

Using JMP to Teach Business Statistics Courses

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Introduction

I've begun writing a collection of cases that use JMP to teach statistics to business students. "Case" means that a business or economic scenario and data set are posed to students, who are then challenged to use the data to enlighten the business problem. The scenarios and data come from real or realistic business settings designed to overcome a common student phobia of statistics as an unneeded and torturous core course.

The cases contain both cross-sectional and time-series data sets, so that students become familiar with methods appropriate to each. The topical coverage of the collection includes marketing, real estate, non-profit strategic management, human resources management, macroeconomics, and operations management. The statistical coverage in the collection includes topics generally seen in today's MBA statistics curriculum: descriptive statistics and graphs, sampling distributions, one- and multi-sample means tests and confidence intervals, forecasting, model building with simple and multiple regression, and data mining.

Each of the cases in the collection follows a standard format: the problem and task is outlined and the data set characteristics are detailed. A step-by-step analysis of the data follows. To highlight the message that we do statistics for a reason, each case ends with a summary of what management has learned from the analysis of the data.

Why JMP?

Many different kinds of statistical software can be found in the business school statistics classroom. Few can rival the extensive visual and graphical capabilities of JMP. This is particularly critical when teaching students of limited technical background. Business students in particular gravitate toward JMP's dynamic linking, three-dimensional spinning plots, leverage plots, and Graph Builder, to name a few.

An Illustrative Case: Housing Prices

Given the selling prices and physical characteristics of houses located in and around a U.S. ski resort town, students are prompted to discover which factors statistically influence selling prices and to ascertain whether certain houses are statistically under- or over-priced. Exploratory data analysis using JMP's dynamic plot-linking reveals unexpected results; e.g., that houses with the largest garage capacity are only moderately priced (see Figure 1). The analysis reveals the need for scaling of the dependent variable into selling price per square foot. JMP's scatterplot matrix provides an ideal backdrop for illustrating the presence of multicollinearity in a regression model containing two location-based predictor variables (Miles to Base and Miles to Resort in Figure 2).

Residual analysis confirms the regression model assumptions, yet several houses are shown to be leveraged or influential. Studentized residuals identify a handful of over-priced houses, but none that are statistically under-priced. The model-building produces a regression equation useful for predicting selling prices per square foot of other houses soon to be on the market. The case concludes with a discussion of the limitations of that predictive model—that many qualitative aspects of a house, so important to purchasing decisions, were not included in the data set.

Figure 1. Dynamic Linking of Housing Prices and Garage Capacity

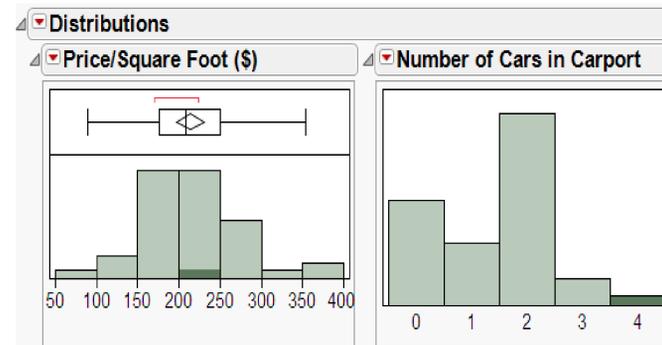
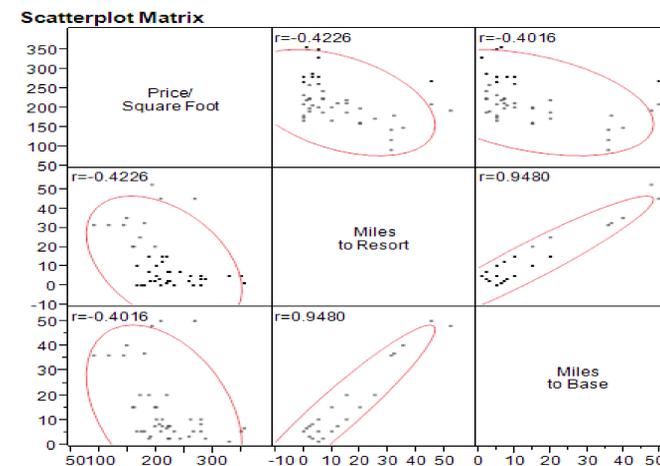


Figure 2. Multicollinearity Diagnosis



Features of the Case Collection

- Available at no charge to the public on the JMP website (Target date: Spring 2012)
- Data sets in JMP format free to instructors and students
- Detailed "Instructor's Notes" explain:
 - The technique used and the data type (cross-sectional/time-series)
 - Assumed prerequisite knowledge
 - Possible extensions to other statistical methods
- Short video presentations showing real-time interactive features of JMP, such as:
 - Dynamic plot-linking
 - Graph Builder
 - 3-dimensional rotating scatterplots
- Links to JMP resources such as the JMP Learning Library

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