11.433J / 15.021J Real Estate Economics
Fall 2008

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Problem Set 3: Simulating Shopping Center Demand
October 14, 2008
Due October 21, in Lecture

I. This assignment draws on the model described in pages 143-146 of DiPasquale and Wheaton, and developed in lecture. The point of this assignment is to use a simulation model, based on actual data plus assumptions, to determine the effects on patronage at shopping centers in the Boston metro area of changing either (1) shopping center characteristics or (2) the costs and patterns of travel costs.

II. In the assignments section, you will find a folder of files entitled "shares.zip," which you will need to download to a PC (not a Mac) and then unzip into a separate directory. How do you unzip files? Use WinZip, which should be decently self-explanatory. Once the folder is unzipped, delete the file "report1.dat" if it exists. Report1.dat is the default name for output files, and the program doesn't work if there is already such a file detected. The way around this is that every time you are done executing the program, rename report1.dat as something else, like "report2.dat".

III. In the directory there are a bunch of input data files and a file labeled shares.exe. This is the program. How do you run an .exe file?
Step 1: You have to run it in the DOS environment. In window start menu click "RUN" and type in "cmd". A DOS Window will pop up.
Step 2: Change the directory to where you unzipped your files.
E.g. "CD H:\WinData\My Documents\ps31" if that's where you put your files.
Step 3: Then type "shares".
When you open the file, you will be confronted with a menu of choices. The only choices that are relevant here are execute the model, observe and save results. To do each of these you type the number of the choice and then hit enter. Hitting enter by itself moves you back up the decision tree.

IV. By carefully toggling under the first option "modify input data" you can actually inspect the center characteristics, utility coefficients, etc. – and in theory change them. The current version of the program however does not allow you to change all of the utility coefficients – hence below we instruct you to do this directly by altering the input file, parm.ssi.

[This program was written in Fortran in the early 1980s when mainframes were widely used. It involves much computation and cannot be easily adapted to a window's friendly environment. Anyone who wants to reprogram it in C++ is welcome to the source code – it will take a few weeks!]

Assignment. The last few years have seen gas prices skyrocket. The media reports that people are not shopping as much and when they do – they do it closer to home. As a consultant for a major retail investor you have been charged with assessing the impact of

rising gasoline prices on the retail patronage at Boston's regional malls. The assumption is that people will not stop coming to malls (and for example use neighborhood and community centers more), but rather re-align which malls they patronize.

In this model there is no "gasoline" variable. There is only the disutility that each group of consumers experiences for travel, and then the distances between consumers and each of the retail malls. What you will change is the disutility parameters for all consumer groups – to reflect the higher costs of travel. You should undertake two experiments in addition to the base or "no change" case.

The first experiment you should do is change the disutility coefficient for everyone from -.37500 to -.67500. This is done by altering the file parm.ssi with a text editor (be sure and copy the digits above exactly and be careful not to alter any other elements of the file. The coefficient is about midway down in the file. This change increases everyone's disutility for travel, but maintains the tendency of wealthier household to "not mind travel as much".

The second experiment adds to this change by also altering the .0081647 coefficient (just below to -.008164. Again be sure the use exactly these digits (Fortran is a very finicky "high level" programming language). What this does is reverse the relationship between household income and travel disutility by making higher income households mind travel "more" (their cars presumably get worse mpg!)

To do all of this you will need to run the program 3 times (note that restarting the program clears your changes). Each time:
(a). Erase the file report1.dat (or rename it)
(b). Make the changes to parm.ssi
(c). Execute the program, run the model, save the results.
(d). Go back and rename the output file from report1.dat to whatever.

Write up your conclusions about what explains the results and why they come out the way they do. This is as important to your grade as getting the simulated outcomes correctly.