GSBA 545 Group Project Information

due Tuesday, December 17, 2019 before the exam (4:30pm) on Blackboard

What factors influence the price of industrial real estate? Dick Nelson, manager of Gary plant is considering relocating the Release Ease chemical plant to Southern California to supply Release Ease chemicals to Reliant Chemicals, Ltd. (Refer to the posted case). Dick's calculations showed the proposal would be profitable if Applichem could buy the right "industrial estate" for the right price, move the plant, and upgrade the plant. Nelson started researching the potential locations for the new plant and found that the recent rapid growth in the area east of Los Angeles and in San Bernardino County near the Ontario Airport had many "ready-to-move-in" industrial real estate properties. Many of the nearby cities have a good pool of skilled workers readily available to hire. Dick was surprised to learn the cost of hiring skilled workers in California was comparable to his workers' pay. His initial conclusion was that Applichem needs to find the right real estate for the right price for the new project to have a positive NPV and an ROI larger than the current ROI of the Gary plant. The property needs to have a lot size of at least 100,000 sqft, a building area of at least 30,000 sqft, easy access to major freeways, and be built of the right construction.

To value the potential properties appropriately, Dick Nelson has hired New Insights, LLC as industrial real estate consultants. New Insights real estate analyst Richard Wang collected a sample of 57 sales of industrial real estate properties that were sold recently in L.A. County and San Bernardino County that met the requirements of Applichem as potential sites to buy.

Dick Nelson was concerned about the method used by Richard Wang and called him to discuss the matter further. Wang convinced him, stating that the data consisted of sales that are considered a representative sample, which permitted the use of a statistical technique known as regression analysis. This is defined as "a method that examines the relationship between one or more independent variables and a single dependent variable by plotting points on a graph; used to identify and weight analytical factors and to make forecasts." (Appraisal Institute. The Dictionary of Real Estate Appraisal, 3rd ed. Chicago: Appraisal Institute, 1993, p 299).

Richard further stated that the valuation of industrial real estate depends on seven independent variables that are considered important in the valuation of industrial buildings. These variables are:

Price: List price of property in $US.
Building Size: Size of building in square feet.
Miles to Freeway: Distance to nearest Freeway in miles.
Building Age: Age of building in years.
Exterior Wall: Measure of metal to masonry. Metal exterior walls are rated at 1.00 and all masonry at 2.00. If the wall is 50% metal and 50% masonry, it is rated at 1.50.
Ceiling Height: Height of ceiling in feet.
Lot Size: Size of lot in square feet.

In addition, the following two variables are added to enrich the data:

Facilities Score: As part of the appraisal, a score was created for each property ranging from 0 to 1, 0 is the lowest score and 1 is the highest score.
Location: Los Angeles County or San Bernardino County

Your goals are to

1. Analyze the data by building Multiple Linear Regression models.
2. Choose the *best* model for predicting the price of real estate.
3. Select the best property of the seven at the bottom of the dataset to buy and explain why you chose it.

Guidelines for Group Project

General Instructions

Use this outline as a guide in the preparation of and writing the report of your Group project. When needed, please use a significance level of $\alpha = 0.05$. The final report should be no more than 10 pages in length.

A. Title Page (Executive Summary) with team members' name, group name.
   A page which describes your group project and key results, the reader of this page will be an executive in a company so keep it simple and avoid too many technical terms. Which of the seven properties should you buy or bid on? What price should be offered?

B. Introduction
   The beginning of the body of the report which orients the reader with the problem and gives necessary background and motivation for the project.

C. Data
   Describe all your variables. Data may be summarized in graphs, charts, etc. Explain the summary statistics (mean, median etc.,), correlations, and key observations, like outliers etc., of the variables.

D. Analysis
   1. What was your initial model, with all the variables?
      - Include your output and assess the following: estimated regression equation (intercept and slopes), R-squared value, standard error of estimate.
      - Is your model statistically significant overall? Cite something from the output for your answer.
      - Are all of your variables statistically significant? Cite an output value for your answer.
      - Do you detect any violation of the *constant variance* assumption? Why or why not?
      - Provide a point estimate and an appropriate interval to predict the price of the seven potential properties at the end of the data.

   2. Provide an outline of steps you took to arrive at a final model from the initial one. Address any topics we covered in class and include any suggestions for improving your model.

   3. What is your final regression model? Why do you think this is the best model? Answer the following questions:
      - Include your output and assess the following: estimated regression equation (intercept and slopes), R-squared value, standard error of estimate.
      - Is your model statistically significant overall? Cite something from the output for your answer.
      - Are all of your variables statistically significant? Cite an output value for your answer.
      - Do you detect any violation of the *constant variance* assumption? Why or why not?
      - Provide a point estimate and an appropriate interval to predict the price of the seven potential properties at the end of the data.

E. Conclusion
   Provide a detailed concluding statement and your recommendation. Indicate insights you obtained which were not obvious.

F. Appendix
   Include all *relevant* printouts. I want to see the two regression models and the best model. Attach summary statistics and graphs.