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416, Spring 2008
Homework 4, due May 7.

1. Consider the Rotemberg model in the notes (a version in which typos have been removed is available on the course website). In the notes, the Ramsey optimal policy is worked out analytically in the case where the subsidy is set to eliminate the labor market distortion. In this case, the Ramsey policy is time consistent. Now consider the case in which the tax subsidy is set to zero ($\upsilon = 0$). In this case, the argument that the price-setting equation is non-binding on the Ramsey policy is invalid. Suppose the law of motion for the technology shock is:

$$a_t = \rho a_{t-1} + \varepsilon_t, \; a_t = \log A_t.$$

The parameters for the model are:

$$\upsilon = 0, \; \beta = 1.03^{-1/4}, \; \varepsilon = 5, \; \phi = 100, \; \rho = 0.9, \; \chi = 1.$$

   1. Compute solution to the Ramsey-optimal problem using the symbolic methods you used in the first two homeworks, and using the QZ decomposition. Write out the solution in the way it is done in the notes for the Ramsey-optimal solution to the Calvo model.
   2. Is the problem time-inconsistent? Explain.
   3. Suppose $\varepsilon_0 = 0.01$ and $\varepsilon_t = 0$ for $t \neq 0$. Suppose that in period 0, the economy begins in the steady state of the Ramsey-optimal solution. Graph the path for inflation, $Y_t$, $h_t$, for $t = 0, 1, .., 10$. Suppose that in period 1, the Ramsey problem is restarted (i.e., 'the initial multipliers are forgotten'). Graph $\pi_t, Y_t, h_t$ for $t = 1, 2, ..., 10$. Compare what would have been done over period $t = 1, 2, ..., 10$ if the problem had not been restarted in period 1, with what is done if it is restarted. Provide intuition into the nature of the time inconsistency problem in this model. That is, explain why they don't announce at date zero, the path that looks optimal from period 1 on.

2. Develop and algorithm to compute the steady state of the open economy model with unemployment. Assign values to the parameters and put $\iota = 1$.

1. Investigate numerically what is the impact on the steady state values of the 14 variables on the last page of the handout of variations in $b^u$, the unemployment compensation parameter. Provide the intuition.
2. Do the same for $\kappa$, $\eta$.
3. Study the impact of variations in the matching function parameter, $\sigma$. Do this for the case, $\iota = 1$ and $\iota = 0$. Is there a substantial difference? Provide intuition.