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name: <unnamed>
log: C:\Users\LENOVO\OneDrive\Desktop\econometrics assignment\Question 1 Anumo
> y Modak.smcl
log type: smcl
opened on: 22 Mar 2023, 12:36:41

1 . /*
> Roll No: ME22002
> name: Anumoy Modak
> School : School of Economics , Xavier University , Bhubaneshwar.
> */
2 .
3 . **QUESTION 1: PART A**
4 .
5 . ***** Haushman's test *****
6 . reg y y2 x1 x2

```

Source	SS	df	MS	Number of obs	=	1,000
Model	20461326.2	3	6820442.05	F(3, 996)	=	38420.78
Residual	176809.517	996	177.519595	Prob > F	=	0.0000
				R-squared	=	0.9914
				Adj R-squared	=	0.9914
Total	20638135.7	999	20658.7945	Root MSE	=	13.324

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
y2	1.65592	.0231798	71.44	0.000	1.610433	1.701407
x1	.3365774	.0381915	8.81	0.000	.2616324	.4115225
x2	1.000348	.0030611	326.80	0.000	.9943408	1.006355
_cons	92.80437	1.638503	56.64	0.000	89.58905	96.01968

```

7 . estimates store efficient
8 .
9 . *****run IV 2SLS regression*****
10. ivregress 2sls y x1 x2 (y2 = z1 z2)

```

Instrumental variables (2SLS) regression	Number of obs	=	1,000
	Wald chi2(3)	=	66428.78
	Prob > chi2	=	0.0000
	R-squared	=	0.9856
	Root MSE	=	17.219

y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
y2	1.054019	.0483232	21.81	0.000	.9593073	1.148731
x1	.9494548	.0626645	15.15	0.000	.8266347	1.072275
x2	.9982991	.0039582	252.21	0.000	.9905412	1.006057
_cons	122.6238	2.830694	43.32	0.000	117.0758	128.1719

```

Instrumented: y2
Instruments: x1 x2 z1 z2

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11.
12.
13. estimates store consistent

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14. hausman consistent efficient

	Coefficients			
	(b) consistent	(B) efficient	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
y2	1.054019	1.65592	-.6019014	.0424007
x1	.9494548	.3365774	.6128774	.0496814
x2	.9982991	1.000348	-.0020485	.0025094

b = consistent under Ho and Ha; obtained from ivregress
 B = inconsistent under Ha, efficient under Ho; obtained from regress

Test: Ho: difference in coefficients not systematic

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = **201.51**
 Prob>chi2 = **0.0000**

```
15. /* H0: efficient = consistent (iv_coefficient and OLS_coefficient are
> asymptotically equal)
> H1: efficient not equal to consistent
> */
```

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16.
17. **QUESTION 1: PART B**
18.
19. **** Run 1st stage SLS ****
20.
21. reg y2 x1 x2 z1 z2
```

Source	SS	df	MS	Number of obs	=	1,000
Model	331369.744	4	82842.436	F(4, 995)	=	405.23
Residual	203413.312	995	204.435489	Prob > F	=	0.0000
				R-squared	=	0.6196
				Adj R-squared	=	0.6181
Total	534783.056	999	535.318374	Root MSE	=	14.298

y2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1	1.015262	.032228	31.50	0.000	.952019	1.078504
x2	-.0046892	.0032849	-1.43	0.154	-.0111353	.0017569
z1	.8731696	.38931	2.24	0.025	.1092068	1.637132
z2	1.031896	.0416354	24.78	0.000	.9501931	1.1136
_cons	25.44231	1.921542	13.24	0.000	21.67157	29.21306

```
22. predict y2_hat
(option xb assumed; fitted values)
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```
23. predict v_hat , resid
```

```
24.
25. ***run 2sls***
26. reg y x1 x2 y2_hat
```

Source	SS	df	MS	Number of obs	=	1,000
Model	19696439.9	3	6565479.98	F(3, 996)	=	6944.09
Residual	941695.734	996	945.477644	Prob > F	=	0.0000
				R-squared	=	0.9544
				Adj R-squared	=	0.9542
Total	20638135.7	999	20658.7945	Root MSE	=	30.749

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1	.9494548	.1119003	8.48	0.000	.7298675	1.169042
x2	.9982991	.0070681	141.24	0.000	.984429	1.012169
y2_hat	1.054019	.0862909	12.21	0.000	.884686	1.223352
_cons	122.6238	5.054786	24.26	0.000	112.7046	132.5431

```

27.
28. ***OR***
29. gen y2_minus_vhat = (y2 - v_hat)

30. dis (y2 - v_hat)
    85.854792

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31.
32. ***now 2sls***
33. reg y y2_minus_vhat x1 x2

```

Source	SS	df	MS	Number of obs	=	1,000
Model	19696440	3	6565479.99	F(3, 996)	=	6944.09
Residual	941695.726	996	945.477636	Prob > F	=	0.0000
				R-squared	=	0.9544
				Adj R-squared	=	0.9542
Total	20638135.7	999	20658.7945	Root MSE	=	30.749

y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
y2_minus_vhat	1.054019	.0862909	12.21	0.000	.884686	1.223352
x1	.9494548	.1119003	8.48	0.000	.7298674	1.169042
x2	.9982991	.0070681	141.24	0.000	.984429	1.012169
_cons	122.6238	5.054786	24.26	0.000	112.7046	132.5431

```

34.
35. **QUESTION 1: PART C**
36. reg y2 z1 z2 x1 x2

```

Source	SS	df	MS	Number of obs	=	1,000
Model	331369.744	4	82842.436	F(4, 995)	=	405.23
Residual	203413.312	995	204.435489	Prob > F	=	0.0000
				R-squared	=	0.6196
				Adj R-squared	=	0.6181
Total	534783.056	999	535.318374	Root MSE	=	14.298

y2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
z1	.8731696	.38931	2.24	0.025	.1092068	1.637132
z2	1.031896	.0416354	24.78	0.000	.9501931	1.1136
x1	1.015262	.032228	31.50	0.000	.952019	1.078504
x2	-.0046892	.0032849	-1.43	0.154	-.0111353	.0017569
_cons	25.44231	1.921542	13.24	0.000	21.67157	29.21306

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37. test z1=z2=0

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( 1)  z1 - z2 = 0
( 2)  z1 = 0

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      F( 2, 995) = 310.55
      Prob > F = 0.0000

```

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38.
39. **QUESTION 1: PART D (Test of Exogeneity)**
40. ivregress 2sls y x1 x2 (y2 = z1 z2)

```

Instrumental variables (2SLS) regression	Number of obs	=	1,000
	Wald chi2(3)	=	66428.78
	Prob > chi2	=	0.0000
	R-squared	=	0.9856
	Root MSE	=	17.219

y	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
y2	1.054019	.0483232	21.81	0.000	.9593073	1.148731
x1	.9494548	.0626645	15.15	0.000	.8266347	1.072275
x2	.9982991	.0039582	252.21	0.000	.9905412	1.006057
_cons	122.6238	2.830694	43.32	0.000	117.0758	128.1719

Instrumented: y2
Instruments: x1 x2 z1 z2

41. estat overid

Tests of overidentifying restrictions:

Sargan (score) chi2(1) = **.055458** (p = **0.8138**)
Basman chi2(1) = **.055184** (p = **0.8143**)

42. predict u_hat_2sls, resid

43. reg u_hat_2sls x1 x2 z1 z2

Source	SS	df	MS	Number of obs	=	1,000
Model	16.4436555	4	4.11091388	F(4, 995)	=	0.01
Residual	296488.185	995	297.978076	Prob > F	=	0.9996
				R-squared	=	0.0001
				Adj R-squared	=	-0.0040
Total	296504.629	999	296.801431	Root MSE	=	17.262

u_hat_2sls	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
x1	.0001852	.0389087	0.00	0.996	-.0761674	.0765379
x2	-.0000182	.0039658	-0.00	0.996	-.0078006	.0077641
z1	-.109964	.4700126	-0.23	0.815	-1.032294	.8123657
z2	.0012402	.0502663	0.02	0.980	-.0973998	.0998803
_cons	.3086257	2.319872	0.13	0.894	-4.243777	4.861028

44. test z1=z2=0

(1) **z1 - z2 = 0**
(2) **z1 = 0**

F(2, 995) = **0.03**
Prob > F = **0.9728**

45.

46. log close

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