Macroeconomics Lecture 8

SGPE Summer School

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Introduction

· What causes short-term fluctuations in production and employment?

· Is there a choice between low inflation and low unemployment?

Long run vs Short run

- Long run:
- – Prices and wages flexible (that is, adjust to shocks)
- – Production/employment is in equilibrium
- – Supply factors determine production
- – Real interest rate is equal to the natural interest rate
- Short run:
- – Prices and wages are sluggish
- – Production/employment can deviate from equilibrium
- – Aggregated demand determines production
- – Expected real interest rate can deviate from the natural rate

- Interest and production in the short run (the IS-LM model)
- Economic activity and inflation in the short run (the Phillips curve)

IS

- A formalisation of Keynes's ideas
- Shows how the nominal interest and production (income) are determined with a given price level
- Analyses the interaction between the goods and money markets

Aggregate Demand: IS

We already have the two equations that make up the IS-LM model:
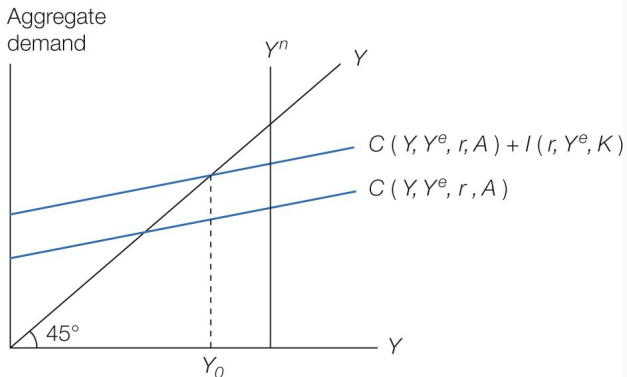
· IS equation – goods market equilibrium

$$Y = C(Y, Y^e, r, A) + I(r, Y^e, K) \qquad r = i - \pi^e$$

· LM equation – money market equilibrium
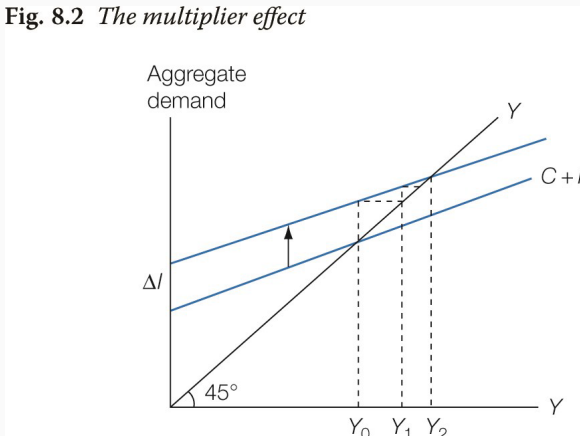
$$\frac{M}{P} = \frac{Y}{V(i)}$$

Fig. 8.1 *Short-run equilibrium in the product market*

Multiplier effect

Effect of increased willingness to invest

Fig. 8.2 *The multiplier effect*

Multiplier effect: The increase in production will be greater than the original demand increase
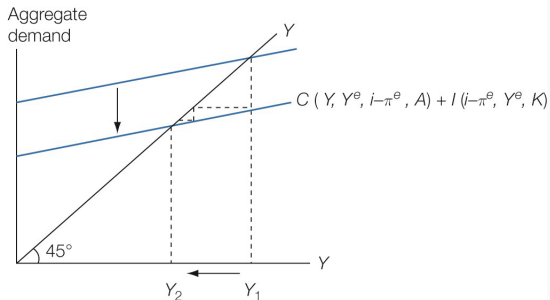
Multiplier effect

The multiplier:

- Investments increase
- Production/incomes increase
- Consumption increases
- Production/incomes increase...

Total effect: $\Delta Y = \Delta I + c\Delta I + c^2\Delta I + \cdots = \frac{1}{1-c}\Delta I$ where c is the MPC
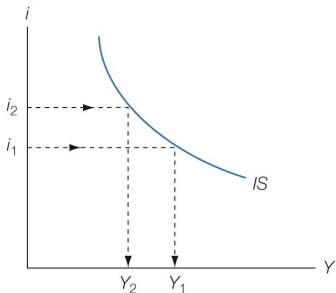
Fig. 8.3 *The effect on production of an increase in the interest rate*

Here we also have a multiplier effect

Fig. 8.4 *The IS curve*

The IS curve:

· Shows demand & production for each interest rate level

· Has a negative slope because a higher rate of interest leads to lower consumption and investments

· The slope is determined by how much the interest rate affects C and I and the size of the multiplier

· Changes in interest and production lead to movements **along** the IS curve

· Changes in exogenous variables (Y^e, π^e) etc. lead to **shifts** of the IS curve

Fig. 8.5 *The IS curve and the natural rate of interest*
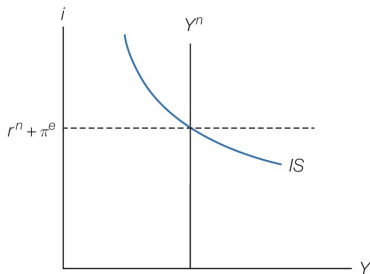
If $i = r^n + \pi^e$ production will be on the natural level

If $i > r^n + \pi^e$ production will be below the natural level

Consumption function: $C = a_0 + a_1 Y + a_2 Y^e - a_3 r + a_4 A$

Investment function: $I = b_0 - b_1 r + b_2 Y^e - b_3 K$

Good's market equilibrium:

$$Y = \frac{a_0 + b_0}{1 - a_1} - \frac{a_3 + b_1}{1 - a_1} r + \frac{a_2 + b_2}{1 - a_1} Y^e + \frac{a_4}{1 - a_1} A - \frac{b_3}{1 - a_1} K$$

The effect of interest rate increase on output:

$$\frac{\Delta Y}{\Delta r} = -\frac{a_3 + b_1}{1 - a_1}$$
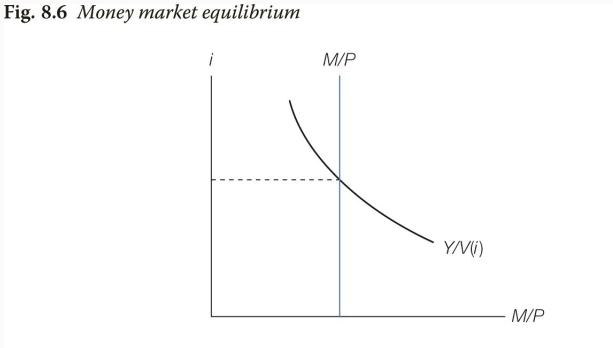
LM

Household assets:

- Money

- Loans to companies

- Shares in the companies, which we assume they retain

The interest rate adjusts so that supply = demand on loans, which is the same as

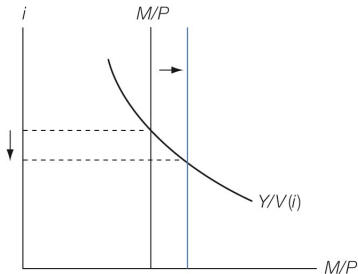supply=demand on money: $\frac{M}{P} = \frac{Y}{V(i)}$

Fig. 8.6 *Money market equilibrium*

Fig. 8.7 *The effect of an increase in the money supply on the interest rate*

The central bank can influence the interest rate by changing the money supply

Fig. 8.8 *The effect of an increase in production on the interest rate*

Fig. 8.9 *The LM curve*
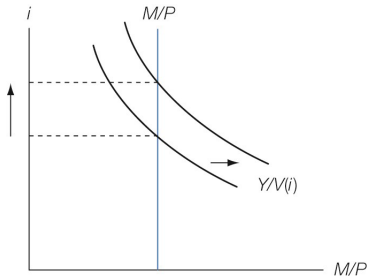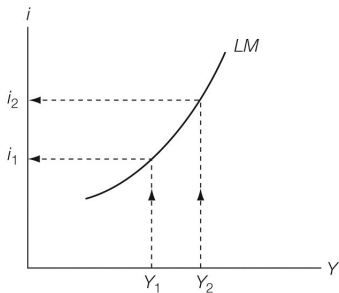
LM curve

The LM curve:

· Shows what the interest rate will be for each level of production

· Slopes upwards since higher production leads to more transactions and an increased demand on money

· The slope is determined by how production and interest rate affect the demand on money

· Changes in production and interest rate lead to movements along the LM curve

· Changes in exogenous variables (like M) lead to shifts of the LM curve

$Y = C + I$ Good's market equilibrium

$C = C(Y, Y^e, i - \pi^e, A)$ Consumption function
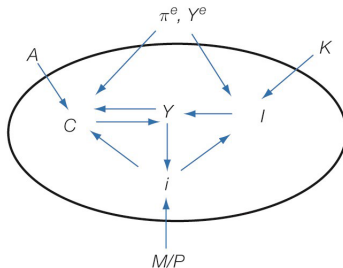
$I = I(i - \pi^e, Y^e, K)$ Investment function

$\dfrac{M}{P} = \dfrac{Y}{V(i)}$ Money market equilibrium

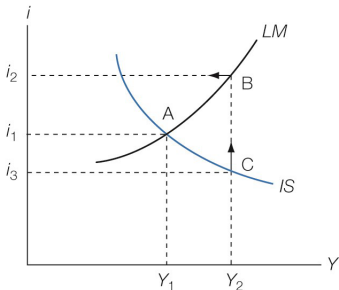Four endogenous variables: Y, C, I and i.

Fig. 8.10 *Exogenous and endogenous variables in the* IS-LM *model with exogenous money supply*

Fig. 8.11 *Short-run equilibrium in goods and money markets*

A: Both markets in equilibrium

B: Goods' market not in equilibrium (Y must go down)

C: Money market not in equilibrium (i must go up)

How to use IS-LM

· Determine whether disturbance shifts IS and/or LM curve(s) and draw new curves in the diagram

· From the diagram, read what is the effect on interest rate and production (if they are going up or down)

· Present an economic explanation for what is happening in the goods' and money markets (direct and indirect effects)

· Investigate and explain the effects on other variables (employment, consumption, investments, etc.)
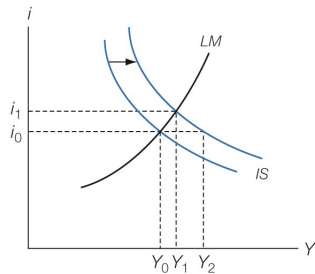
Fig. 8.12 *The short-run effect of an increase in the money supply*
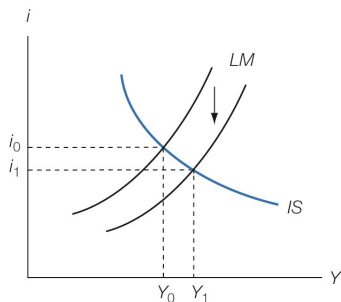
Fig. 8.13 *The short-run effect of increased optimism*

There are many studies of microdata that show that prices are sluggish.

It is harder to use macroeconomic data to test the model.

How can we test if monetary policy has any effects on the real economy?

· Study the correlation between changes in interest rate and changes in production?

· Carry out experiments with monetary policy?

· Use statistical methods (VAR) to identify effects of 'exogenous' shocks to the interest rate. Studies using this method suggest that monetary policy has substantial effects on GDP

Fig. 8.15 *Effects of a monetary policy shock in the United States*
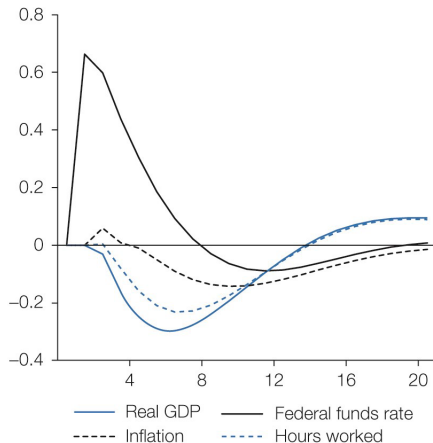
Note: The figure shows the response of GDP, hours worked, and inflation to a typical monetary policy shock. The interest rate and inflation are measured in percentage points, while GDP is measured in percent deviations from the steady state.

Source: Lawrence J. Christiano, Karl Walentin, and Mathias Trabandt, 'DSGE models for monetary policy analysis', in *Handbook of Monetary Economics*, ed. Benjamin M. Friedman and Michael Woodford (Amsterdam: North-Holland, 2011), vol. 3a, ch. 7, pp. 285–367.