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Econ 899
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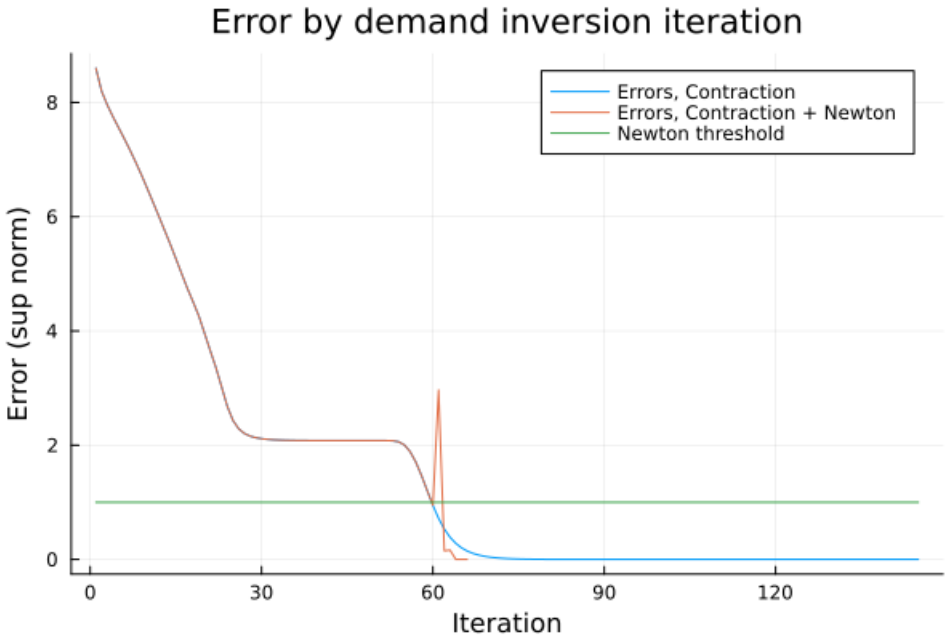
Problem 1.

Solution: We plot the error of the contraction mapping algorithm as well as the contraction method/Newton's method algorithm for 1985. They have a similar path until iteration 60 or so. Once the error drops below $\varepsilon = 1$, the error for Newton's method initially shoots up and then swiftly drops. Once it switches to Newton's method, the algorithm converges within a few iterations. Conversely, it takes the contraction mapping almost 80 additional iterations to converge from this point.



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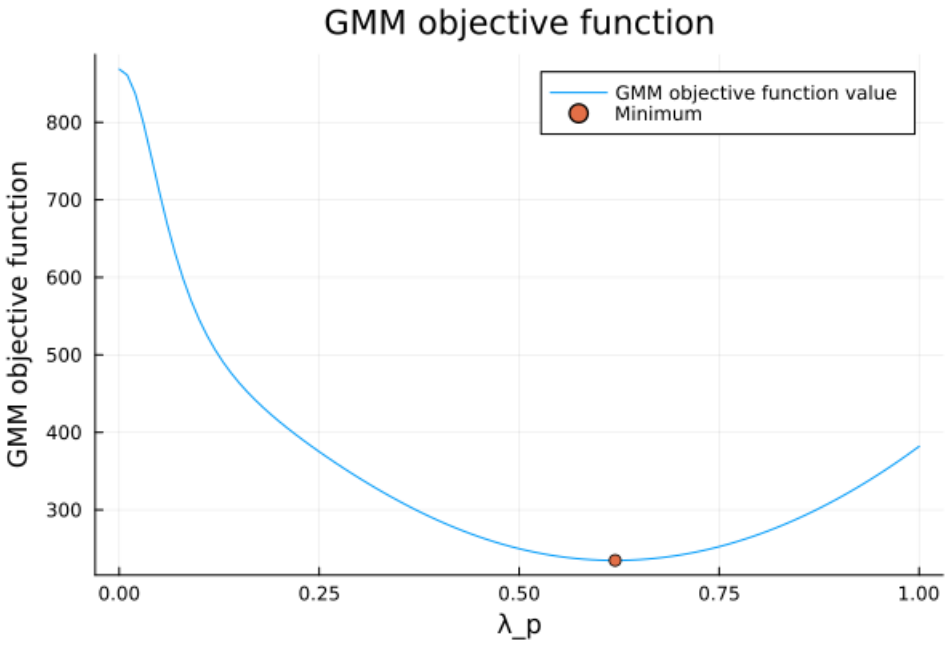
Problem 2.

Solution: We conduct a grid search for the optimal $\lambda_p \in [0, 1]$ using the 2SLS weight matrix $W = (Z'Z)^{-1}$. We plot the objective function for each grid point below. The minimum objective function value of 234.7611 is attained at $\hat{\lambda}_p = 0.62$.



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Problem 3.

Solution: Using $\hat{\lambda}_p = 0.62$, we construct the weight matrix $W = [(Z\xi)'(Z\xi)]^{-1}$, where $\xi = \rho(s, p \mid \hat{\lambda})$. We then use this to find the 2-step GMM estimator. We use LBFGS to minimize the GMM objective function and estimate that $\lambda_p = 0.5639$ with corresponding objective function value of 163.7396. We plot the new GMM objective function with the previous one below:

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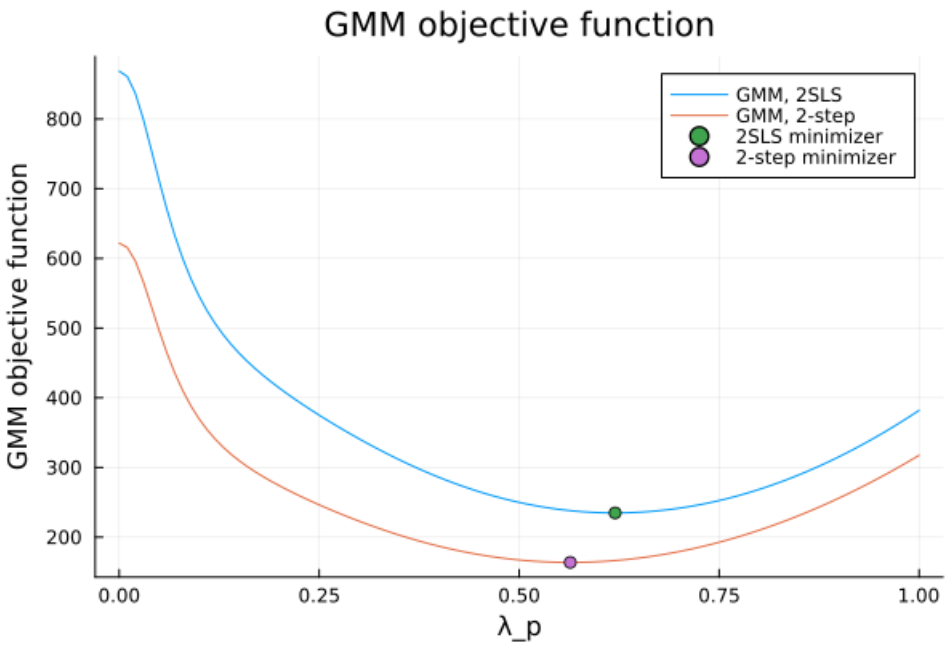

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