Department of Applied Economics Johns Hopkins University

Economics 602
Macroeconomic Theory and Policy
Problem Set 7
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1. **Deriving a Money Demand Function.** Denote by $\phi(c_t, i_t)$ the real money demand function. Here you will generate particular functional forms for $\phi(\cdot)$ using the MIU model we have studied.

   In an MIU model, recall that the consumption-money optimality condition can be expressed as

$$\frac{u_{m_t}}{u_{c_t}} = \frac{i_t}{1+i_t},$$

   where u_{m_t} denotes marginal utility with respect to **real** money balances (what was named u_2 in our look at the MIU model) and u_{c_t} denotes marginal utility with respect to consumption (what was named u_1 in our look at the MIU model). In each of the following, you are given a utility function and its associated marginal utility functions. For each case, construct the consumption-money optimality condition and use it to generate the function $\phi(\cdot)$. In each case, your money demand function should end up being an increasing function of c_t and a decreasing function of i_t. (**Note:** Be careful to make the distinction between real money holdings and nominal money holdings. The marginal utility function u_{m_t} is marginal utility with respect to **real** money holdings.)

   a. $u\left(c_t, \frac{M_t}{P_t}\right) = \ln c_t + \ln\left(\frac{M_t}{P_t}\right).$

   b. $u\left(c_t, \frac{M_t}{P_t}\right) = 2\sqrt{c_t} + 2\sqrt{\frac{M_t}{P_t}}.$

   c. $u\left(c_t, \frac{M_t}{P_t}\right) = c_t^{\sigma} \cdot \left(\frac{M_t}{P_t}\right)^{1-\sigma}.$

2. **The Keynesian-RBC-New Keynesian Evolution.** Here you will briefly analyze aspects of the evolution in macroeconomic theory over the past 25 years.
   a. Describe **briefly** what the Lucas critique is and how/why it led to the demise of (old) Keynesian models.
   b. Briefly define and describe the neutrality vs. nonneutrality debate surrounding monetary policy today. Which type of shock does this debate concern?

3. **Portfolio Adjustment Costs.** In the infinite-period MIU model with three assets (i.e., stocks, nominal money, and nominal bonds), suppose that bond purchases are subject to a transactions cost (portfolio adjustment cost). Specifically, suppose the transactions cost in period t depends on by how much nominal bond holdings are changed during period t, and this transactions cost is increasing in the change in bond holdings (we'll assume it's a quadratic adjustment cost). The period-t budget constraint of the representative consumer is thus

$$P_t c_t + P_t^b B_t + \frac{\psi^B P_t}{2}(B_t - B_{t-1})^2 + M_t + S_t a_t = Y_t + M_{t-1} + B_{t-1} + (S_t + D_t)a_{t-1},$$

   where ψ^B is simply a scaling parameter.

   a. In this extended version of the MIU model, express the asset-pricing kernel (i.e., the term $\frac{\beta\lambda_{t+1}}{\lambda_t}$) using just the first-order-condition on bond-holdings B_t. That is, isolate $\frac{\beta\lambda_{t+1}}{\lambda_t}$ from the consumer's FOC on bonds. Does the presence of the transactions cost affect the kernel?
   b. Does the presence of the transactions cost on bond holdings affect the period-t **stock** price? Show algebraically why or why not, and qualitatively explain why or why not?
   c. Does the presence of the transactions cost on bond holdings affect the consumption-money optimality condition? Show algebraically why or why not, and qualitatively explain why or why not?