

EE 325 HW 5 ANSWERS

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

Chapter 9

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.

9.8

(a) Neglecting the dummies for the moment, since this is a double log regression, each estimated slope coefficient represents an elasticity. Thus, if X2 (the total number of offices or branches in a bank), increase by 1%, on average, the FDIC examiner hours go up by about 0.22 percent, perhaps reflecting some economies of scale. Other coefficient of the logged X variables are to be interpreted similarly. A priori, all the logged X coefficients are expected to be positive, which they are.

(b) & (c): Take the antilog of each estimated coefficients attached to a dummy variable and subtract 1 from it. Multiply the difference by 100, which will then give the percentage change in the regressand when a dummy variable goes from state 0 to state 1. For example, consider the coefficient of D4, which is -0.2572. Taking the antilog of this number, we get 0.7732. Subtracting 1 from this, and multiplying by 100, we get -22.68%. Thus, when the examination is conducted jointly with the state, FDIC examination hours go down by about 23 percent. Other dummy coefficients are to be interpreted similarly.

9.9

(a) & (c): *Ceteris paribus*, if the expected inflation rate goes up by 1 percentage point, the average Treasury bill rate (TB) is expected to go down by about 0.13 percentage point, which does not make economic sense. However, the TB coefficient is not statistically significant, as its t value is only -1.34. If the unemployment rate goes up by 1 percentage point, the average TB rate is expected to go down by about 0.71 percentage point. This coefficient is statistically significant, as its t value is -4.24. It also makes economic sense, as a higher unemployment rate means slowing down of the economy and the Fed would probably reduce the TB rate to revive the economy. If the change in the monetary base goes up by a unit, on average, the TB rate is expected to go down, as an increase in the monetary base, via the multiplier effect, leads to an increase in the money supply, which will have the effect of reducing the interest rate, *ceteris paribus*. The lagged value of Y is positive and statistically significant. This lagged value takes into account the dynamics of change, a topic discussed in the chapter on distributed lag models.

(b) In late 1979 the then Governor of the Federal Reserve System, Paul Volker, changed monetary policy from interest rate targeting to monetary base targeting, the objective being to reduce the comparatively high rate of inflation then prevailing in the US economy. By tightening the monetary base, which lead to increases in the TB rate, the inflation rate was subsequently brought down considerably. Incidentally, note that the dummy coefficient is statistically significant.

9.16

(a) 2.4%.

(b) Since both the differential intercept and slope coefficients are highly significant, the levels as well the growth rates of population in the two periods are different. The growth rate for the period before 1978 is 1.5% and that after 1978 it is 2.6% ($= 1.5\% + 1.1\%$).

9.29

(a)

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

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

Inwi	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.