**32.**				
7.					**20.**					**33.**				
8.					**21.**					**34.**				
9.					**22.**					**35.**				
10.					**23.**					**36.**				
11.					**24.**					**37.**				
12.					**25.**									
13.					**26.**									

Problem 1:

Consider the mass joint probability:

$P(Y,X)$		X		
		0	**5**	**10**
Y	**1**	0,2	0	0,2
	2	0,1	0	0,1
	3	0	0,2	0,2

Problem 2:

Consider the model

$$\ln Y = \beta_0 + \beta_1 \ln X + \varepsilon,$$

where Y = Food household expenditure (in euros), X = Total household expenditure (in euros), and ε is an unobservable error term for which $E(\varepsilon) = 0$. We are concerned with the best predictor of $\ln Y$ given $\ln X$.

Problem 3: Returns to Schooling.

We would like to study the returns of education (ED) to wages (W). We are interested in knowing if the wage rates, on average, changes based on years of education. We have a sample of 3010 US young men in 1976 from the *National Longitudinal Survey of Young Men* (NLSYM) of the National Longitudinal Surveys in the USA for the year 1976.

The characteristics of the individuals we are interested in are ED (Years of education), EX (Experience, in years), EX^2 (Experience squared). Also, we control for ethnic differences through the variable $WHITE$ (Binary variable that takes the value of 1 if the individual is white and 0 otherwise).

We are interested in the following model to analyze the return to education:

$$\ln W = \beta_0 + \beta_1 ED + \beta_2 EX + \beta_3 EX^2 + \beta_4 WHITE + \beta_5 (WHITE \times ED) + \beta_6 ABIL + u \quad (0)$$

where $ABIL$ is individual's ability. We know that $E(u| ED, EX, WHITE, ABIL) = 0$ for any ED, EX, $WHITE$, $ABIL$.

However, $ABIL$ is unobserved, so that the empirical model that we consider is:

$$\ln W = \gamma_0 + \gamma_1 ED + \gamma_2 EX + \gamma_3 EX^2 + \gamma_4 WHITE + \gamma_5 (WHITE \times ED) + \varepsilon \quad (1)$$

We also have two additional variables: $NEAR$ is a dummy variable that takes value 1 if the individual lived close to a university and 0 otherwise, and $WHITE \times NEAR$ which takes value 1 if the individual is white and lived close to a university and 0 otherwise. Moreover, we know that $C(EX, \varepsilon) = C(EX^2, \varepsilon) = C(WHITE, \varepsilon) = C(NEAR, \varepsilon) = 0$.

The results of the various estimations are presented below:

Output 1: OLS, using observations 1-3010
Dependent variable: $\ln(W)$

	Coefficient	Std. Error	t-ratio	p-value
const	4.249	0.088	48.3	0.0000
ED	0.100	0.006	16.7	0.0000
EX	0.085	0.007	12.1	0.0000
EX^2	-0.0023	0.0003	-7.7	0.0000
$WHITE$	0.522	0.082	6.4	0.0000
$WHITE \times ED$	-0.023	.	.	0.0003
	.	.	.	.

Mean dependent var	6.3	. S.D. dependent var	0.44
Sum squared resid	447.8	.	
R^2	0.2444	. Adjusted R^2	0.2431

Output 2: OLS, using observations 1–3010
Dependent variable: $\ln(W)$

	Coefficient	Std. Error	t-ratio	p-value
const	4.468	0.069	.	.
ED	0.093	0.00358023	.	.
EX	0.090	0.007	.	.
EX^2	-0.0025	0.0003	.	.
	.	.	.	.

Mean dependent var	6.3	. S.D. dependent var	0.44
Sum squared resid	476.6	.	
R^2	0.1958	. Adjusted R^2	0.1950

Output 3: TSLS, using observations 1-3010
Dependent variable: $\ln(W)$
Instrumented: ED, $WHITE \times ED$
Instruments: const EX, EX^2, $WHITE$, $NEAR$ $WHITE \times NEAR$

	Coefficient	Std. Error	z	p-value
const	1.617	0.677	2.4	0.0168
ED	0.262	0.049	5.3	0.0000
EX	0.156	0.022	7.1	0.0000
EX^2	−0.0024	0.0006	−4.0	0.0002
$WHITE$	0.159	0.681	0.2	.8148
$WHITE \times ED$	−0.010	.	.	0.8504
	.	.	.	.

Mean dependent var	6.3	. S.D. dependent var	0.44
Sum squared resid	794.0	.	
R^2	0.1957	. Adjusted R^2	0.1944

Output 4: OLS, using observations 1-3010
Dependent variable: ED

	Coefficient	Std. Error	t-ratio	p-value
const	15.599	0.197	79.2	0.0000
EX	−0.407	0.034	−12.0	0.0000
EX^2	0.00025	0.0017	0.1	0.8803
$WHITE$	1.157	0.142	8.1	0.0000
$NEAR$	0.585	0.152	3.8	0.0001
$WHITE \times NEAR$	−0.070	0.176	−0.4	0.6903
	.	.	.	.

Mean dependent var	13.3	. S.D. dependent var	2.7
Sum squared resid	11484.2	.	
R^2	0.4674	. Adjusted R^2	0.4665

NOTE to Output 4: The R^2 of the OLS estimation of the linear projection of ED over EX, EX^2 and $WHITE$ is 0,4588.

Output 5: OLS, using observations 1-3010
Dependent variable: $WHITE \times ED$

	Coefficient	Std. Error	t-ratio	p-value
const	3.776	0.188	20.1	0.0000
EX	−0.462	0.032	−14.4	0.0000
EX^2	0.0084	0.0016	5.2	0.0000
$WHITE$	12.707	0.135	94.1	0.0000
$NEAR$	−0.282	0.145	−1.9	0.0520
$WHITE \times NEAR$	0.818	0.168	4.9	0.0000
	.	.	.	.

Mean dependent var	10.5	. S.D. dependent var	6.2
Sum squared resid	10454.2	.	
R^2	0.9097	. Adjusted R^2	

NOTE to Output 5: The R^2 of the OLS estimation of the linear projection of $WHITE \times ED$ over EX, EX^2 and $WHITE$ is 0,9083.

Output 6: OLS, using observations 1-3010
Dependent variable: $\ln(W)$

	Coefficient	Std. Error	t-ratio	p-value
const	1.617	0.505	3.2	0.0014
ED	0.262	0.036	7.3	0.0000
EX	0.157	0.016	9.8	0.0000
EX^2	−0.0024	0.0005	−4.8	0.0000
$WHITE$	0.159	0.508	0.3	0.7538
$WHITE \times ED$	−0.010	0.040	−0.2	0.8007
$RES4$	−0.166	0.037	−4.5	0.0000
$RES5$	−0.012	0.041	−0.3	0.7730
	.	.	.	.

Mean dependent var	6.3	.	S.D. dependent var	0.44
Sum squared resid	442.4	.	.	.

NOTE to Output 6: $RES2$ and $RES3$ are the residuals of Outputs 5 and 6, respectively.

Output 7: OLS, using observations 1-3010
Dependent variable: $\ln(W)$

	Coefficient	Std. Error	t-ratio	p-value
const	4.246	0.087	48.8	0.0000
ED	0.096	0.006	16.0	0.0000
EX	0.084	0.007	12.0	0.0000
EX^2	−0.0023	0.0003	−7.7	0.0000
$WHITE$	0.501	0.082	6.2	0.0000
$WHITE \times ED$	−0.021	0.006	−3.5	0.0008
$NEAR$	0.094	0.030	3.1	0.0021
$WHITE \times NEAR$	−0.002	0.036	−0.1	0.9542
	.	.	.	.

Mean dependent var	6.3	.	S.D. dependent var	0.44
Sum squared resid	442.4	.		
R^2	0.2535	.	Adjusted R^2	0.2517

Statistical Tables:

Critical Values $N(0,1)$	
	Acumulated Probability
99,5 %	2,576
99 %	2,326
97,5 %	1,960
95 %	1,645
90 %	1,282

Critical Values χ^2_m				
		Acumulated Probability		
	m	90 %	95 %	99 %
	1	2,7	3,8	6,6
	2	4,6	6,0	9,2
	3	6,2	7,8	11,3
	4	7,8	9,5	13,3
	5	9,2	11,1	15,1

1. (Problem 1) Consider the following statements:
I. X and Y are uncorrelated.
II. The higher the X is, the higher Y is.
III. The conditional expectation of Y given X is increasing with X.

   a) None of the three statements is true.
   b) Only I. is true.
   c) Only II. and III. are true.
   d) Only III. is true.

2. (Problem 1) Consider the following statements:
I. The covariance between X and Y is 1, so there is perfect correlation between such variables.
II. $E(Y|X)$ is constant for all X.
III. The conditional expectation of Y given X is linear in X.

   a) None of the three statements is true.
   b) The three statements are true.
   c) Only I. is true.
   d) Only II. is true.

3. (Problem 1) Consider the following statements:
I. $L(Y|X) = E(Y|X)$.
II. $L(Y|X)$ has positive slope.
III. $E(Y|X)$ is strictly increasing with X.

   a) The three statements are true.
   b) Only II. and III. are true.
   c) Only II. is true.
   d) Only III. is true.

4. (Problem 1) The linear projection of Y given X is (rounding to 2 decimal digits):

   a) $2{,}00 - 0{,}05X$.
   b) $1{,}68 + 0{,}05X$.
   c) $-4 + X$.
   d) $4 + X$.

5. (Problem 1) If we consider the best prediction of Y for a randomly chosen observation:
I. It is approximately 2, if we ignore the value of X for such observation.
II. It is approximately 3, if we know that $X = 5$ for such observation.
III. It is approximately 1,95, if we know that $X = 5$ for such observation.

   a) Only I. and III. are true.
   b) Only I. and II. are true.
   c) None of the three statements is true.
   d) Only I. is true.

6. (Problem 1) Given the information available, conditioning on $X = 0$, the best prediction of Y would approximately be (rounding to one decimal digit):

a) 1,3.

b) 2.

c) None of the other answers is true.

d) 1,7.

7. (Problem 1) If X changes from 5 to 10, the causal effect on Y is approximately equal to (rounding to one decimal digit):

   a) 0.

   b) 0,3.

   c) $-1{,}0$.

   d) 5,0.

8. (Problem 1) The linear projection of X given Y is (rounding to two decimal digits):

   a) $0{,}60 + 20Y$.

   b) $3{,}5 + 1{,}25Y$.

   c) $3{,}5 + 1{,}25X$.

   d) $1{,}25 + 3{,}5Y$.

9. There is a positive correlation between the number of children's books in a household and the academic performance of those children living in that household. Then:
   I. We can infer that the higher the number of children's books at a household, the better the academic performance of the children living in that household.
   II. The fact that there are many children's books at a household can be result of other factors, like parentsíntelligence.
   III. The number of children's books in a household has a positive causal effect on the academic performance of children living in that household.

   a) Only I. and II. are true.

   b) The three statements are true.

   c) Only II. is true.

   d) Only I. is true.

10. Considering households whose children are taking the same course in a particular school, we want to evaluate the causal effect of the number of children's books available at home on the academic performance of those children, given the following alternatives:

    I. We randomly allocate, among such households, different numbers of children's books.
    II. We randomly allocate, among the households with illiterate parents, different amounts of children's books.
    III. We leave batches of children's books available to all those households that want to pick them.

    If we measure children's academic performance after one year, we can properly assess the causal effect of the number of children's books at home on academic performance of corresponding children:

    a) Only in cases I. and II.

    b) Only in case I.

c) Only in cases I. and III.

d) In all the three cases.

11. (Problem 2) Assuming that $E(\varepsilon|\, X) = 0$ for all X, consider the following statements:
I. $E(Y|X)$ is linear in β_0 and β_1.
II. If $\beta_1 = 0$, the best predictor is $E(\ln Y)$.
III. The best predictor is $L(\ln Y|\ln X)$.

    a) The three statements are true.

    b) Only I. and II. are true.

    c) Only I. and III. are true.

    d) Only II. and III. are true.

12. (Problem 2) Suppose that the assumptions that ensure that $E(\ln Y|\ln X)$ is linear in $\ln X$ hold. Consider the following statements:
I. $\beta_0 = E(\ln Y) - \beta_1 E(\ln X)$.
II. β_1 measures the causal effect of X on Y.
III. The error term satisfies $C(\ln X, \varepsilon) = 0$.

    a) The three statements are true.

    b) Only I. and II. are true.

    c) Only I. and III. are true.

    d) Only II. and III. are true.

13. (Problem 2) Let $\beta_0 = 3{,}67$ and $\beta_1 = 0{,}48$. Assuming that $E(\varepsilon|\, X) = 0$ for all X, we can assess that the average food expenditure of a household whose total expenditure amounts to 5000 euros is approximately equal to:

    a) 7,8 euros.

    b) 2404 euros.

    c) 2341 euros.

    d) None of the other answers is true.

14. (Problem 2) Let $\beta_0 = 3{,}67$ and $\beta_1 = 0{,}48$. Assuming that $E(\varepsilon|\ln X) = 0$ for all X, the mean elasticity of food expenditure with respect to total expenditure is approximately equal to:

    a) 48.

    b) 0,48.

    c) We cannot answer with the information available, since the answer will depend on the amount of total expenditure in euros.

    d) 4800 euros.

15. (Problem 2) Let $\beta_0 = 3{,}67$ and $\beta_1 = 0{,}48$. Assuming that $E(\varepsilon|\, X) = 0$ for all X, if total expenditure of a household is increased by 5 %, its mean food expenditure rise approximately by:

    a) 2400 euros.

    b) 2,4 %.

    c) 0,24 %.

d) We cannot answer with the information available, since the answer will depend on the amount of total expenditure in euros.

16. (Problem 2) Let $\beta_0 = 3{,}67$ and $\beta_1 = 0{,}48$. Consider the following statements:
I. The higher the total expenditure in a household, the higher its mean food expenditure.
II. An increase in total household expenditure can reflect additional factors, such as household size or the educational level of its members.
III. The total expenditure of a household has a positive causal effect on its food expenditure.

    a) Only I. and II. are true.

    b) The three statements are true.

    c) Only II. is true.

    d) Only I. is true.

17. (Problem 2) Let $\beta_0 = 3{,}67$ and $\beta_1 = 0{,}48$. Assume that $E(\varepsilon|\, X) = 0$ for all X, and $V(\ln X) = 25$. Then, $C(\ln Y, \ln X)$ is equal to:

    a) 0,48.

    b) $0{,}48 \times 25 = 12$.

    c) $0{,}48/25 = 0{,}0192$.

    d) We do not have enough information to answer.

18. (Problem 2) Consider the following statements:
I. There is not any reason why those factors not included in the model (captured by ε) are related with household total expenditure.
II. Among the factors potentially affecting household expenditure, there are household size or educational level of household members.
III. If $E(\varepsilon|\, X) = 0$, then $E(\ln Y|\ln X)$ is linear in $\ln X$.

    a) Only I. and II. are true.

    b) The three statements are true.

    c) Only II. and III. are true.

    d) Only I. and III. are true.

19. (Problem 2) Suppose that $E(\ln Y|\ln X)$ is linear in $\ln X$. Consider the following conditions:
I. $E(\varepsilon|\, X) = 0$ for all X.
II. $V(\varepsilon|\, X) = \sigma^2$ for all X.
III. $C(X, \varepsilon) = 0$.

    a) Only I is true.

    b) Only I. and III are true.

    c) Only II. and III are true.

    d) Only III is true.

20. (Problem 2) Suppose that $E(\ln Y|\ln X)$ is linear in $\ln X$. Consider the following conditions:
I. $E(\varepsilon|\ln X) = 0$ for all X.
II. $V(\varepsilon|\ln X) = \sigma^2$ for all X.
III. $C(\ln X, \varepsilon) = 0$.

    a) Only I is true.

b) Only I. and III are true.

c) Only II. and III are true.

d) Only III is true.

21. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. Then, the OLS estimator for γ_1, $\widehat{\gamma}_1$, has the following property:

    a) $p \lim_{n\to\infty} \widehat{\gamma}_1 = \beta_1 + \beta_6$.

    b) $p \lim_{n\to\infty} \widehat{\gamma}_1 = \beta_1$.

    c) None of the other answers is true.

    d) $p \lim_{n\to\infty} \widehat{\gamma}_1 \neq \beta_1$.

22. (Problem 3) A valid instrumental variable for education, say Z_1, should satisfy:

    a) $C(ED, Z_1) = 0$.

    b) None of the other answers is true.

    c) $C(u, Z_1) = 0$.

    d) $C(\varepsilon, Z_1) = 0$.

23. (Problem 3) Is the dummy variable for the person who lived close to a university, $NEAR$, a valid instrumental variable (IV) for education?

    a) Yes, because $NEAR$ is exogenous and the coefficient of $NEAR$ is significant in Output 4.

    b) None of the other answers is true.

    c) Yes, because $NEAR$ is exogenous and the coefficient of $NEAR$ is significant in Output 5.

    d) No, because the variable $NEAR$ is not included in model (1).

24. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. Then:

    a) The interaction of ethnic origin and education, $(WHITE \times ED)$, is an endogenous variable.

    b) The OLS estimation of model (1) will consistently estimate the causal effects of education, experience and ethnic origin, respectively.

    c) The OLS estimates of model (1) will provide consistent estimates of the causal effect of experience.

    d) None of the other answers is true.

25. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. Then:

    a) None of the other answers is true.

    b) The estimated coefficient of $WHITE$ in Output 1 is consistent for β_4.

    c) The estimated coefficient of ED in Output 1 is inconsistent for β_1.

    d) The estimated coefficient of $WHITE \times ED$ in Output 1 is consistent for β_5.

26. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. Suppose also that all the individuals in the sample are known to have the same ability. Then:

    a) None of the other answers is true.

b) The estimated coefficient of $WHITE$ in Output 1 is inconsistent for β_4.

c) The estimated coefficient of ED in Output 1 is inconsistent for β_1.

d) The estimated coefficient of $WHITE \times ED$ in Output 1 is consistent for β_5.

27. (Problem 3) Given all the available information, can we conclude that education (ED) and its interaction with ethnic origin ($WHITE \times ED$) are exogenous?

a) The test statistic is approximately equal to 37, so we conclude, at the 5 % significance level, that ED and $WHITE \times ED$ are endogenous.

b) None of the other answers is true.

c) The test statistic is approximately equal to 203, which suggests there is not enough evidence to conclude that ED and $WHITE \times ED$ are endogenous at 5 % significance level.

d) The test statistic is approximately equal to 203, which suggests there is not enough evidence to conclude that ED and $WHITE \times ED$ are exogenous at 5 % significance level.

28. (Problem 3) Assume that $C\,(ABIL, ED) = 0$. We want to test whether ethnic characteristics affect wages.Consider the following statements:
I. The value of an appropriate statistic is approximately 194, so we conclude, at usual significance levels, that there are differences in wage determination by ethnic origin.
II. The appropriate statistic is approximately distributed as a χ^2_1 or, equivalently, the square root of such statistic is approximately distributed as a standard normal.
III. The appropriate statistic is approximately 6,4, so we conclude, at usual significance levels, that there are differences in wage determination by ethnic origin.

a) Only I is true.

b) Only I and II are true.

c) The three statements are true.

d) None of the three statements is true.

29. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. For a white individual, increasing experience from 10 to 11 years leads to an average wage increase of, approximately (rounding to one decimal number):

a) 3,7 %.

b) None of the other answers is true.

c) 8,5 %.

d) 10,6 %.

30. (Problem 3) Assume that $C\,(ABIL, ED) = 0$. For $j = 0, 1, \ldots, 5$, let $\widehat{\gamma}_j$ be the OLS estimator and $\widetilde{\gamma}_j$ be the 2SLS estimator of the corresponding parameter in model (1). Then:

a) None of the other answers is true.

b) The variance of $\widetilde{\gamma}_j$ will be smaller than the variance of $\widehat{\gamma}_j$.

c) $\widehat{\gamma}_j$ will be a consistent estimator of β_j.

d) $\widetilde{\gamma}_j$ will be an inconsistent estimator of β_j.

31. (Problem 3) Assume that $C\,(ABIL, ED) \neq 0$. If we wanted to test that the effect of education is independent of ethnic origin:

a) The null hypothesis is $H_0 : \beta_1 = \beta_5$.

b) At the 5 % significance level, we reject the hypothesis that the effect of education is independent of ethnic origin.

c) None of the other answers is true.

d) We cannot reject that the effect of education is independent of ethnic origin.

32. (Problem 3) When we estimate model (1) via 2SLS, using $NEAR$ and $(WHITE \times NEAR)$ as instruments, the model in the second stage is:

a) $\ln(W) = \delta_0 + \delta_1 NEAR + \delta_2 EX + \delta_3 EX^2 + \delta_4 WHITE + \delta_5 (WHITE \times NEAR) + v_1$.

b) None of the other answers is true.

c) $\ln(W) = \theta_0 + \theta_1 \widehat{ED} + \theta_2 EX + \theta_3 EX^2 + \theta_4 WHITE + \theta_5 (\widehat{WHITE \times ED}) + v_2$, where $\widehat{ED}$ and $(\widehat{WHITE \times ED})$ are predicted values from the first stage estimations.

d) $\ln(W) = \alpha_0 + \alpha_1 ED + \alpha_2 EX + \alpha_3 EX^2 + \alpha_4 WHITE + \alpha_5 (WHITE \times ED) + \alpha_6 NEAR + \alpha_7 (WHITE \times NEAR) + v_3$.

33. (Problem 3) Assume we estimate model (1) via 2SLS, using $NEAR$ and $(WHITE \times NEAR)$ as instruments. Each first stage equation (reduced form) for each endogenous explanatory variable, includes as explanatory variables:

a) None of the other answers is true.

b) All the exogenous explanatory variables from model (1) and all the instrumental variables.

c) Only the instrumental variables.

d) Only the exogenous explanatory variables from model (1).

34. (Problem 3) In model (0), assume that we wanted to test that, for an individual with 11 years of experience, a further year of education has, on average, the same effect on wages as a further year of experience. The null hypothesis is:

a) $H_0 : \beta_1 = \beta_2,\ \beta_2 + 12\beta_3 = 0$.

b) $H_0 : \beta_1 - \beta_2 - 23\beta_3 = 0$.

c) $H_0 : \beta_1 = \beta_2 - 23\beta_3$.

d) $H_0 : \beta_1 = \beta_2 + 11\beta_3 = 0$.

35. (Problem 3) Assume that the variables Z_2 and Z_3 are invalid instruments for both education and its interaction with ethnic origin. Then, the inconsistency bias of the estimators of the corresponding coefficients would be larger:

a) The larger the correlation between instruments and the endogenous explanatory variables.

b) The larger the variances of the endogenous explanatory variables.

c) The smaller the correlation between instruments and the endogenous explanatory variables.

d) None of the other answers is true.

36. (Problem 3) Assume that $C(ABIL, ED) \neq 0$. Then $NEAR$ and $WHITE \times NEAR$:

a) Would not be valid instrumental variables for model (1), since the coefficient of $WHITE \times NEAR$ is insignificant in the first stage (reduced form) equation for ED.

b) Would not be valid instrumental variables for model (1), since these variables are not included in Output 1.

c) Would be valid instrumental variables for model (1), even though the coefficient of $WHITE \times NEAR$ is insignificant in first-stage (reduced form) equation for ED.

d) None of the other answers is true.

37. (Problem 3) Assume that $C(ABIL, ED) \neq 0$. For a white individual, increasing experience from 9 to 10 years leads to an average wage increase of, approximately (rounding to one decimal number):

a) 11,0 %.

b) None of the other answers is true.

c) 15,6 %.

d) 4,1 %.

Answer Keys to exam type C

1	A
2	A
3	C
4	B
5	B
6	A
7	C
8	B
9	C
10	B
11	D
12	A
13	C
14	B
15	B
16	C
17	B
18	C
19	A
20	B
21	D
22	D
23	A
24	A
25	C
26	D
27	A
28	A
29	D
30	C
31	D
32	C
33	B
34	B
35	C
36	C
37	A