

Economics 312
Daily Problem #13

Spring 2014
February 20

This problem uses a variant on the wage/education relationship using the log of wage, so that a change of 0.01 in the dependent variable is approximately an increase of 1% in the wage. Here is the simple regression of log(wage) on education:

```
. reg lwage educ
```

Source	SS	df	MS			
Model	60.015841	1	60.015841	Number of obs =	1000	
Residual	276.76489	998	.27731953	F(1, 998) =	216.41	
Total	336.780731	999	.337117849	Prob > F =	0.0000	
				R-squared =	0.1782	
				Adj R-squared =	0.1774	
				Root MSE =	.52661	

lwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
educ	.0904082	.0061456	14.71	0.000	.0783484	.1024681
_cons	1.609444	.0864229	18.62	0.000	1.439853	1.779036

Adding three regional dummy variables to the regression (the East region is omitted) yields

```
. reg lwage educ midwest south west
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Source	SS	df	MS			
Model	63.7111173	4	15.9277793	Number of obs =	1000	
Residual	273.069614	995	.274441823	F(4, 995) =	58.04	
Total	336.780731	999	.337117849	Prob > F =	0.0000	
				R-squared =	0.1892	
				Adj R-squared =	0.1859	
				Root MSE =	.52387	

lwage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
educ	.0904304	.006124	14.77	0.000	.0784129	.1024479
midwest	-.1313871	.0487029	-2.70	0.007	-.2269593	-.035815
south	-.0523116	.046397	-1.13	0.260	-.1433588	.0387357
west	.0332736	.0487333	0.68	0.495	-.0623583	.1289056
_cons	1.648171	.092581	17.80	0.000	1.466494	1.829847

1. Interpret the coefficients of the three dummy variables and their individual t statistics. (What economic hypothesis does each of these t tests test?)
2. How could you use Stata to test whether wages are lower in the South than in the West?
3. Use the SSE form of the F test in HGL's equation (6.4) to test the null hypothesis that region does not matter, *i.e.*, $H_0: \beta_3 = 0, \beta_4 = 0,$ and $\beta_5 = 0$ against $H_1: \beta_3 \neq 0$ or $\beta_4 \neq 0$ or $\beta_5 \neq 0$ in the regression $\ln(\text{wage}) = \beta_1 + \beta_2 \text{educ} + \beta_3 \text{midwest} + \beta_4 \text{south} + \beta_5 \text{west} + e$.