

Handout seminar 5, ECON4150

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March 11, 2013

There are no new commands to learn for this seminar, we can again recycle what we have already learnt. More specifically, it would be a good idea to consult the seminar 3 handout on how to create a lagged variable. Apart from that, we are not asked to do anything else than simple regressions in Stata.

```
gen loljespotpris = ln(oljespotpris)
gen loljespotpris_1 = loljespotpris[_n-1]

gen lsp500_aksjeindeks = ln(sp500_aksjeindeks)
gen lsp500_aksjeindeks_1 = lsp500_aksjeindeks[_n-1]

gen r_at = loljespotpris - loljespotpris_1
gen r_mt = lsp500_aksjeindeks - lsp500_aksjeindeks_1

reg r_at r_mt
```

Source	SS	df	MS	Number of obs =	182
Model	.000887734	1	.000887734	F(1, 180) =	0.76
Residual	.21003037	180	.001166835	Prob > F =	0.3842
Total	.210918104	181	.001165293	R-squared =	0.0042
				Adj R-squared =	-0.0013
				Root MSE =	.03416

r_at	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
r_mt	-.1731595	.1985225	-0.87	0.384	-.5648901 .2185711
_cons	.0064819	.0025366	2.56	0.011	.0014766 .0114872

```
reg ya zb
```

Source	SS	df	MS			
Model	34.9725025	1	34.9725025	Number of obs =	100	
Residual	32.3421121	98	.330021552	F(1, 98) =	105.97	
Total	67.3146146	99	.679945602	Prob > F =	0.0000	
				R-squared =	0.5195	
				Adj R-squared =	0.5146	
				Root MSE =	.57448	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
zb	.5806058	.0564013	10.29	0.000	.4686793	.6925324
_cons	49.94871	.0574487	869.45	0.000	49.8347	50.06271

```
reg ya za
```

```
predict ehat1, residuals
```

```
reg zb za
```

```
predict ehat2, residuals
```

Source	SS	df	MS			
Model	.776463569	1	.776463569	Number of obs =	100	
Residual	66.538151	98	.678960725	F(1, 98) =	1.14	
Total	67.3146146	99	.679945602	Prob > F =	0.2875	
				R-squared =	0.0115	
				Adj R-squared =	0.0014	
				Root MSE =	.82399	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
za	.0998799	.0933985	1.07	0.288	-.0854664	.2852262
_cons	49.95188	.0824015	606.20	0.000	49.78836	50.1154

Source	SS	df	MS			
Model	26.7817814	1	26.7817814	Number of obs =	100	
Residual	76.9624359	98	.785330979	F(1, 98) =	34.10	
Total	103.744217	99	1.04792139	Prob > F =	0.0000	
				R-squared =	0.2582	
				Adj R-squared =	0.2506	
				Root MSE =	.88619	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
za	-.5865936	.1004486	-5.84	0.000	-.7859306	-.3872566
_cons	.0105495	.0886215	0.12	0.905	-.1653169	.1864159

Note: The prediction has to be done *after* the regression itself (else Stata won't

know which regression you want a prediction from!), so in Stata write first regress var1 var2, then predict whatever needs to be predicted.

```
reg ehat1 ehat2
```

Source	SS	df	MS			
Model	54.5506146	1	54.5506146	Number of obs =	100	
Residual	11.987537	98	.122321806	F(1, 98) =	445.96	
Total	66.5381516	99	.672102542	Prob > F =	0.0000	
				R-squared =	0.8198	
				Adj R-squared =	0.8180	
				Root MSE =	.34975	

ehat1	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ehat2	.8418998	.0398669	21.12	0.000	.7627853	.9210144
_cons	-1.25e-09	.0349745	-0.00	1.000	-.0694058	.0694058

Note: Now we have use of the residuals we predicted earlier. Consult the *Frisch Waugh-theorem*. It allows us to do the regression between the two estimated residuals from the two preceding regressions, and the coefficient we will get from this regression is the same as the coefficient we would get were we to conduct the *bivariate* (multiple) regression instead. Hence, we can find the unknown coefficient for Z_b by using the theorem and find the coefficient between the two residuals instead.

```
reg ya za zb
```

Source	SS	df	MS			
Model	55.3270775	2	27.6635388	Number of obs =	100	
Residual	11.9875371	97	.123582857	F(2, 97) =	223.85	
Total	67.3146146	99	.679945602	Prob > F =	0.0000	
				R-squared =	0.8219	
				Adj R-squared =	0.8182	
				Root MSE =	.35154	

ya	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
za	.593733	.0462636	12.83	0.000	.5019126	.6855534
zb	.8418998	.0400719	21.01	0.000	.7623682	.9214314
_cons	49.943	.0351579	1420.53	0.000	49.87322	50.01278

Note: This is the *bivariate* regression, and notice the coefficient for Z_b , which is similar to the one from the previous regression. This is not a coincidence, owing to the *Frisch Waugh-theorem*.

```
reg za zb
```

Source	SS	df	MS			
Model	20.0927956	1	20.0927956	Number of obs =	100	
Residual	57.7403897	98	.58918765	F(1, 98) =	34.10	
				Prob > F =	0.0000	
				R-squared =	0.2582	
				Adj R-squared =	0.2506	
				Root MSE =	.76759	
Total	77.8331853	99	.786193791			

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
zb	-.4400867	.0753607	-5.84	0.000	-.5896375	-.2905359
_cons	.0096148	.0767602	0.13	0.901	-.1427133	.1619428

```
corr(za zb)
```

	za	zb
za	1.0000	
zb	-0.5081	1.0000