

BS2551 Money Banking and Finance

The IS –LM

Output and the interest rate are determined simultaneously in the goods and money markets. The output is determined by the goods market and national income, (the IS Curve). The interest rate is determined by the money market (the LM Curve).

The determination of output at the aggregate level is the fundamental issue in macroeconomics. The interest rate effects output (through investment) and output effects the interest rate (through money demand), so its necessary to consider the simultaneous determination of output and the interest rate.

This is done by solving the IS and LM curves simultaneously to determine the output and the interest rate.

The IS Curve

The goods market and output is determined by the IS schedule which is defined as the following (assuming a closed economy),

$$Y = C + I + G$$

Investment is determined by two factors, sales and the interest rate. A firm facing an increase in sales will require greater investment in plants, machinery and new products to finance the sales. Thus, investment increases when sales increase. (This may not be the case for internet firms, but generally holds for 'blue chip' companies.)

An increase in the interest rate will increase the cost of borrowing which will in turn decrease investment. Example, individuals borrow smaller sums than companies because of the higher cost of borrowing.

Consumption depends on disposable income,

$$C = (Y - T)$$

Therefore, consumption depends on income minus tax, given that tax is deducted at source.

Government expenditure is exogenous (fixed rate that is constant) whereas investment and consumption are endogenous.

Accounting for the endogeneity of investment and consumption the IS schedule is,

$$Y = C(Y - T) + I(Y, i) + G \quad (1)$$

Equation (1) is called the IS relation which represents equilibrium in the goods market.

The LM Curve

By assumption, money is required for transactions to take place. Although it is not possible to measure the number or value of all transactions in the

economy, it seems reasonable to assume that the level of transactions is proportional to nominal income (Y). Therefore, money demand should be proportional to Y . On the other hand, allocating wealth to money comes at a cost of forgone interest on bonds. So money demand should decrease with the interest rate. Putting these observations together money demand can be defined as:

$$Md = YL(i)$$

Where the function L decreases as the interest rate increases and vice versa.

Assuming all money is currency, consider the supply of money to be fully controlled by the Central Bank and take national income as given. If this is the case then the money market is in equilibrium when the supply for money is equal to the demand for money.

$$Md = Ms$$

The central bank controls the money supply. The central bank increases money supply by simply printing more money. To reduce money supply they issue more bonds and once they are purchased there is less money in the economy.

The central bank controls money supply for monetary policy. If money supply is controlled they control the interest rate. Increasing the Money supply reduces interest rates and vice versa. The money supply is the governments measure of controlling monetary policy, and government expenditure is the way they control fiscal policy in the economy.

Both G and M_s are exogenous because both tools are used by the government to correct the free market if and when they choose to do so.

Empirical Example

$$Y=C+I+G,$$

$C=Y-T$, which is equal to disposable income.

$$\text{If } C=200+0.25(Y-T)$$

$$T=200,$$

$$I=150+0.25Y-1000i.$$

$$G=250,$$

$$\text{Is Curve } (Y=C+I+G) \Rightarrow Y=1100-2000i$$

$$\text{Money Demand} = 2Y-8000i$$

$$\text{Money Supply} = 1600.$$

$$\text{LM Curve} \Rightarrow i= Y/4000-1/5.$$

Substituting i from the LM curve into the IS curve gives: $Y=1000$, $i=1/20$, or 5%.