HW 4 EE 325 Answers

Gujarati, D.N. (2009) Basic Econometrics. 5th ed. Singapore, McGraw-Hill.

Chapter 9 Questions 9.1, 9.2, 9.3, and 9.29

9.1
(*a*) If the intercept is present in the model, introduce 11 dummies. If the intercept is suppressed, introduce 12 dummies.

(*b*) If the intercept is included in the model, introduce 5 dummies, but if the intercept is suppressed (i.e., regression through the origin), introduce 6 dummies.

9.2
(a) As per economic theory, the coefficients of X2, X5 are expected to be positive and that of X3, X8, and X9 are expected to be negative. The coefficient of X4 could be positive or negative, depending on wife's age and the number of children. Perhaps an interactive dummy of age and children under 6 or between 6 and 13 might shed more light on the relationship between age and desired hours of work.

(b) Holding all other factors constant, one would expect that desired hours of work would be higher than the (common) intercept value of 1286 hours. This coefficient, however, has a negative sign. However, since it is not statistically significant, we can say little about the impact of X6 on (average) Y. As for X7, its coefficient is expected to be positive, which it is. Not only that, it is statistically significant, as the t value is quite high.

(c) Perhaps, this is due to collinearity between age and education, as well as collinearity of these variables with number of children. Also, notice that the model does not include years of schooling completed by husband.

9.3
(a) The relationship between the two variables is expected to be negative, for if the unemployment rate is high, indicating slackness in the labor market, employers are less likely to advertise job vacancies.

(b) It is 3.8998 (=2.7491+1.1507). Since the dummy coefficient is statistically significant, the unemployment rate post 1966 4th quarter is statistically higher than it was in the pre-1964 4th quarter period.

(c) Since the differential dummy coefficient is just about significant at the 5% level, we could say that the slopes of the regression function in the two periods are different.

(d) Most probably yes. By making unemployment benefits more generous, the government reduces the opportunity cost of remaining unemployed.

9.29
(a)

Source	SS	df	MS	Number of obs =	114
				F(8, 105) =	13.12
Model	39.3767288	8	4.9220911	Prob > F =	0.0000
Residual	39.3911662	105	.375153964	R-squared =	0.4999
				Adj R-squared =	0.4618
Total	78.767895	113	.697061018	Root MSE =	.6125

lnwi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
age	.0300112	.0047349	6.34	0.000	.0206228	.0393996
dsex	-.5878966	.1452119	-4.05	0.000	-.8758249	-.2999682
de2	.0381515	.1923389	0.20	0.843	-.3432211	.4195241
de3	.3593484	.2114815	1.70	0.092	-.0599803	.7786772
de4	1.757512	.621087	2.83	0.006	.5260109	2.989012
de2dpt	.399618	.3276193	1.22	0.225	-.2499905	1.049227
de3dpt	.438133	.3108017	1.41	0.162	-.1781292	1.054395
de4dpt	-1.199202	.6778215	-1.77	0.080	-2.543197	.1447928
_cons	3.688426	.1757925	20.98	0.000	3.339862	4.03699

Based on the p-values of the new terms, there doesn't really appear to be a significant interaction between the education level and job type (permanent or temporary). The last variable, combining the highest education level with job type, however, is marginally significant with a *p value* of 0.080.

(b) To assess the difference between workers with an education level up to primary and those without a primary education, we will look at both the dummy variable DE2 and the interaction term DE2_DPT. Neither are significant (based on the high *p values*). For workers with a secondary education, look at DE3 and DE3_DPT *p values*, neither of which are significant at the standard 5% level. For the difference between those with an education level beyond secondary and those without a primary level of education, however, there does seem to be a significant difference in the intercept term (the *p value* for DE4 is 0.0056). This is not surprising considering it represents the most extreme disparity in education levels in this dataset.

(c) Having deleted the dummy variables, but retaining the interaction terms, the regression results are now the following:

Source	SS	df	MS	Number of obs =	114
				F(5, 108) =	17.60
Model	35.3635071	5	7.07270141	Prob > F =	0.0000
Residual	43.4043879	108	.401892481	R-squared =	0.4490
				Adj R-squared =	0.4234
Total	78.767895	113	.697061018	Root MSE =	.63395

lnwi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
age	.0299581	.0047524	6.30	0.000	.0205381	.0393781
dsex	-.632527	.1487523	-4.25	0.000	-.92738	-.3376741
de2dpt	.3683329	.2925221	1.26	0.211	-.2114966	.9481623
de3dpt	.7347649	.2514172	2.92	0.004	.2364123	1.233117
de4dpt	.515768	.2975022	1.73	0.086	-.073933	1.105469
_cons	3.759603	.1666903	22.55	0.000	3.429194	4.090012

Now we see a slightly different result: the interaction term between the secondary education level and job type (DE3_DPT) is very statistically significant. That between education level past secondary and job type (DE4_DPT) is marginally significant, but that between primary level and job type is not. This is not surprising after having deleted the dummy variables; the differences between the education levels is now being picked up in the interaction terms instead.