

## Demand for Money

Money is a special form of wealth. It is something that is accepted as a mean of payment. The definition of money is not precise. For empirical purposes we will use rather technical definition – **monetary aggregates**.

First definition of money: currency (banknotes and coins) in the hand of the public (households, firms, and government) plus sight deposits (bank accounts that are payable on demand, often called demand deposits or checking accounts). This monetary aggregate is denominated as M1.

**M1 = currency in circulation + sight deposits**

Banks often offer more attractive accounts that bear interest, but cannot be drawn on with cheques. Such funds can be easily transferred into regular sight deposits. The ease of transfer renders these assets very similar to sight deposits. They are included in second definition of money M2

**M2 = M1 + time (or savings) deposits at banks with unrestricted access**

Broader measure includes instruments such as large certificates of deposit or time deposits with a longer term and possibly restricted access, foreign currency deposits with nonbank institutions. These instruments are less liquid meaning that they are more costly or difficult to convert into cash or checking accounts. This is called M3.

**M3=M2 + larger, fixed-term deposits + accounts at non-bank institutions**

These definitions are inevitably arbitrary and vary from country to country. We are usually thinking of money in terms of its narrower definition M1.

## Determinants of Money Demand

The main reason for holding money is to facilitate transactions. The real volume of economic activity must therefore be an important factor in determining the demand for money. We should expect a **positive** relationship between **real GDP** and money demand.

Money is valued for its purchasing power, and this purchasing power is measured by the price level. With increased prices people increase their demand for money – we expect **positive** relationship between **prices** and money demand.

The nominal interest rate matters for the demand for money because it is the opportunity cost that households and firms face for holding wealth in the form of money. Money bears a zero nominal interest rate and holding money implies forgoing that nominal interest rate. Higher interest rates discourage the holding of wealth in the

form of money, therefore there is **negative** relationship between money demand and **nominal interest rate**.

It is costly to turn other assets into liquidity, so transactions cost (bank commissions, or time and effort spent converting money from and into other assets) lead people to use money more efficiently. With higher transactions cost people want to hold more money – there is a **positive** relationship between **transactions cost** and demand for money. (Problem for estimation: how to express transaction cost?)

Money demand function

$$M = f(Y^+, P^+, I^-, C^+, \dots)$$

**Exercise 1:**

$$M_t = \alpha_0 Y_t^{\alpha_1} P_t^{\alpha_2} I_t^{\alpha_3} C_t^{\alpha_4} e^{\epsilon_t}$$

where  $M_t$  is nominal stock of money,  $Y_t$  is real output (GDP),  $P_t$  is price level,  $I_t$  is (gross) nominal interest rate,<sup>1</sup>  $C_t$  are transaction costs,  $\epsilon_t$  is residual and  $\alpha_j$  is elasticity of money demand with respect to appropriate variable.

After taking logarithm

$$\ln M_t = \ln \alpha_0 + \alpha_1 \ln Y_t + \alpha_2 \ln P_t + \alpha_3 \ln I_t + \alpha_4 \ln C_t + \epsilon_t$$

and denoting by small letters the result is

$$m_t = \tilde{\alpha}_0 + \alpha_1 y_t + \alpha_2 p_t + \alpha_3 i_t + \alpha_4 c_t + \epsilon_t$$

**Note:** Transaction cost are declining over time due to innovations in payment technologies. Nowadays it is easier and cheaper to convert one type of asset into another than some decades ago. Declining time series is used as proxy variable.

**Exercise 2:** Estimate demand for real money balances (defined as  $M/P$ ). In log-linearised version

$$m_t - p_t = \beta_0 + \beta_1 y_t + \beta_3 i_t + \beta_4 c_t + \epsilon_t$$

**Exercise 3:** Estimate relationship where ratio of monetary aggregates  $M2/M1$  depends on interest rates (for short-term and long-term deposits) and on transaction costs. The log-linearised form is:

$$m_{2,t} - m_{1,t} = \gamma_0 + \gamma_1 i r s_t + \gamma_2 c_t + \epsilon_t$$

$$m_{2,t} - m_{1,t} = \delta_0 + \delta_1 i r l_t + \delta_2 c_t + \epsilon_t$$

**Further readings**

Burda, M., Wyplosz, C. *Macroeconomics: A European Text*, 2001, chapter 7.

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<sup>1</sup> $I_t = (1 + i_t)$ , after taking logarithms and using approximation  $\log I_t = \log(1 + i_t)$ ,  $\ln I_t \approx i_t$