Lecture 11: LM
(chapter 10, 2nd half)

1a) Theory of Liquidity Preference

Consider demand for real money balances
\((M/P)_d = L(r, Y)\): Amount of purchasing power depends on two things:
positive function of \(Y\): more want to purchase, more money want have
negative function of \(r\): if interest rate rises, the opportunity cost of holding
money rises. High \(r\), will put more of money in interest-earning bank
account.

note: using real interest rate here, \(r\). But more precise if used nominal interest
rate, \(i\). Use real \(r\) for now to keep things simple.

Draw real money demand for different values of \(r\) (for a given level of \(Y\))

\[
\begin{align*}
\text{r} & \quad \text{L}(r, Y_{\text{bar}}) \\
\text{M/P} &
\end{align*}
\]

b) Money market equilibrium:
To explain what interest rate prevails in the economy, we combine demand with supply.

Supply: We take the nominal money supply as fixed by the government. Since
price level is fixed in short run, real money supply is fixed:
\((M/P)^s = M_{\text{bar}}/P_{\text{bar}}\)

\[
\begin{align*}
\text{r} & \quad (M/P)^s \\
\text{L}(r, Y_{\text{bar}}) & \quad \text{M/P}
\end{align*}
\]

So, given a level of real money supply, the interest rate adjusts to equate real
money demand to this real money supply.
Notice difference here from classical model:
In the classical model:

It was price level that adjusted; here it is interest rate. In classical model, if nominal money supply exceeded real money demand, price would rise, so real money supply fell. Holding more money than wanted. So got rid of it buy taking it to store and buying goods. Lead to price rise.

But here in the Keynesian model:

Here if there is too much money supply, people take it to the bank and convert it to interest-earning assets. But if bank having to pay interest on accounts, but no one wants to borrow the cash and pay them interest for loan, bank will lower the interest rate they are paying, to encourage more borrowing and less people putting cash in saving accounts.

2a) LM - Curve

All this is taking level of Y as given. Now allow both Y and r to vary.

What if Y rise:

\[(M/P)^d = L(r,Y)\]: higher income, will want to buy more so want hold more money. For any given level of r, people want to hold more money. Means L curve shift right. Rise Y means Money demand curve shift right. So equilibrium r will rise. Given level of money supply, automatic market forces in money market will have to make people content to hold just existing amount of money. Higher Y makes want to hold more, but discourage them from doing so by higher r.

So we conclude that that if output rises from Y_1 to Y_2, equilibrium in the money market will require the interest rate to rise from r_1 to r_2. Summarize this in a curve: LM curve.
b) Derive LM with algebra:

\[(M/P)^d = eY - fr\]
\[(M/P)^s = M/P\]

Money supply equal money demand:
\[(M/P)^s = eY - fr\]

Want \(r\) as a function of \(Y\):
\[r = (e/f)Y - (1/f)M/P\]

This is a line, slope = \(e/f\), slope up

A steep LM curve (\(e/f\) large) means that a rise in output requires a big rise in interest rate to maintain equilibrium in the money market.

**Causes** of this:
1) **Money demand does not very responsive to the interest rate** (\(f\) is small).
   (Money demand is steep.)
   So if a rise in output raises money demand, it takes a big rise in the interest rate to convince people to be content holding the existing supply of money.

2) **Money demand is very responsive to output** (\(e\) is large).
   (Money demand shifts a lot when income rises.)
   So a rise in output causes money demand to rise a lot, and this requires a big rise in the interest rate to convince people to be content holding the existing supply of money.
c) What happens if money supply rise:
Whatever r was for a given Y, now r will by lower by \((1/f)\Delta M\): LM curve shift down and to the right.

Does this mean the equilibrium value of \(r\) must fall? Can’t say that much. Can only say that for a given level of Y, \(r\) must fall. To say what happens to the equilibrium level of \(r\) and Y, we more information; we need another curve...

Equilibrium is intersection of the two: equilibrium \(r\) and \(Y\)

IS: Equilibrium in goods market: planned expenditure equals actual expend. Change in \(r\) will change I, which will change \(Y\).

LM: demand for real money balances equals supply. Change in \(Y\) will change money demand, need change in \(r\) to keep money market in balance.

Next time show how is useful tool to analyze short-run fluctuations and what stabilization policy can do about it.