

Stata Textbook Examples

Introductory Econometrics: A Modern Approach by Jeffrey M. Wooldridge (1st & 2d eds.)

Chapter 4 - Multiple Regression Analysis: Inference

Example 4.1: Hourly Wage Equation

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/WAGE1
```

```
reg lwage educ exper tenure
```

Source	SS	df	MS			
Model	46.8741805	3	15.6247268	Number of obs =	526	
Residual	101.455581	522	.194359351	F(3, 522) =	80.39	
Total	148.329762	525	.28253288	Prob > F =	0.0000	
				R-squared =	0.3160	
				Adj R-squared =	0.3121	
				Root MSE =	.44086	

lwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
educ	.092029	.0073299	12.555	0.000	.0776292	.1064288
exper	.0041211	.0017233	2.391	0.017	.0007357	.0075065
tenure	.0220672	.0030936	7.133	0.000	.0159897	.0281448
_cons	.2843595	.1041904	2.729	0.007	.0796755	.4890435

Increase in log(wage) if experience increases by 3 years

```
display _b[exper]*3
.0123
```

Example 4.2: Student Performance and School Size

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/MEAP93
```

```
reg math10 totcomp staff enroll
```

Source	SS	df	MS			
Model	2422.93434	3	807.644779	Number of obs =	408	
Residual	42394.2462	404	104.936253	F(3, 404) =	7.70	
Total	44817.1805	407	110.115923	Prob > F =	0.0001	
				R-squared =	0.0541	
				Adj R-squared =	0.0470	
				Root MSE =	10.244	

math10	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
totcomp	.0004586	.0001004	4.570	0.000	.0002613	.0006559
staff	.0479199	.039814	1.204	0.229	-.0303487	.1261884
enroll	-.0001976	.0002152	-0.918	0.359	-.0006207	.0002255
_cons	2.274021	6.113794	0.372	0.710	-9.7448	14.29284

```
reg math10 ltotcomp lstaff lenroll
```

Source	SS	df	MS			
				Number of obs =	408	
				F(3, 404) =	9.42	

Model		2930.03231	3	976.677437	Prob > F	=	0.0000
Residual		41887.1482	404	103.68106	R-squared	=	0.0654

Total		44817.1805	407	110.115923	Adj R-squared	=	0.0584

Root MSE = 10.182							

math10		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ltotcomp		21.15498	4.055549	5.216	0.000	13.18237	29.1276
lstaff		3.979981	4.189659	0.950	0.343	-4.256274	12.21624
lenroll		-1.268042	.6932037	-1.829	0.068	-2.630778	.094695
_cons		-207.6645	48.70311	-4.264	0.000	-303.4077	-111.9213

Change in math10 if enrollment increases by 1 percent

```
display _b[lenrol]/100
-.013
```

Example 4.3: Determinants of College GPA

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/GPA1
```

```
reg colGPA hsGPA ACT skipped
```

Source		SS	df	MS	Number of obs =	141	
Model		4.53313314	3	1.51104438	F(3, 137) =	13.92	
Residual		14.8729663	137	.108561798	Prob > F =	0.0000	

Total		19.4060994	140	.138614996	R-squared =	0.2336	

Adj R-squared = 0.2168							
Root MSE = .32949							

colGPA		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
hsGPA		.4118162	.0936742	4.396	0.000	.2265819	.5970505
ACT		.0147202	.0105649	1.393	0.166	-.0061711	.0356115
skipped		-.0831131	.0259985	-3.197	0.002	-.1345234	-.0317028
_cons		1.389554	.3315535	4.191	0.000	.7339295	2.045178

Example 4.4: Campus Crime and Enrollment

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/campus
```

```
reg lcrime lenroll
```

Source		SS	df	MS	Number of obs =	97	
Model		107.083654	1	107.083654	F(1, 95) =	133.79	
Residual		76.0358244	95	.800377098	Prob > F =	0.0000	

Total		183.119479	96	1.90749457	R-squared =	0.5848	

Adj R-squared = 0.5804							
Root MSE = .89464							

lcrime		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
--------	--	-------	-----------	---	------	----------------------	--

lenroll		1.26976	.109776	11.57	0.000	1.051827
_cons		-6.63137	1.03354	-6.42	0.000	-8.683206

T-statistics for testing the coefficient on lenrol equal to 1

```
scalar tvalue=(_b[lenrol]-1)/_se[lenrol]
```

```
scalar pvalue=ttail(120,tvalue)
```

```
display "T-value: " tvalue ", P=value: " pvalue
```

T-statistics: 2.45737, P=value: .00771259

```
test lenroll=1
```

```
( 1) lenroll = 1.0
```

```
F( 1, 95) = 6.04
Prob > F = 0.0158
```

Example 4.5: Housing Prices and Air Pollution

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/HPRICE2
```

```
gen ldist=log(dist)
```

```
reg lprice lnox ldist rooms stratio
```

Source	SS	df	MS			
Model	49.3987735	4	12.3496934	Number of obs =	506	
Residual	35.1834974	501	.070226542	F(4, 501) =	175.86	
Total	84.5822709	505	.167489645	Prob > F =	0.0000	
				R-squared =	0.5840	
				Adj R-squared =	0.5807	
				Root MSE =	.265	

lprice	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnox	-.95354	.1167418	-8.168	0.000	-1.182904	-.7241762
ldist	-.1343401	.0431032	-3.117	0.002	-.2190255	-.0496548
rooms	.2545271	.0185303	13.736	0.000	.2181203	.2909338
stratio	-.0524512	.0058971	-8.894	0.000	-.0640373	-.0408651
_cons	11.08387	.3181115	34.843	0.000	10.45887	11.70886

Example 4.6: Participation Rates in 401K Plans

```
use http://fmwww.bc.edu/ec-p/data/wooldridge/401K
```

```
reg prate mrate age totemp
```

Source	SS	df	MS			
				Number of obs =	1534	
				F(3, 1530) =	56.41	

Model		42666.5732	3	14222.1911	Prob > F	=	0.0000
Residual		385718.966	1530	252.103899	R-squared	=	0.0996

Total		428385.539	1533	279.442622	Adj R-squared	=	0.0978
					Root MSE	=	15.878

prate		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
mrate		5.441433	.5244086	10.376	0.000	4.412797	6.470068
age		.2694073	.0451486	5.967	0.000	.1808477	.3579669
totemp		-.0001298	.0000367	-3.535	0.000	-.0002018	-.0000578
_cons		80.29429	.7776952	103.246	0.000	78.76882	81.81975

Change in participation rate if total employment increases by 10,000

```
display _b[totemp]*10000
-1.2978125
```

Example 4.7: Effect of Job Training Grants on Firm Scrap Rates

use <http://fmwww.bc.edu/ec-p/data/wooldridge/JTRAIN>

```
summ hrsemp sales employ
```

Variable		Obs	Mean	Std. Dev.	Min	Max
hrsemp		390	14.96754	25.71064	0	163.9167
sales		373	6116327	7912603	110000	5.40e+07
employ		440	59.31591	74.12378	4	525

```
reg lscrap hrsemp lsales lemploy
```

Source		SS	df	MS	Number of obs =	135
Model		27.3075334	3	9.10251115	F(3, 131) =	4.66
Residual		256.148694	131	1.95533354	Prob > F	= 0.0040

Total		283.456227	134	2.11534498	R-squared	= 0.0963
					Adj R-squared	= 0.0756
					Root MSE	= 1.3983

lscrap		Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
hrsemp		-.0031172	.0045738	-0.682	0.497	-.0121651	.0059308
lsales		-.7265661	.2169671	-3.349	0.001	-1.155779	-.2973534
lemploy		.7457646	.2090992	3.567	0.001	.3321164	1.159413
_cons		8.800996	2.716819	3.239	0.002	3.42648	14.17551

Change in Firm Scrap Rates if training per employee increases by 1 hour

```
display _b[hrsemp]*1
-.00311716
```

Change in Firm Scrap Rates if training per employee increases by 5 hour

```
display _b[hrsemp]*5
```

-.01558579

Note: the textbook example is based on an undocumented subset of this dataset.

Example 4.8: Hedonic Price Model for Houses

Dataset is not available

Example 4.9: Parents Education in a Birth Weight Equation

use <http://fmwww.bc.edu/ec-p/data/wooldridge/BWGHT>

```
reg bwght cigs parity faminc motheduc fatheduc
```

Source	SS	df	MS	Number of obs =	1191
Model	18705.5567	5	3741.11135	F(5, 1185) =	9.55
Residual	464041.135	1185	391.595895	Prob > F =	0.0000
				R-squared =	0.0387
				Adj R-squared =	0.0347
Total	482746.692	1190	405.669489	Root MSE =	19.789

bwght	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cigs	-.5959362	.1103479	-5.401	0.000	-.8124352	-.3794373
parity	1.787603	.6594055	2.711	0.007	.493871	3.081336
faminc	.0560414	.0365616	1.533	0.126	-.0156913	.1277742
motheduc	-.3704503	.3198551	-1.158	0.247	-.9979957	.2570951
fatheduc	.4723944	.2826433	1.671	0.095	-.0821426	1.026931
_cons	114.5243	3.728453	30.716	0.000	107.2092	121.8394

Test for joint significance of motheduc and fatheduc

```
test motheduc fatheduc
```

(1) motheduc = 0.0
(2) fatheduc = 0.0

F(2, 1185) = 1.44
Prob > F = 0.2380

```
reg bwght cigs parity faminc if e(sample)
```

Source	SS	df	MS	Number of obs =	1191
Model	17579.8997	3	5859.96658	F(3, 1187) =	14.95
Residual	465166.792	1187	391.884408	Prob > F =	0.0000
				R-squared =	0.0364
				Adj R-squared =	0.0340
Total	482746.692	1190	405.669489	Root MSE =	19.796

bwght	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	

cigs	-.5978519	.1087701	-5.50	0.000	-.8112549	-.3844489
parity	1.832274	.6575402	2.79	0.005	.5422035	3.122345
faminc	.0670618	.0323938	2.07	0.039	.0035063	.1306173
_cons	115.4699	1.655898	69.73	0.000	112.2211	118.7187

Example 4.10: Salary-Pension Tradeoff for Teachers

use <http://fmwww.bc.edu/ec-p/data/wooldridge/MEAP93>

reg lsalary bensal lenrol lstaff droprate gradrate

Source	SS	df	MS	Number of obs = 408		
Model	3.49912092	5	.699824185	F(5, 402)	=	45.43
Residual	6.19292056	402	.015405275	Prob > F	=	0.0000
				R-squared	=	0.3610
				Adj R-squared	=	0.3531
Total	9.69204149	407	.02381337	Root MSE	=	.12412

lsalary	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
bensal	-.5893175	.1648739	-3.574	0.000	-.9134402	-.2651948
lenroll	.0881206	.007324	12.032	0.000	.0737224	.1025187
lstaff	-.2182771	.0499504	-4.370	0.000	-.3164737	-.1200806
droprate	-.0002826	.0016145	-0.175	0.861	-.0034565	.0028913
gradrate	.0009674	.0006625	1.460	0.145	-.0003351	.0022699
_cons	10.73846	.2582652	41.579	0.000	10.23074	11.24618

reg lsalary bensal lenrol lstaff

Source	SS	df	MS	Number of obs = 408		
Model	3.41865698	3	1.13955233	F(3, 404)	=	73.39
Residual	6.27338451	404	.015528179	Prob > F	=	0.0000
				R-squared	=	0.3527
				Adj R-squared	=	0.3479
Total	9.69204149	407	.02381337	Root MSE	=	.12461

lsalary	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
bensal	-.6047698	.1653685	-3.657	0.000	-.9298599	-.2796797
lenroll	.0873968	.0073462	11.897	0.000	.0729552	.1018385
lstaff	-.2220324	.0500774	-4.434	0.000	-.3204773	-.1235875
_cons	10.84383	.2516434	43.092	0.000	10.34914	11.33853

reg lsalary bensal

Source	SS	df	MS	Number of obs = 408		
Model	.390608607	1	.390608607	F(1, 406)	=	17.05
Residual	9.30143288	406	.022909933	Prob > F	=	0.0000
				R-squared	=	0.0403
				Adj R-squared	=	0.0379
Total	9.69204149	407	.02381337	Root MSE	=	.15136

lsalary	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
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bensal		-.8253933	.199895	-4.129	0.000	-1.218352	-.4324349
_cons		10.52318	.0415602	253.203	0.000	10.44148	10.60488

This page prepared by Oleksandr Talavera (revised 8 Nov 2002)

Send your questions/comments/suggestions to Kit Baum at baum@bc.edu
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