Econ 466, Fall 2003
Midterm Examination 2
Total: 100 points
Time: 1 hour and 15 minutes

Note: Answer all questions. Write clearly and legibly. Good Luck!!

F values at the 5% level: F(3,40) = 2.8387; F(2,40) = 3.2317; F(3,27) = 3.3541

1. A labor economist estimated the following model

$$\ln W = \beta_0 + \beta_1 S + \beta_2 N + \beta_3 N^2 + u \,.$$

Using **44 observations** she obtained the estimated regression function

$$\ln \hat{W} = \underset{(0.113)}{7.71} + \underset{(0.005)}{0.094}\, S + \underset{(0.009)}{0.023}\, N - \underset{(0.000187)}{0.000325}\, N^2, \; R^2 = 0.337$$

where $\ln \hat{W}$ = the natural log of earnings, S = years of schooling, and N = years of experience. Standard errors are in parentheses.

(i) Test the hypothesis (state the null and alternative hypotheses) that schooling has no effect on earnings. **(6 points)**

(ii) Test the hypothesis (state the null and alternative hypotheses) that neither schooling nor experience has any effect on earnings. **(8 points)**

(iii) Describe how you would test the hypothesis that experience has no effect on earnings. **(8 points)**

(iv) Derive the expressions for the elasticity of earnings with respect to schooling and experience. What additional information, if any, do you need to compute these elasticities? **(10 points)**

(v) To predict lnW and E(lnW) when S = 10 and N = 10, she ran the above regression slightly differently, and obtained the following result.

$$\ln \hat{W} = \underset{(0.436)}{8.8475} + \underset{(0.005)}{0.094}(S-10) + \underset{(0.009)}{0.023}(N-10) - \underset{(0.000187)}{0.000325}(N-10)^2, \; R^2 = 0.337$$

Predict lnW and E(lnW) when S = 10 and N = 10. Also compute the standard errors of these predicted values. **(10 points)**

2. Using data on **34 observations**, the following model (Model A) was estimated.

$$\ln Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 X_3 + u,$$

where Y = per-capita new car sales, X_1 = new car price, X_2 = per-capita income, X_3 = interest rate. In addition, two other models are estimated using season dummies (that take a value of 1 in the corresponding quarter and 0 otherwise). The regression results for these 3 models are reported in the following table.

	Model A		**Model B**		**Model C**	
Variable	Coeff	Std.err.	Coeff	Std.err.	Coeff	Std.err.
Intercept	-31.85	6.12	-33.35	5.92	-32.58	5.89
$\ln X_1$	-1.75	0.24	-1.25	0.021	-1.76	0.017
$\ln X_2$	4.73	1.04	4.93	0.981	4.81	0.871
X3	-0.29	.052	-0.27	0.049	-0.19	0.056
Spring			0.092	0.043	0.125	0.034
Summer			-0.051	.0048	--	--
Fall			-0.049	0.029	--	--
R^2	.748	--	.834	--	.818	--
$\bar{R}^2$		--		--		--

(a) Interpret the coefficients of $\ln X_1$, $\ln X_2$, X_3 in **Model A**. **(9 points)**

(b) Interpret the coefficients of Spring, Summer and Fall dummies in **Model B**. **(12 points)**

(c) Interpret the coefficients of the Spring dummy in **Model C**. **(4 points)**

(d) Compute $\bar{R}^2$ for **Models A, B** and **C**. **(9 points)**

(e) Which model would you choose as the best model and why? **(4 points)**

(f) You want to test the hypothesis that there are no seasonal differences in sales. How would you test such a hypothesis, given the information in the above table? Explain. **(8 points)**

(g) You want to test whether price elasticity (β_1) is different across seasons. Starting from **Model B**, write down another model that will enable you to test for this. Write down the null and alternative hypotheses and describe the testing procedure step by step. **(12 points)**