ECON3500

Assignment 6

(Due Apr. 12 Th)

You can do this assignment in groups (no more than 5 people). If you do, please only submit one copy with all the names of your group members.

This is a hands-on assignment, please use copy/paste for your Eviews output (so I can read them). If you use programs other than Eviews, please also show me screen shots of the command window.

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This laboratory assignment is an exercise in the detection and correction of heteroskedasticity.
Several years ago, an airplane pilot took econometrics, and for his project he estimated a hedonic model of the determinants of used, single-engine airplane prices in the year 2000. This lab uses data from his project as the basis for an exercise in the detection and correction of heteroskedasticity. The dataset, PLANES10, consists of the variables in Table 10.3.

Step 1: Use the Data to estimate the Model with OLS
Use lnpricei as the dependent variable and use all the other variables in Table 10.3 as independent variables in your regression.

1. Which variables have coefficients that are significant in the expected direction at the 5-percent level?
2. Explain the meaning of all the estimated slope coefficients.

Step 2: Multicollinearity Concerns

1. Could severe imperfect multicollinearity account for any of the coefficients being insignificant at the 5-percent level?
2. If so, which ones? Use simple correlation coefficients and VIFs to support your answer.

Step 3: Heteroskedasticity Concerns

1. Plot the residuals from your OLS regression against the passenger capacity.
2. Do the residuals look heteroskedastic? Explain.

Step 4: Conduct a Breusch–Pagan Test for Heteroskedasticity
Use all the right-hand variables in the original model to run the Breusch– Pagan auxiliary regression. Write the null and alternative hypotheses, compute the test statistic, and conduct the test at the 5-percent level. Does heteroskedasticity appear to be present?

Step 5: Conduct a White test for heteroskedasticity
Test the regression in Step 1 at the 5-percent level for heteroskedasticity using the White test. Use the White test command in your regression package to run the auxiliary regression and to calculate the test statistic.

1. How many variables are on the right-hand side of the auxiliary regression?
2. What is the chi-square critical value?
3. According to the White test, does there appear to be heteroskedasticity in the model?

Step 6: Estimate the equation with heteroskedasticity-Corrected Standard errors

Re-estimate the model in Step 1 with heteroskedasticity-corrected standard errors, also known as White standard errors. Are the coefficients and adj R^2 the same?

Step 7: Compare the results
Compare the OLS results from Step 1 with the heteroskedasticity-corrected results in Step 6.

1. For how many of the coefficients are the heteroskedasticity- corrected standard errors larger than the OLS standard errors?
2. Doesn't this make the equation worse? If so, why bother to estimate the heteroskedasticity-corrected errors?

Table 10.3 Variable Listing

Variable	Description	Hypoth. Sign of Coef.
$lnprice_i$	Natural log of the price in dollars for used, basic single-engine aircraft i	n/a
$lnceiling_i$	Natural log of the service ceiling, or the highest possible altitude plane i can fly, in feet	+
$lncruise_i$	Natural log of the cruising speed in miles per hour of airplane i	+
$lnhorse_i$	Natural log of horsepower of the engine of airplane i	+
$fixgear_i$	Equal to 1 if aircraft i's landing gear is fixed (not retractable), 0 otherwise	−
$lnfuel_i$	Natural log of the volume of the fuel tank of aircraft i, in gallons	+
$pass_i$	The number of passengers aircraft i can accommodate during flight	+
$tdrag_i$	Equal to 1 if aircraft i is a tail dragger, 0 otherwise *(A tail dragger is an aircraft that has a wheel connected to its tail—hence, a tail dragger.)*	−
$wtop_i$	Equal to 1 if aircraft i has wings above the fuselage, 0 otherwise	−
$lnage_i$	Natural log of the age in years of aircraft i	−