

# Macroeconomics Lecture 10

SGPE Summer School

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# Introduction

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## Stabilization Policy:

- Monetary policy: money supply and interest rate
- Fiscal policy: government consumption, investment, transfers and taxes

# Monetary Policy

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# Questions

- What are the goals of monetary policy?
- How should the central bank act when there are shocks to demand and supply?
- How is monetary policy carried out in practice?

- Price stability
- High and stable production and employment
- Well-functioning financial markets: payment systems, credit supply

...but price stability is the primary goal

### Goal of the ECB

- The primary goal of the ECB is to maintain price stability
- Without neglecting this goal, the ECB should support the general economic policy of the EU with the aim of realizing its general goals

Note that the goal of price stability is superior



Why is price stability the primary goal?

- Monetary policy cannot affect the long-term level of production/employment
- A clear inflation target can make it easier to achieve low inflation by affecting expectations - expectations are tied down and the Phillips curve is stabilized

Model

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

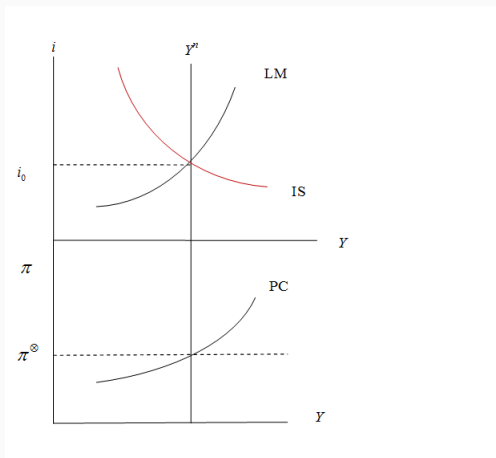
$$\frac{M}{P} = \frac{Y}{V(i)}$$

$$\pi = \pi^e + \beta \frac{Y - Y^n}{Y^n} + Z$$

The central bank has an inflation goal  $\pi = \pi^\otimes$

Assume that  $Y = Y^n$  and  $\pi = \pi^e = \pi^\otimes$  initially

# Model in Graph



# Changes in variables

- Increase in the demand for money
- Shock to aggregate demand
- Shock to non-wage costs (oil price)
- Shock to productivity
- Increase in expected inflation

# Increase in demand for money

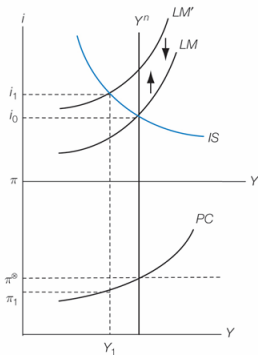
Question:

How should the central bank act if there is an increase in the demand for money (for instance, if people become afraid to use their credit cards so they need more cash in their wallets)?

If nothing is done, the interest rate will rise, production will fall and inflation will fall below target

Answer: Increase the money supply so that the interest rate stays constant

Fig. 10.1 A shock to money demand



Source: ECB homepage, which contains footnotes and explanations and where data can be obtained free of charge, <http://www.ecb.int/stats/monetary/rates/html/index.en.html#>.

- Shocks to demand for money need to be accommodated and this is what central banks do
- Central banks decide about the interest rate and adjust the monetary base so as to keep the interest rate at the desired level
- In the following we focus on the interest rate rather than the money supply when discussing monetary policy



Question:

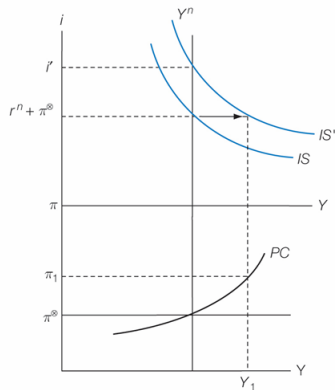
How should the central bank react if consumers become more optimistic about the future (increase in )?

Answer: Counteract increase in aggregate demand by raising the interest rate Ideally, the interest rate is adjusted so the expected real rate reaches the new, higher, natural level, so that

$$Y = Y^n$$

# AD shocks in graph

Fig. 10.2 A real demand shock



## Temporary cost shocks

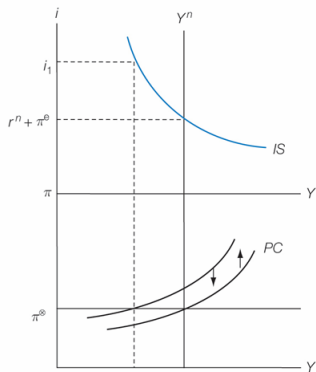
Question: How should the central bank act if there is an unexpected cost shock, for example, an unexpected rise in the price of oil while equilibrium production is the same ( )?

Alternatives:

- Keep the same interest rate  $\implies$  Higher inflation
- Raise the interest rate  $\implies$  Negative output gap

It is probably best to keep the same interest rate and accept temporarily higher inflation but the CB has to convince the general public that it has not changed to a more inflationary monetary policy

Fig. 10.3 A cost-push shock



Question:

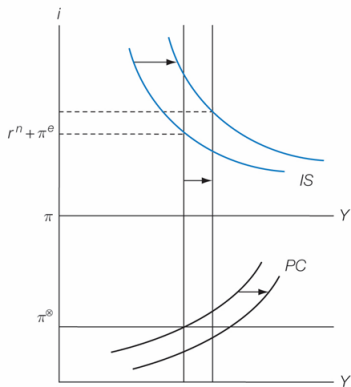
How should the central bank act if there is an unexpected permanent increase in productivity (that is,  $Y^n$  increases)?

The increase in productivity leads to a higher equilibrium level for production and to higher consumption and investments

Firms' unit labour costs go down, which brings down inflation

The central bank should stabilise inflation by adjusting interest rates so that production lands on the new equilibrium level. Whether the interest rate should rise or fall depends on how much IS shifts in relation to  $Y^n$

**Fig. 10.4** *An unexpected permanent increase in productivity*



Question:

How should the central bank react if the general public loses confidence in the inflation target and starts to expect higher inflation?



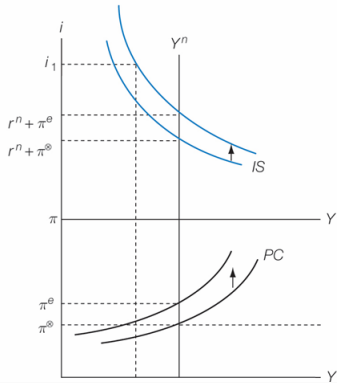
Higher expected inflation leads to a drop in the expected real interest rate and an increase in demand at a given nominal interest rate, so the IS curve shifts up

Higher expected inflation implies that, for a given level of production, wage increases and inflation will be higher so production must fall in order for inflation to return towards the target

If the central bank wants to defend its inflation target it must raise the interest rate so that production drops

The interest rate must be raised more than the increase in expected inflation

Fig. 10.5 An increase in the expected inflation rate



## A rule for monetary policy

When expected inflation is in line with the inflation target, the central bank should set the interest rate so that production is on the natural level

When expected inflation is higher than the inflation target, the central bank should defend the inflation target by setting the interest so high that it causes a negative output gap and inflation is brought down

If there is a cost-push shock, the reaction depends upon the weight given to stabilizing inflation relative to production

In practice there are several complications:

The central bank cannot directly observe the exogenous shocks, the equilibrium levels of production and interest rate or the inflation expectations of the wage and price setters

Data become available after a time delay of  $\frac{1}{2}$ -1 year

Monetary policy affects production and inflation with a time delay of 1-2 years (see VAR-studies in Lecture 8)

## How will the central bank react to news?

Production increased more than expected

- Is this a sign that the economy is overheated?
- Is it a sign of an increase in the underlying productivity growth?

Estimate the size of the output gap

## How will the central bank react to news?

Inflation exceeds the inflation target

- Is this because expected inflation is higher than the inflation target?
- Is it a result of an overheated economy?
- Is it the result of an unexpected cost-push shock?

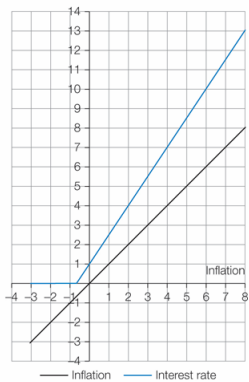
Use data about inflation expectations, estimates of the size of the output gap and alternative measures of inflation

John Taylor showed that monetary policy in the USA during the period from 1982-1991 could be described quite well by the equation:

$$i = 0.01 + 1.5\pi + 0.5\hat{Y}$$

The Taylor principle: The interest rate should be raised more than the increase in inflation so as to raise the real interest rate and reduce aggregate demand

**Fig. 10.6** *The Taylor Rule*



Note: Interest rate and inflation are shown in percentage units.



# Rational Expectations

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Rational individuals should form expectations that are consistent with how monetary policy is actually carried out

This means that only monetary policy that isn't expected can have any real effects

But monetary policy can nonetheless have real effects if wages and prices are sticky. In theory, monetary policy can compensate for lack of wage flexibility

## Tools for monetary policy

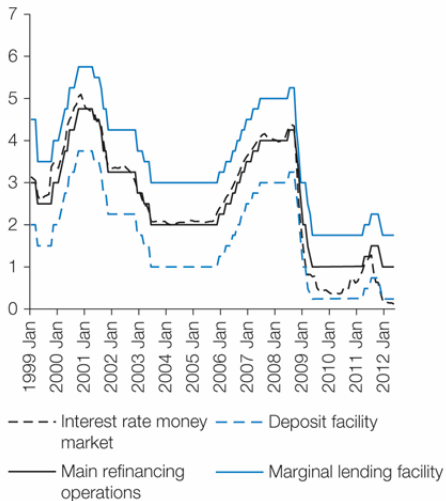
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What instruments does the central bank use to control the interest rate?

Open market operations

Interest rates for banks' overnight deposits and loans at the central bank (marginal deposit and lending facilities)

**Fig. 10.8** *The interest rate corridor at the European Central Bank*



Source: ECB homepage, which contains footnotes and explanations and where data can be obtained free of charge, <http://www.ecb.int/stats/monetary/rates/html/index.en.html#>.

The overnight rate is controlled by the central bank through the interest rate corridor and repurchase operations

Other interest rates are influenced by expectations of future repo rates

For long interest rates, expected inflation plays the biggest role