Economics 416.
Advanced Macroeconomics, Spring 2009.
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Homework #6, due Tuesday, May 19.

1. Consider the simple model without capital in the handout on the zero bound. Suppose government spending remains equal to its steady state value while the economy is in the zero bound.

   (a) Reproduce the magnitude of the output and inflation drop in the zero bound reported in the handout.

   (b) Now solve for the equilibrium when $\rho_R = 0.8$ in the Taylor rule. Note that in this case, the system does not jump immediately to its steady state when the discount rate snaps back to its steady state level. This is because the lagged interest rate is now a state variable. Note, however, that the lagged interest rate is always the same in the period you emerge from the lower bound, no matter how long the system has been in the lower bound. This allows you to develop simple expressions for output and inflation in the first period out of the zero bound, which is what you need to compute output and inflation in the lower bound. Note that this change in ρ_R causes the magnitude of the drop in output and inflation in the lower bound to be much smaller. Explain the intuition for this.

2. Consider the impact of a shock to government spending when the zero lower bound on the nominal rate of interest can be ignored.

   (a) Display the dynamic response of inflation, output and the interest rate for $l, k = 0, 1$ in the monetary policy rule. Explain the economics of the differences.

   (b) Most of the big movements in government spending over the past several centuries stem from war. These shocks are probably not well captured with the first order autoregressive representation of government spending that we use. Such shocks are better thought of as having a relatively small immediate impact, with a much

larger one later. This sort of pattern can be produced with a second order autoregressive representation for $\hat{G}_t$:

$$\hat{G}_t = \rho_1 \hat{G}_{t-1} + \rho_2 \hat{G}_{t-2} + \varepsilon_t.$$

Consider the case, $\rho_1 = 1.7$, $\rho_2 = -0.72$. Set $l = k = 0$. Graph the response of inflation, output and the interest rate for the above specification of ρ_1, ρ_2. On the same graph, place the responses for the baseline case, $\rho_1 = 0.8$, $\rho_2 = 0$. Can you explain the economics of the different responses?