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Assignment #7

Answers to Tutorial on Model Solution Using Dynare 4

1. For the answers to this question, run rbcans1.mod. In the case of part f, when the shock is more persistent, the fraction of the jump in output devoted to consumption goes up because of a stronger wealth effect. Still, that fraction isn't as high as the permanent income hypothesis would predict, because the rate of return on capital jumps by a lot, as the answer to part g shows.

2. For the quantitative parts of this question, run rbcans2.mod. In the case of 2b, the speed of adjustment increases with σ because with higher σ it is more costly for households to cut consumption. As a result, it takes longer to do the investment necessary to get the capital stock back up to steady state. The speed of adjustment increases with the rise in α because in this case the production function is more linear, so that the rate of return on capital increases less with a drop in the stock of capital and the incentive to accumulate that capital is reduced. The speed of adjustment falls with the rise in δ because this increases the nonlinear portion of the return on capital, so that it rises more with a fall in the stock of capital, providing more incentive to respond to a drop by increasing investment and quickly return to the initial steady state.

3. For the answers to this, run rbcans3.mod. In the case of 3c, the reason for the differences in response have to do with the much greater income effect associated with the high ρ case.

4. Now, consider the Clarida-Gali-Gertler model. For my answer to this question, see cggsignal.mod. Regarding 4a, the lecture notes showed that the Taylor rule does not produce a big enough interest rate rise in the wake of a technology shock. Modifying that rule so that the interest rate rises more improves things. A rise in a_π helps because inflation rises after a technology shock. Regarding 4c, the reason for the switch in sign is that a shock to technology has very different implications in

the two cases. In the case that the growth rate of technology is $AR(1)$, a jump in technology signals even greater increases in the future. This creates a desire to borrow, and so the natural rate of interest must rise to discourage this effect. In the case that it is the level of log technology that is $AR(1)$, a jump in technology creates the expectation that technology will be lower in the future, creating a desire to save. The higher natural rate of interest counters this desire. Regarding 4d, a signal that technology will rise in the future raises the natural rate of interest in order to reduce the desire to borrow that is created by such a shock. Because the Taylor rule does not raise the rate of interest high enough, a boom occurs. Paradoxically, inflation falls at the same time because - although current marginal cost rises - future marginal cost is expected to fall. The latter effect explains why forward-looking price setters reduce prices.