

Economics 602  
**Macroeconomic Theory and Policy**  
**Problem Set 7**  
 Professor Sanjay Chugh  
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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  $\psi^B$  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?