

Economics 312
Daily Problem #7

Spring 2012
Adjusted due date: February 13

In Daily Problem #6, we considered the following linear wage regression:

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. reg wage educ
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Source	SS	df	MS	Number of obs	=	1000
Model	28794.2878	1	28794.2878	F(1, 998)	=	211.66
Residual	135771.14	998	136.043226	Prob > F	=	0.0000
				R-squared	=	0.1750
				Adj R-squared	=	0.1741
Total	164565.428	999	164.730158	Root MSE	=	11.664

wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
educ	1.980288	.1361174	14.55	0.000	1.713178 2.247397
_cons	-6.710328	1.914156	-3.51	0.000	-10.46656 -2.954096

The estimated covariance matrix of the regression coefficients, saved by Stata as $e(V)$ and shown by the Stata command matrix list $e(V)$, is

	educ	_cons
educ	.01852794	
_cons	-.25566703	3.6639926

1. Verify that the standard errors of the two coefficients as reported in the regression table are the square roots of the diagonal elements of the estimated covariance matrix of the coefficients.
2. According to HGL's equation (2.22), the covariance between the intercept and the slope coefficients is negative if $\bar{x} > 0$. Explain the intuition of this: if we underestimate the slope, why would we tend to overestimate the intercept (and vice versa) and why does this depend on the mean of x being positive?
3. Follow the logic of HGL's section 3.6 to examine the one-tailed alternative hypothesis that the predicted wage of a college graduate ($\text{educ} = 16$) from this population is greater than 20.