Course in Macroeconomics and Global Economics
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Instructor: Prof. Barbara Annicchiarico
Teaching Assistants: Francesca Diluiso, Matilde Giaccherini

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Solution to Practice 2

Exercise 1

1. If i = 5%

   M^d = €60,000(0.30-0.05)=€15,000

   If i = 10%

   M^d = €60,000(0.30-0.10)=€12,000

2. The money demand negatively depends on interest rates.

3. We know that the 50% of €60,000 is €30,000

   M^d= €30,000(0.30-0.10)=€6,000

   In percentage terms M^d is reduced by 50% : $\frac{M'^d - M^d}{M^d} = \frac{6000-12000}{12000} = -0.5$

4. M^d = €30,000(0.30-0.05)=€7,500

5. The money demand increases in proportion to nominal income, if income doubles, so does the money demand.
   If the interest rate doubles the money demand decreases by 20%.

Exercise 2

1. $i = \frac{€100 - €P_B}{€P_B}$

   - $€P_B = €75 \longrightarrow i = \frac{100-75}{75} = 0.33 \longrightarrow (i = 33\%)$
   - $€P_B = €85 \longrightarrow i = \frac{100-85}{85} = 0.1765 \longrightarrow (i = 17.65\%)$
   - $€P_B = €95 \longrightarrow i = \frac{100-95}{95} = 0.0526 \longrightarrow (i = 5.26\%)$

2. The higher the price, the lower the interest rate.

Exercise 3

1.
   - We know that $Wealth = M^d + B^d$.
     $B^d = Wealth - M^d$
     $B^d = €50,000 - €Y(0.35 - i)$
     $B^d = €50,000 - €60,000(0.35 - i)$
     $B^d = €50,000 - €21,000 + €60,000i$
     $B^d = €29,000 + €60,000i$
   - If i increases, the demand for bonds increases too.

2. An increase in wealth positively affects the demand for bonds, whereas it does not affect the demand for money which depends on the level of income.

3. An increase in income positively affects the demand for money, as richer people conduct more transactions. An increase in income also affects the demand for bonds: if the interest rate on bonds is not too high (higher than 35% in our example), an increase in income reduces the demand for bonds as money and bonds are alternative ways to allocate your wealth.

Exercise 4

Note: For convenience, in this exercise we scale down the amounts of the monetary base and income, thus $H = 100$ and $Y = 5000$.

1. The demand for central-bank money, H^d, is the sum of currency demand by the public (CU^d) and reserve demand by the banking system (R^d): $H^d = CU^d + R^d$.
   The two demands are given by:
   $CU^d = cM^d$
   $R^d = \theta(1 - c)M^d$

   - The public holds no currency $\longrightarrow CU^d = 0; c = 0$
   - The ratio of deposits to reserves $\longrightarrow \theta = 0.1$

   $H^d = [c + \theta(1 - c)]M^d$
   $H^d = [c + \theta(1 - c)]Y(0.8 - 4i)$
   $H^d = 0.1 * [5,000 * (0.8 - 4i)]$
   $H^d = 0.1 * [4,000 - 20,000i]$
   $H^d = 400 - 2,000i.$

2. $H = H^d$
$H = [c + \theta(1-c)]M^d$
$100 = 0.1 * [5,000 * (0.8 - 4i)]$
$100 = 400 - 2,000i$
$2,000i = 300$
$i = \frac{300}{2,000} = 0.15$
solving for i yields, $i = 0.15 \longrightarrow (i = 15\%)$

3. - $M^s = \frac{H}{[c+\theta(1-c)]}$
   $M^s = \frac{100}{0.1}$
   $M^s = 1,000$
   - The overall supply of money, M^s, is greater than the supply of central bank money, H (1,000 vs 100). This happens as, in a world without currency as the one we postulated in this exercise, the demand for central bank money is entirely determined by the demand for reserves. The demand for reserves is only a fraction of the demand for deposits (which, in turn, coincide with the overall demand money when $CU^d = 0$). In our case, with $\theta = 0.1$, the demand for central bank money is equal to one-tenth of the overall demand for money. The *money multiplier* explains how the supply of central bank money is magnified into the overall supply of money.
   - The overall supply of money equals the overall demand for money at the equilibrium interest rate.
   Check: $5,000 * (0.8 - 4 * 0.15) = 5,000 * 0.2 = 1,000$.

4. $300 = 400 - 2,000i$
$i = \frac{100}{2,000} = 0,05$
The impact on i is negative.

Exercise 5

$H = 100$; $\theta = 0.05$; $c = 0.1$

1. $H = [c + \theta(1-c)M^d]$

$M^s = \frac{1}{c+\theta(1-c)}H$

$M^s = \frac{1}{0.1+0.05(1-0.1)}100$

$M^s = \frac{1}{0.1+(0.05*0.9)}100$

$M^s = \frac{1}{0.1+0.045}100$

$M^s = \frac{1}{0.145}100 = 689.65$

The money multiplier is $\frac{1}{0.145}$

Money supply is 689.65

2. Recompute with $\theta = 0.1$

   $M^s = \frac{1}{0.1+0.1(1-0.1)}100$

   $M^s = \frac{1}{0.1+0.09}100$

   $M^s = \frac{1}{0.19}100 = 526.32$

   If θ increases the money supply M^s decreases. The reserve ratio affects the money supply by changing the magnitude of the multiplier effect. Money that have to be reserved is money that cannot be used to make new loans or to purchase bonds through the money multiplier mechanism.