The Money Market

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Two assets: money, bonds.

- For simplicity, consider a perpetual bond: a consol (with no fixed redemption date, hence infinite maturity). Assume that this bond makes a coupon payment of 1 per period, in perpetuity.
- Nominal market interest rate for bonds is i%.
- Nominal return on money is 0%, in perpetuity.
- Real financial wealth A (the supply of money and bonds) is given: \( A = \frac{M^s}{P} + \frac{P^B}{P} B^S \)
  
  S denotes stock
  
  \( B^S \) is number of bonds issued
  
  \( P^B \) is price of bonds.
The LM curve - Assumptions

- Individuals decide whether to hold their assets as money or bonds depending on the interest rate.
  - The interest rate is the return on bonds and the opportunity cost of holding cash.
- This portfolio decision gives rise to a money demand function.
- The level of income also affects money demand. Money demand (like bond demand) is increasing in income.
- The LM curve shows combinations of real output and (nominal) interest rate such that the money market is in equilibrium, for a given price level.
- Real supply of money equals real demand for money.
- Equilibrium in the money market also implies equilibrium in the bond market.
Price of bonds:

\[ PB = \frac{1}{1+i} + \frac{1}{(1+i)^2} + \ldots + \frac{1}{(1+i)^\infty} = \frac{1}{i} \]

Demand for bonds:

\[ B^D(i, Y), \quad \text{with} \quad B_i^D > 0, \quad B_y^D > 0 \]

(Real) bond supply = (real) bond demand when:

\[ \frac{P^B}{P} B^S = \frac{P^B}{P} B^D(i, Y) \]
Money Market

- Stock of money = currency + liquid deposits
- Treat supply of nominal money balances MS as exogenous: $M^S = M_1$
- Recall: Price level P is assumed exogenous (fixed).
- Demand for real money balances:
  \[
  \left( \frac{M}{P} \right)^d = L(i, y), \quad \text{with} \quad Li < 0, LY > 0
  \]
  \[
  i = \text{opportunity cost of holding money}
  \]
Deriving the LM schedule

\[ (\frac{M}{P})^S_0 \]

\[ L(i, Y_1) \]

\[ L(i, Y_0) \]

\[ LM_0 \]

\[ Y_0 \]

\[ Y_1 \]
LM schedule

- LM curve slopes upwards in \((i, Y)\) space.
- We can find the slope of this schedule in the same way as with the IS schedule. We can define the implicit function \(F\):

\[
F \equiv \left( \frac{M}{P} \right)^s - L(i, Y) = 0
\]

and then find the derivative of \(i\) with respect for \(Y\):

\[
\frac{di}{dY} = -\frac{F_Y}{F_i} = \frac{-L_Y}{L_i} > 0
\]

- A given change in income will have a smaller impact on the interest rate along the LM curve, i.e. the LM curve is relatively flat, either
  - the lower the income sensitivity of money demand \(L_Y\)
  - the higher the interest sensitivity of money demand \(L_i\)
The LM curve implies equilibrium in both the money and bond markets

\[
\frac{M^S}{P} + \frac{P^B}{P} B^S = L(i, Y) + \frac{P^B}{P} B^D(i, Y)
\]

\[
\left[ L(i, Y) - \frac{M^S}{P} \right] + \frac{P^B}{P} [B^D(i, Y) - B^S] = 0
\]

If \( L(i, Y) = \frac{M^S}{P} \) then \( B^D(i, Y) = B^S \) and vice versa.
Equilibrium in the money and bond markets

\[
\left( \frac{M}{P} \right)_0^S \quad P^b = \frac{1}{i} \quad B^D(i, Y)
\]
The MP curve has the advantage of modelling monetary policy as policymakers now conceive of it – as targeting a particular interest rate, rather than as targeting a particular money supply level.

Most importantly, the MP curve assumes that policymakers choose the interest rate in response to the inflation rate.

In modelling terms, this means that IS-MP results in an AD relationship between the output gap and inflation rate. This matches the New Keynesian models that dominate current macro theory and policy.

In contrast, the AD curve that results from IS-LM, when we allow prices to change, relates output and price levels.
A shift in the money supply

An decrease in the money supply.

\[ (\frac{M}{P})_1^S \quad (\frac{M}{P})_0^S \]

\[ i \]

\[ (i, Y) \]

\[ L(i, Y) \]

\[ i_1 \]

\[ i_0 \]