

log: U:\einfuehrung\Aufgabeboston.log
log type: text
opened on: 7 Jun 2010, 14:21:04

* Oeffne Verzeichnis

* cd U:\einfuehrung

* Daten einlesen

. use "BOSTON.dta", clear

. describe

contains data from BOSTON.dta

obs: 506
vars: 14
size: 30,360 (97.1% of memory free)

11 Jun 2007 14:34

506 Beobachtungen

variable name	storage type	display format	value label	variable label
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VALUEOFHOME	float	%9.0g	homes in this district in \$1000	median value of owner occupied
CRIMRATE	float	%9.0g	CRIMRATE	per capita crime rate
RESIDENTIALZONE	float	%9.0g	RESIDENTIALZONE	proportion of residential land
zoned for large lots	float	%9.0g	zoned for large lots	proportion of nonretail business
NONRETAIL	float	%9.0g	NONRETAIL	acres
acres	float	%9.0g	acres	1 if tract bounds river, 0
RIVER	float	%9.0g	RIVER	nitric oxides concentration
otherwise	float	%9.0g	otherwise	average number of rooms per
NOCONCENTRATION	float	%9.0g	NOCONCENTRATION	proportion of owner-occupied units
NOOFROMS	float	%9.0g	NOOFROMS	weighted distances to five Boston
dwelling	float	%9.0g	dwelling	index of accessibility to radial
AGE	float	%9.0g	AGE	full-value property tax rate per
built prior to 1940	float	%9.0g	built prior to 1940	pupil/teacher ratio
DISTANCE	float	%9.0g	DISTANCE	I(B<0.63)*1000(B-0.63)^2 where B =
employment centers	float	%9.0g	employment centers	% lower status of the population
ACCESSHIGHWAY	float	%9.0g	ACCESSHIGHWAY	
highways	float	%9.0g	highways	
TAXRATE	float	%9.0g	TAXRATE	
\$10,000	float	%9.0g	\$10,000	
PUPILTEACHER	float	%9.0g	PUPILTEACHER	
BLACKPEOPLE	float	%9.0g	BLACKPEOPLE	
proportion of blacks	float	%9.0g	proportion of blacks	
LOWERSTATUS	float	%9.0g	LOWERSTATUS	

Sorted by:

. sum

Variable	obs	Mean	Std. Dev.	Min	Max
VALUEOFHOME	506	22.53281	9.197104	5	50

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φ-Wert eines Wohnung = 22532\$

Die Einheiten der Regressoren sind wichtig für die spätere Interpretation!

Aufgabeboston.log

	CRIMRATE	RESIDENTIAL~E	NONRETAIL	RIVER	NOCONCENTR~N	NOOFRROOMS	AGE	DISTANCE	ACCESSTOHI~Y	TAXRATE	PUPILTEACHER	BLACKPEOPLE	LOWERSTATUS
506	3.613524	8.601545	23.32245	0	.385	.871	8.78	100	12.1265	24	711	22	37.97
506	11.36364	23.32245	0	.46	3.561	8.78	100	12.1265	1	187	711	22	37.97
506	11.13678	6.860353	0	.32	1.1296	8.78	100	12.1265	1	187	711	22	37.97
506	.06917	.253994	0	0	1.1296	8.78	100	12.1265	1	187	711	22	37.97
506	9.549407	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259	8.707259
506	3.795043	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571	2.10571
506	68.5749	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886	28.14886
506	6.284634	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172	.7026172
506	.5546951	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777	.1158777
506	408.2372	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371	168.5371
506	18.45553	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946	2.164946
506	356.674	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486	91.29486
506	12.65306	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062	7.141062

* a) OLS Regression

* Führe Regression durch und speichere Abweichungssumme ab

regress VALUEOFHOME CRIMRATE RESIDENTIALZONE NONRETAIL RIVER NOCONCENTRATION NOOFRROOMS AGE DISTANCE ACCESSTOHIGHWAY TAXRATE PUPILTEACHER BLACKPEOPLE LOWERSTATUS

Number of obs = 506
F(13, 492) = 108.08
Prob > F = 0.0000
R-squared = 0.7406
Adj R-squared = 0.7338
Root MSE = 4.7453

Source	SS	df	MS
Model	31637.511	13	2433.65469
Residual	11078.7846	492	22.5178548
Total	42716.2956	505	84.586724

VALUEOFHOME	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
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CRIMRATE	-.1080114	.032865	-3.29	0.001	-.1725844	-.0434383
RESIDENTIAL~E	.0464205	.0137275	3.38	0.001	.0194488	.0733921
NONRETAIL	.0205587	.0614957	0.33	0.738	-.1002679	.1413852
RIVER	2.686734	.8615798	3.12	0.002	.9939043	4.379564
NOCONCENTR~N	-17.76661	3.819744	-4.65	0.000	-25.27164	-10.26159
NOOFRROOMS	3.809865	.4179252	9.12	0.000	2.988727	4.631003
AGE	.0006922	.0132098	0.05	0.958	-.0252623	.0266468
DISTANCE	-1.475567	.1994547	-7.40	0.000	-1.867455	-1.083679
ACCESSTOHI~Y	.3060495	.0663464	4.61	0.000	.1756922	.4364068
TAXRATE	-.0123346	.0037605	-3.28	0.001	-.0197233	-.0049459
PUPILTEACHER	-.9527473	.1308267	-7.28	0.000	-1.209795	-.6956992
BLACKPEOPLE	.0093117	.002686	3.47	0.001	.0040343	.0145891
LOWERSTATUS	-.5247584	.0507153	-10.35	0.000	-.6244036	-.4251132
_cons	36.45949	5.103459	7.14	0.000	26.43223	46.48675

scalar rss_u = e(rss)

display rss_u
11078.785

* b) Test, ob alle Betas ausser Konstante gleich Null

signifikant von Null verschieden

Alle Regressoren aufser

NONRETAIL und AGE sind

Aufgabeboston.log

Source	SS	df	MS
Model	0	0	
Residual	42716.2956	505	84.586724
Total	42716.2956	505	84.586724

Number of obs = 506
F(0, 505) = 0.00
Prob > F = 0.0000
Adj R-squared = 0.0000
Root MSE = 9.1971

VALUEOFHOME	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
_cons	22.53281	.4088611	55.11	0.000	21.72953 23.33608

β_0 , $y_i = \beta_0 + \epsilon_i$ (Regression auf Konstante)

Variable	obs	Mean	Std. Dev.	Min	Max
VALUEOFHOME	506	22.53281	9.197104	5	50

* F-Test

scalar rss_r = e(rss) = ϵ_r^2

scalar F = (506 - 13 - 1) / 13 * (rss_r - rss_u) / rss_u

display F 108.07667

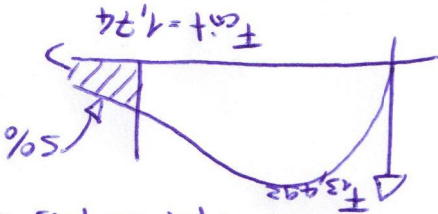
display invtail(13, 492, 0.05)

kritischer Wert

scalar pvalue = Ftail(13, 492, F)

display pvalue 6.72e-135

$\approx 0 = P\text{-Wert} < 5\%$



$\Rightarrow H_0$ ablehnen (Wenn der P-Wert kleiner als 5% ist, wird die Teststatistik in Ablehnungsbereich liegen.)

* restringierte Regression (ohne NONRETAIL, AGE)

regress VALUEOFHOME CRIMRATE RESIDENTIALZONE RIVER NOCONCENTRATION NOOFRORMS DISTANCE ACCESSSTOHIWAY TAXRATE PUPILTEACHER BLACKPEOPLE LOWERSTATUS

Source	SS	df	MS
Model	31634.9316	11	2875.90288
Residual	11081.364	494	22.4319109
Total	42716.2956	505	84.586724

Number of obs = 506
F(11, 494) = 128.21
Prob > F = 0.0000
R-squared = 0.7406
Adj R-squared = 0.7348
Root MSE = 4.7362

VALUEOFHOME	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
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CRIMRATE -0.1084133 0.0327794 -3.31 0.001 -0.1728177 -0.044009
RESIDENTIALZONE 0.0458449 0.0135227 3.39 0.001 0.0192759 0.072414
RIVER 2.718716 0.8542398 3.18 0.002 1.040325 4.397108

VALUEOFHOME	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
CRIMRATE	-.1080114	.032865	-3.29	0.001	-.1725844
RESIDENTIAL	.0464205	.0137275	3.38	0.001	.0194488
NONRETAIL	.0205587	.0614957	0.33	0.738	-.1002679
RIVER	2.686734	.8615798	3.12	0.002	.9939043
NOCENTR~N	-17.76661	3.819744	-4.65	0.000	-25.27164
NOOFR00MS	3.809865	.4179252	9.12	0.000	2.988727
AGE	.0006922	.0132098	0.05	0.958	-.0252623
DISTANCE	-1.475567	.1994547	-7.40	0.000	-1.867455
ACCESSTOHI~Y	.3060495	.0663464	4.61	0.000	.1756922
TAXRATE	-.0123346	.0037605	-3.28	0.001	-.0197233
PUPILTEACHER	-.9527473	.1308267	-7.28	0.000	-1.209795
BLACKPEOPLE	.0093117	.002686	3.47	0.001	.0040343
LOWERSTATUS	-.5247584	.0507153	-10.35	0.000	-.6244036
_cons	36.45949	5.103459	7.14	0.000	26.43223

Source	SS	df	MS
Model	31637.511	13	2433.65469
Residual	11078.7846	492	22.5178548
Total	42716.2956	505	84.586724

Number of obs = 506
F(13, 492) = 108.08
Prob > F = 0.0000
R-squared = 0.7406
Adj R-squared = 0.7338
Root MSE = 4.7453

regress VALUEOFHOME CRIMRATE RESIDENTIALZONE NONRETAIL RIVER NOCONCENTRATION
NOOFR00MS AGE DISTANCE ACCESSTOHIWAY TAXRATE PUPILTEACHER BLACKPEOPLE
LOWERSTATUS

* F-Test mit STATA → H_0 nicht ablehnen
± liegt nicht im Ablehnungsbereich
display pvalue
scalar pvalue = Fstat1(2, 492, F)
display invFtail1(2, 492, 0.05)
display F
scalar F = (506 - 13 - 1) / 2 * (rss_r - rss_u) / rss_u
* F-Test
scalar rss_r = e(rss)

Aufgabeboston.log	0.000	-4.92	3.535243	0.000	-24.32199
NOCONCENTR~N	3.801579	.4063159	9.36	0.000	3.003258
NOOFR00MS	-1.492711	.1857308	-8.04	0.000	-1.857631
DISTANCE	.2996085	.0634021	4.73	0.000	.1750374
ACCESSTOHI~Y	-.011778	.0033723	-3.49	0.001	-.0184039
TAXRATE	-.9465246	.1290656	-7.33	0.000	-1.20011
PUPILTEACHER	.0092908	.0026739	3.47	0.001	.0040372
BLACKPEOPLE	-.5225535	.0474244	-11.02	0.000	-.6157318
LOWERSTATUS	36.34115	5.067492	7.17	0.000	26.38465
_cons	46.29764	46.29764			

test NONRETAIL=AGE=0

(1) NONRETAIL - AGE = 0
(2) NONRETAIL = 0

F(2, 492) = 0.06
Prob > F = 0.9443

* LR Chi-2-Test

scalar LR = 506 * log(rss_r/rss_u)

display LR
11779429

display invchi2tail(2, 0.05)
5.9914645

scalar pvalue = chi2tail(2, LR)

display pvalue
94280373

* d) Berechne Residuen

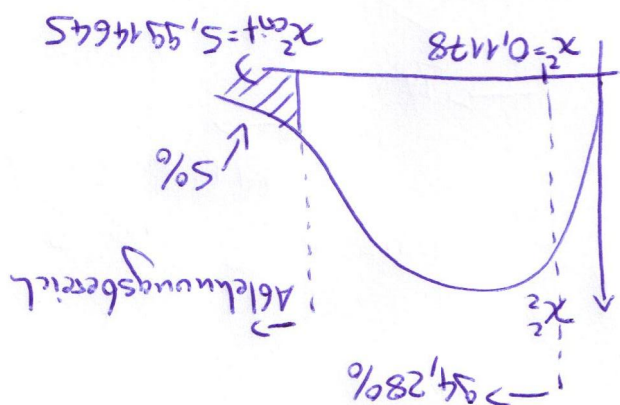
predict eps, residual

kdensity eps, scheme(s2mono) normal

* schliesse log-file

log close
log U:\einfuehrung\Aufgabeboston.log
log type: text
closed on: 7 Jun 2010, 14:21:05

Die Teststatistik χ^2 liegt nicht im Ablehnungsbereich bzw. der P-Wert ist über 5% $\rightarrow H_0$ wird akzeptiert



Es gibt eine Abweichung von der Normalverteilung, es ist aber unklar, wie "groß" diese Abweichung ist.

