Matlab Programs
"Spatial Development"
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Main Programs

In this note we describe how use the Matlab programs to run the simulations presented in "Spatial Development", as well as the programs to generate the figures in the paper.

The main program is MonCarFinal.m. This program computes niter (an integer) times the economy in "Spatial Development" and saves the output in a file called OutputFinal.mat. Note that all the results we presented are averaged over 100 realizations (niter = 100). Averaging over these realizations eliminates some of the randomness in outcomes, but not fully. Hence running a program with the same parameters twice will yield small differences in outcomes. Increasing the value of the parameter niter reduces these differences. An example of the synthetic data generated by MonCarFinal.m can be found in the file OutputFinal.mat, which can be downloaded from:
https://www.dropbox.com/s/g548yw0ib4zti4j/OutputFinal.mat.

MonCarFinal.m uses SDMasterFinal.m which is a program that computes the economy for one realization of the paths of shocks. An equilibrium of the economy is a solution to a system of equations that the program SDMasterFinal.m solves using the Matlab non-linear solver called fsolve given some initial conditions. The initial conditions as they are set in the enclosed programs work for the parameter values used in "Spatial Development" but large changes in these values would imply finding alternative initial conditions that make the solver perform well. The system of equations solved in the program SDMasterFinal.m is a function called SDsysFinal.m

Most of the parameter values used in the baseline economy presented in the paper are discussed in the text. Some others are discussed only by saying that we choose them to match some appropriate target. The parameters values not presented in the main text are: The Pareto coefficient 'a' that we set to 45; the two innovation function parameters that we set to $\psi_1 = 1.142793$ and $\psi_2 = 0.0082433$ respectively (called ksi1 and ksi2 in the code). All baseline parameter values are set in the included SDMasterFinal.m. Note that the code refers to labor shares as 'mu' and 'sigma' which are called μ_M and μ_S, respectively, in the text.

Figures

Figures 8 and 9: Figures 8 and 9 require running MonCarFinal.m several times after setting different values of the labor share parameters (mu and sigma) in SDMasterFinal.m. In particular, it uses for both mu and sigma, namely μ_M and μ_S in the text, values of .33, .4, .5 and .66. This requires running MonCarFinal.m for each value, saving the output in files, and then plotting productivity (Figure 8) and employment shares (Figure 9) for each sector. The file SDGraphsFinal.m generates graphs for aggregate

productivity, employment shares, and the level of productivity in each sector at each point in time and in each location. The data generated by this program for each value of the labor shares parameter was exported to excel to construct Figures 8 and 9. Note that SDGraphsFinal.m loads the matrix of outcomes, OutputFinal.mat, generated by MonCarFinal.m.

Figure 10: The program RentsPriceWelfareFinal.m generates Figure 10 after loading the synthetic data file OutputFinal.mat.

Figure 11: The programs DistRentFinal.m generates Figure 11 after loading the synthetic data file OutputFinal.mat. It also uses the data file landrents.txt which includes the data used in Figure 7.

Figure 12: The program SpecGraphFinal.m generates Figure 12 after loading the synthetic data file OutputFinal.mat. Note that the command colormap('bone') can be used to generate black and white graphs while the command colormap('jet') can be used to generate a range from blue to red.

Figure 13: The program DeltaGraphFinal.m generates Figure 13 after loading the synthetic data files OutputFinal.mat (that should include the outcome of running MonCarFinal.m with baseline parameters) and OutputDelta5.mat (that should include the outcome of running MonCarFinal.m with baseline parameters except for $\delta = 5$).

Figure 14: The program KappaGraphFinal.m generates Figure 14 after loading the synthetic data files OutputFinal.mat (that should include the outcome of running MonCarFinal.m with baseline parameters) and OutputKappa07.mat (that should include the outcome of running MonCarFinal.m with baseline parameters except for $\kappa = 0.07$).

Figure 15: The program MuGraphFinal.m generates Figure 15 after loading the synthetic data files OutputFinal.mat (that should include the outcome of running MonCarFinal.m with baseline parameters) and OutputMu05.mat (that should include the outcome of running MonCarFinal.m with baseline parameters except for $\mu = \sigma = 0.5$, that is μ_M and $\mu_S = 0.5$).