

Macroeconomics Analysis II, EC3102

Tutorial 3 (Money in utility)¹

Question 1 *Deriving the 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 (Money in Utility) model we have studied.

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

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

where u_{m_t} denotes marginal utility with respect to real money balances and u_{c_t} denotes marginal utility with respect to consumption.

a.

Derive this consumption-money optimality condition for a generic lifetime utility function of a representative agent:

$$\sum_{t=0}^{\infty} \beta^t u\left(c_t, \frac{M_t^D}{P_t}\right).$$

b.

In each of the following, you are given a utility function and its associated marginal utility functions. For each case, use the consumption-money optimality condition derived in part (a) 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.)

i

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

ii

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

iii

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

¹Question 1 adapted from adopted text: Modern Macroeconomics by Sanjay Chugh (2015), Chapter 15, Q.1