

University of Central Florida
College of Business

QMB 6912
Capstone Project in Business Analytics

Problem Set #6

Due Date: Sunday, 5 March 2023, at 11:59 PM.

Use hedonic price theory to estimate the price an agent could expect to derive from sales of houses to homeowners or to real estate investors in the rental market. In particular, select the feature variables (covariates) that you would use as characteristics, and build a series of regression models. Consider any interactions of variables in your model and generate any new variables necessary to incorporate these into your regression model. Use the results of your previous analysis to inform your specification decisions.

First, analyze the entire sample, including homes occupied by their owners and those held as rental properties. Run regressions for your proposed specifications using the data from `HomeSales.dat`. Determine which specifications are supported by the data and cite specific statistics when drawing conclusions. Remove any variables that are statistically insignificant to pare down your model until all remaining variables have a statistically significant effect. Explain your recommended regression model and provide an interpretation of the estimated regression coefficients.

Next, split the sample into two parts, one for each type of buyer. Build a separate regression model for homes sold to be occupied by owners and another model for homes sold as rental properties. In each analysis, exclude any variables that do not appear relevant for the type of buyer. Conversely, include any variables that seem relevant, including those not included in the full sample. You might start each model-building exercise from a full set of variables, regardless of the form of your final model from the full sample.

Perform a statistical test that the price is best explained by separate models for each type of buyer against the null hypothesis that the two models are the same. That is, calculate the F -statistic to test that the coefficients are equal.

Compare the separate models for each type of buyer. Note any differences in the coefficients on variables included in both models and any variables included or excluded.

Prepare and compile your work in \LaTeX and include scripts for any of the calculations in R. In particular, create the following directory structure, separate from your existing work:

- Code/
- Data/
- Figures/
- Tables/
- Text/
- Paper/
- Misc/

In a file called `README.md`, which should also live in the directory containing the above folders, provide the instructions concerning how to run the executable shell script `DoWork.sh` (in the same directory) that will execute the code that produced all of the answers collected and documented in your report, which will live in the subdirectory `Paper/`. In the subdirectory `Code/`, keep the R code; in `Data/` keep the raw data file you downloaded, so that `DoWork.sh` can load it into R, and in `Figures/` keep any figures you created for your answers. Similarly, keep any \LaTeX scripts for tables in the `Tables/` folder. You may put any written text in the `Text/` folder, if not already included in a `tex` file in your `Paper/` folder. Put anything else in the subdirectory `Misc/`. I should then be able to replicate all of your work simply by typing

- `$./DoWork.sh`

on the command line of a terminal window.

To provide you a template, which makes preparation easier for you and grading easier for me, I have placed sample \LaTeX and R code in the GitHub repository for the course: `QMB6912S23`, under my GitHub username `LeeMorinUCF`; pull this repository and use these files a framework within which to create the answers for this problem set. Push the files to a folder on your GitHub repository and I will pull your submissions to my computer for grading.

Be sure to support your calculations with descriptions of what you were trying to do (for example, in comments in your R code as well as in the \LaTeX explanations) because partial credit will be given.

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