Empirical Methods in Economics

Assignment VII

Orville D. Mondal

18^{th} of February, 2019

1. The computation essentially replicates the method in the lecture notes for Ariel-Pakes games. There is no damping. Initial values for the value function is the mean between the "quality" parameter ν, and marginal cost, by state of the world. Inital values for the optimal price policy is 1.5 times marginal cost. The major "cheat" used is that the tolerance to test for convergence in value function and policy function is set to 10^{-3}. This leads to a reasonable result, but also circumvents the issue of non-convergence (the percentage change in the value function never fell below 0.0002 in my implementation). Figures are shown below:

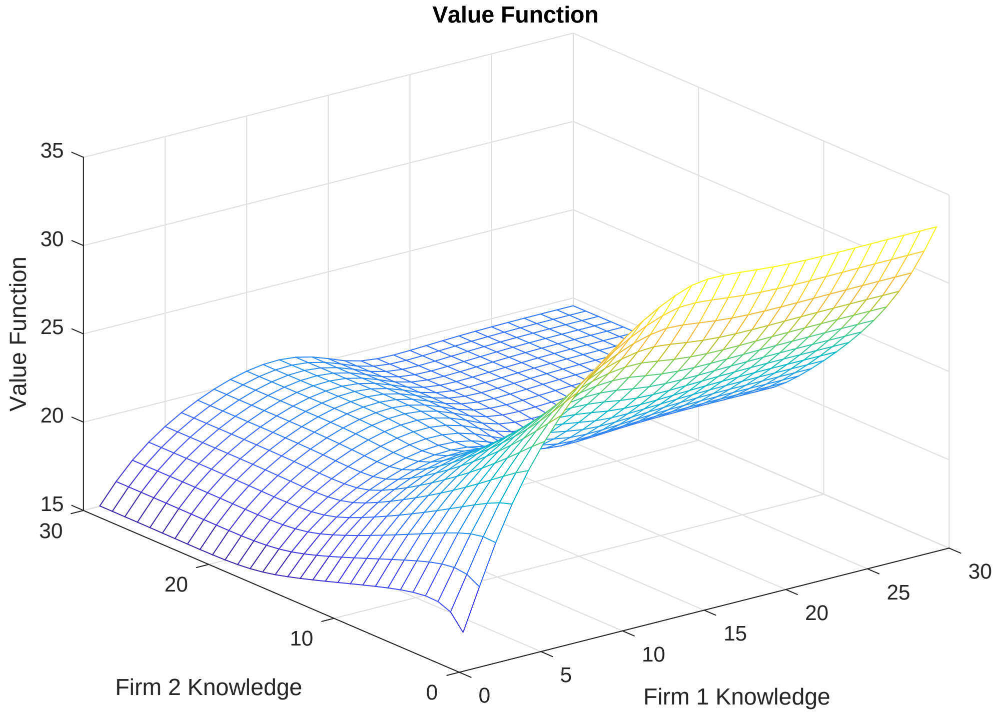

Figure 1: Value function at different combinations of firm knowledge.

The optimal policy function is shown on the next page. The next portion of the question requires a succinct way to represent the state transition matrices. In the attached code, I've constructed a 900×900 dimension matrix where the rows are indexed starting from the state pair $(1,1),(1,2),(1,3),\ldots(1,30),(2,1),(2,2),\ldots(30,30)$. Each row lists the probability of moving to one of the 900 states in the next period. Computing the necessary figures is then a simple matter of matrix multiplication (and reshaping). The steady state is found by raising the transition matrix to a very large number, and reshaping any row to be 30×30.

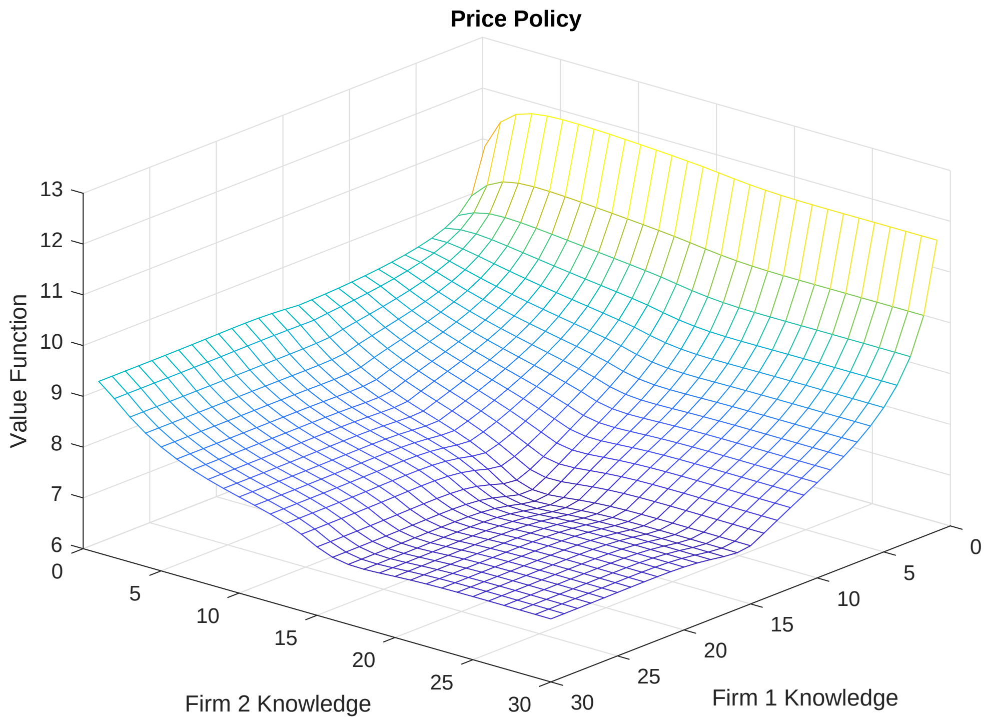

Figure 2: Optimal price at different combinations of firm knowledge.

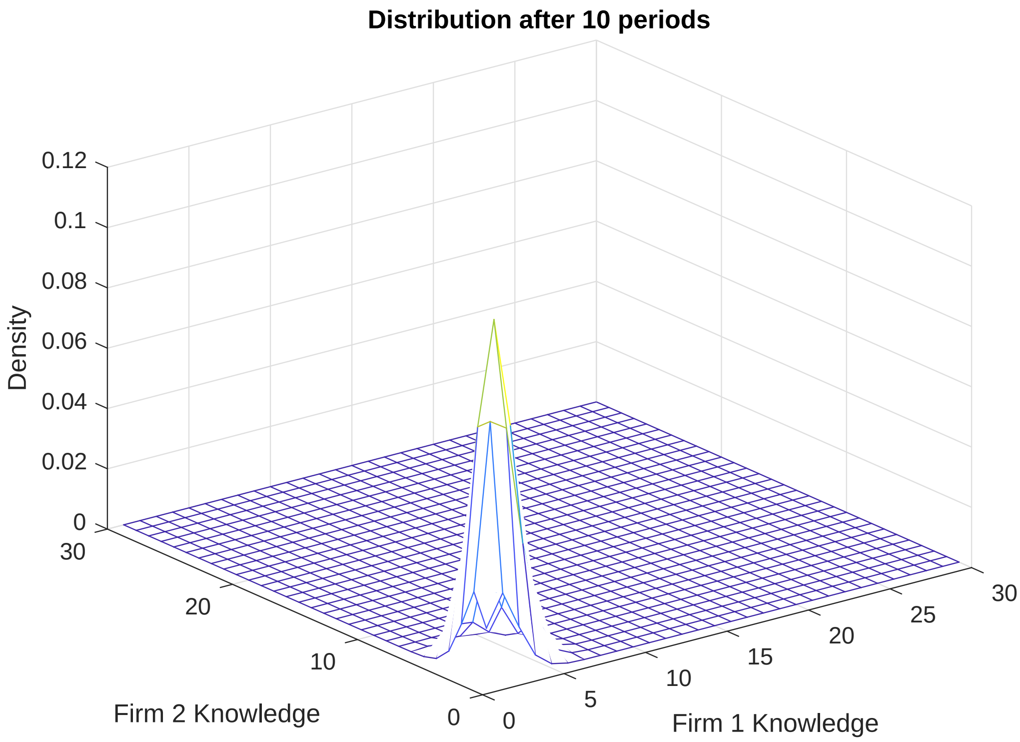

Figure 3: Distribution of states at different combinations of firm knowledge.

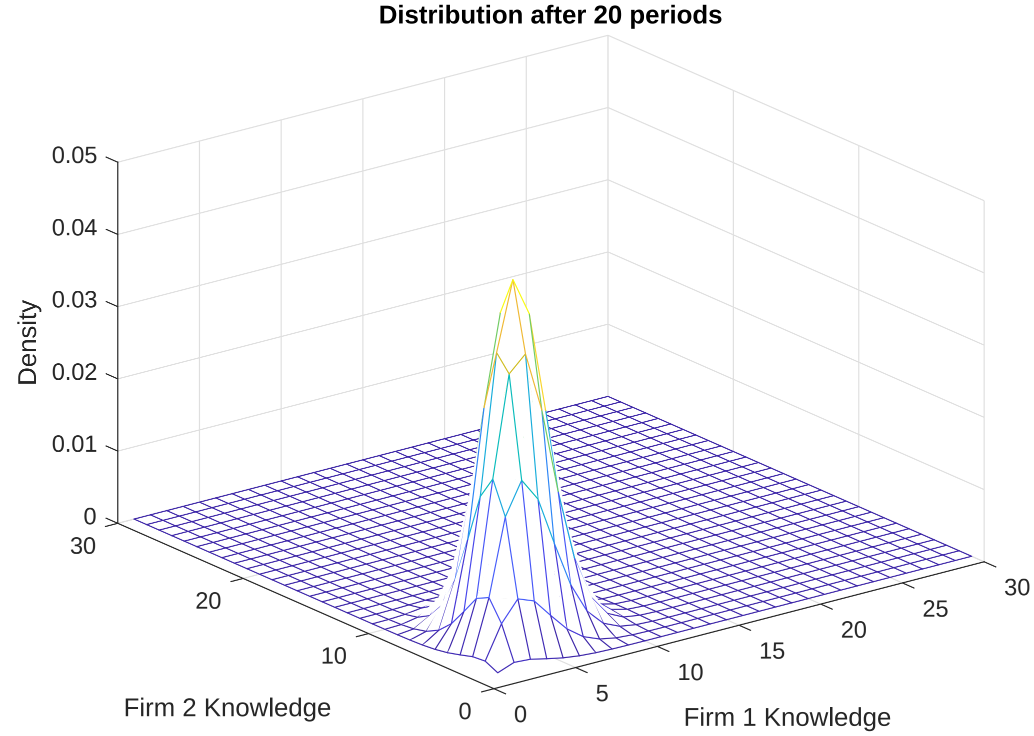

Figure 4: Distribution of states at different combinations of firm knowledge.

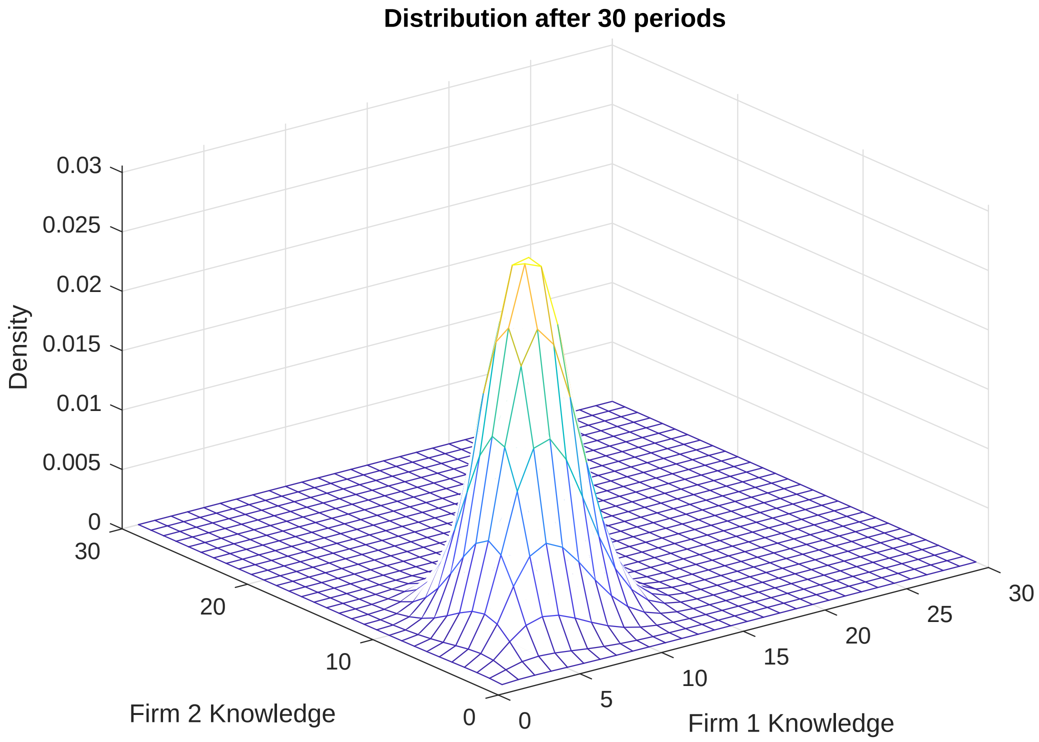

Figure 5: Distribution of states at different combinations of firm knowledge.

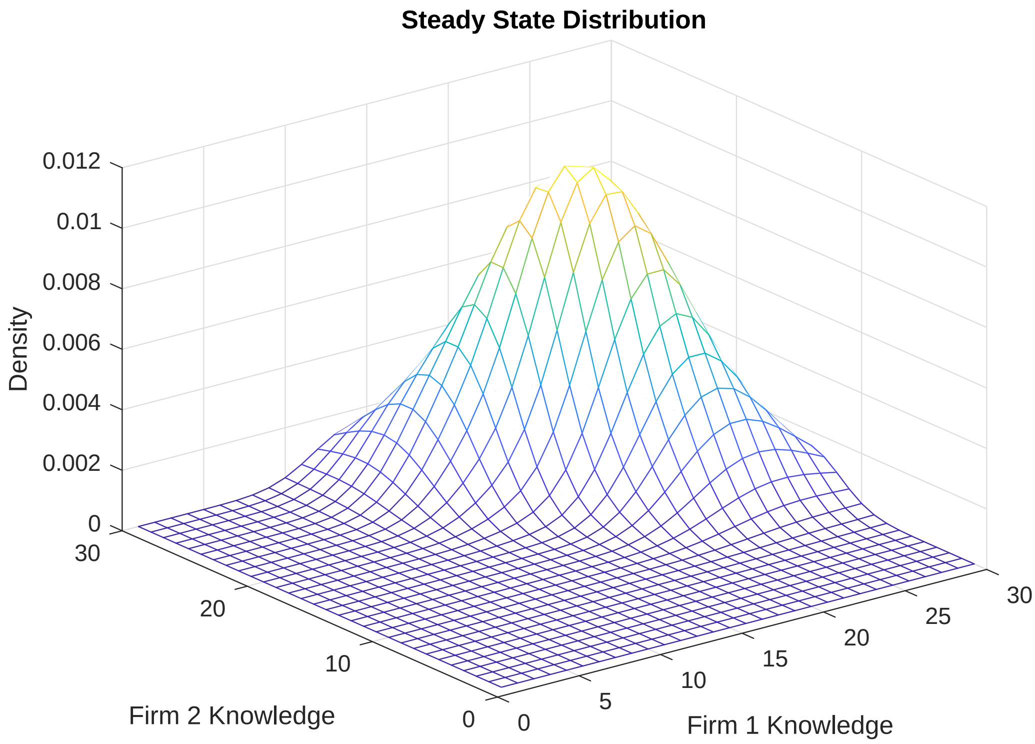

Figure 6: Distribution of states at different combinations of firm knowledge.