Weiterführende Fragen der Ökonometrie

Übungsaufgaben – Blatt 10

Aufgabe 1

Lesen Sie Abschnitt 15.8 aus Wooldridge 4e.

Aufgabe 2

In Example 15.4 in Wooldridge (2009) the authors used the data set `card.txt` to estimate the return to education. The data set contains information on whether someone grew up near a four-year college (*nearc*4) which they use as an instrument for education. Table 15.1 summarizes the results from the IV regression as well as the OLS regression.
The OLS regression leads to:

Dependent Variable: LWAGE
Method: Least Squares
Sample: 1 3010
Included observations: 3010

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.620807	0.074233	62.24757	0.0000
EDUC	0.074693	0.003498	21.35102	0.0000
EXPER	0.084832	0.006624	12.80634	0.0000
EXPERSQ	-0.002287	0.000317	-7.223157	0.0000
BLACK	-0.199012	0.018248	-10.90580	0.0000
SMSA	0.136385	0.020100	6.785144	0.0000
SOUTH	-0.147955	0.025980	-5.694989	0.0000
SMSA66	0.026242	0.019448	1.349349	0.1773
REG662	0.096367	0.035898	2.684478	0.0073
REG663	0.144540	0.035124	4.115086	0.0000
REG664	0.055076	0.041657	1.322110	0.1862
REG665	0.128025	0.041839	3.059906	0.0022
REG666	0.140517	0.045247	3.105567	0.0019
REG667	0.117981	0.044802	2.633360	0.0085
REG668	-0.056436	0.051258	-1.101021	0.2710
REG669	0.118570	0.038830	3.053556	0.0023
R-squared	0.299836	Mean dependent var		6.261832
Adjusted R-squared	0.296329	S.D. dependent var		0.443798
S.E. of regression	0.372280	Akaike info criterion		0.866961
Sum squared resid	414.9460	Schwarz criterion		0.898907
Log likelihood	-1288.777	F-statistic		85.47627
Durbin-Watson stat	1.880434	Prob(F-statistic)		0.000000

while the IV regression results in:

Dependent Variable: LWAGE
Method: Two-Stage Least Squares
Sample: 1 3010
Included observations: 3010
Instrument list: NEARC4 EXPER EXPERSQ BLACK SMSA SOUTH SMSA66 REG662 REG663 REG664 REG665 REG666 REG667 REG668 REG669

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.666151	0.924830	3.964137	0.0001
EDUC	0.131504	0.054964	2.392559	0.0168
EXPER	0.108271	0.023659	4.576401	0.0000
EXPERSQ	-0.002335	0.000333	-7.001372	0.0000
BLACK	-0.146776	0.053900	-2.723119	0.0065
SMSA	0.111808	0.031662	3.531311	0.0004
SOUTH	-0.144672	0.027285	-5.302309	0.0000
SMSA66	0.018531	0.021609	0.857580	0.3912
REG662	0.100768	0.037686	2.673898	0.0075
REG663	0.148259	0.036814	4.027225	0.0001
REG664	0.049897	0.043740	1.140770	0.2541
REG665	0.146272	0.047064	3.107940	0.0019
REG666	0.162903	0.051910	3.138206	0.0017
REG667	0.134572	0.049402	2.724007	0.0065
REG668	-0.083077	0.059331	-1.400221	0.1616
REG669	0.107814	0.041814	2.578444	0.0100
R-squared	0.238166	Mean dependent var		6.261832
Adjusted R-squared	0.234349	S.D. dependent var		0.443798
S.E. of regression	0.388330	Sum squared resid		451.4948
Durbin-Watson stat	1.888320	Second-stage SSR		477.2625

(i) (4 Punkte) Obtain the reduced form residuals $\hat{\nu}_2$, that is, the residuals of the regression from *educ* on the instrument variable as well as the exogeneous variables. Use these to test whether *educ* is exogenous; that is, determine if the difference between OLS and IV is *statistically* significant.

(ii) (2 Punkte) Estimate the equation by 2SLS, adding *nearc*2 as an instrument. Does the coefficient on *educ* change much?

(iii) (3 Punkte) Test the single overidentifying restriction from part (ii).

Quelle: Wooldridge 3e & 4e Computer Exercise C15.5

Aufgabe 3

Use the data in `murder.txt` for this exercise. The variable *mrdrte* is the murder rate, that is, the number of murders per 100,000 people. The variable *exec* is the total number of prisoners executed for the current and prior two years; *unem* is the state unemployment rate.

(i) (1 Punkt) How many states executed at least one prisoner in 1991, 1992, or 1993? Which state had the most executions? [The ID number is sufficient.]

(ii) (1 Punkt) Using the two years 1990 and 1993, do a pooled regression of *mrdrte* on *d*93, *exec*, and *unem*. What do you make of the coefficient on *exec*?

(iii) (1 Punkt) Using the changes from 1990 to 1993 only (for a total of 51 observations), estimate the equation

$$\Delta mrdrte = \delta_0 + \beta_1 \Delta exec + \beta_2 \Delta unem + \Delta u$$

by OLS and report the results in the usual form. Now, does execution appear to have a deterrent effect?

(iv) (1 Punkt) The change in executions may be at least partly related to changes in the expected murder rate, so that $\Delta exec$ is correlated with Δu in part (iii). It might be reasonable to assume that $\Delta exec_{-1}$ is uncorrelated with Δu. (After all, $\Delta exec_{-1}$ depends on executions that occured three or more years ago.) Regress $\Delta exec$ on $\Delta exec_{-1}$ to see if they are sufficiently correlated; interpret the coefficient on $\Delta exec_{-1}$.

(v) (2 Punkte) Reestimate the equation from part (iii), using $\Delta exec_{-1}$ as an IV for $\Delta exec$. Assume that $\Delta unem$ is exogenous. How do your conclusions change from part (iii)?

Quelle: Wooldridge 3e & 4e Computer Exercise C15.6