ECN 106 Macroeconomics 1

Lecture 7

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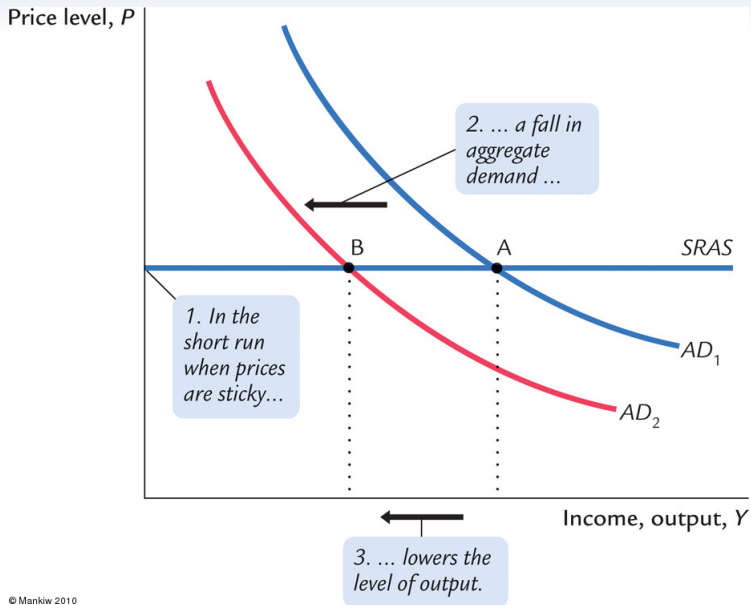# Roadmap for this lecture

- General equilibrium in the short run
- General equilibrium in the short vs. long run: a taxonomy
- Policy mix
- Interest rate setting vs money supply setting
- Mankiw Chapters 11-1, 11-2(Section 2), 9-5

Recapping: sticky prices

- ▶ In the last lecture we argued that our long-run model can explain changes in the composition of output and inflation over a 3-6 year horizon.

- ▶ In order to explain output fluctuations at business cycle frequency (1-3 years) we need a different - short run - model.

- ▶ Such a model has to feature some sort of price stickyness to generate deviations in output from its long-run value (particularly in response to monetary shocks).

- ▶ We assume an extreme form of short-run price stickyness. Prices are fixed at some exogenous value in the short run.

Recapping: demand shocks in the short run

Price level, P

2. ... a fall in aggregate demand ...

B   A   SRAS

1. In the short run when prices are sticky...

AD_1

AD_2

Income, output, Y

3. ... lowers the level of output.

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Why do we care

- Demand shocks cause output fluctuations in the short run (recessions and booms)

- Because the Central Bank (through monetary policy) and the government (through fiscal policy) can shift the aggregate demand curve, they can try to offset demand shocks and keep output and employment at their long-run value.

Adjustment from SR to LR equilibrium

▶ Suppose that in the second period, half of firms set their price equal to its long-run value and the other half leave it unchanged. In the third period, half of the firms which did not adjust set their price to its long-run value and so on...

▶ As a result, SRAS shifts down to SRAS'.
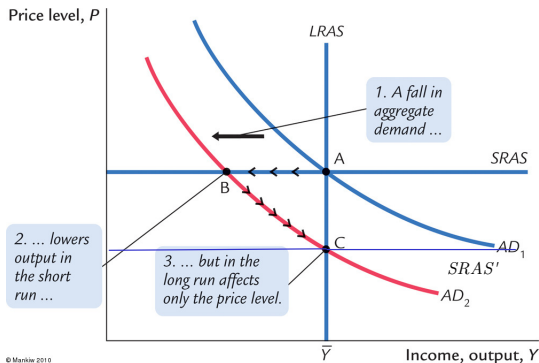
General equilibrium in the short run

$$P = \bar{P} \qquad \text{(SRAS)}$$

$$Y = \bar{C} + c(Y - \bar{T}) + a - br + \bar{G} \qquad \text{(IS)}$$

$$\frac{\bar{M}}{P} = YL(r + \pi^e) \qquad \text{(LM)}$$

- Three equations in three endogenous variables (Y, r, P).
- But now the labour market no longer determines $Y \to$ output is not determined on the labour market alone.
- In fact, we need to solve for (Y, r, P) all together.

Aggregate demand and supply

- The price level does not appear in the (Y, r) space.
- On the other hand, in the (Y, P) space we can use the SRAS and AD

$$P = \bar{P} \qquad \text{(SRAS)}$$

$$Y = Y^{AD}\left(\frac{\bar{M}}{P}, \bar{Z}, \pi^e\right) \qquad \text{(AD)}$$
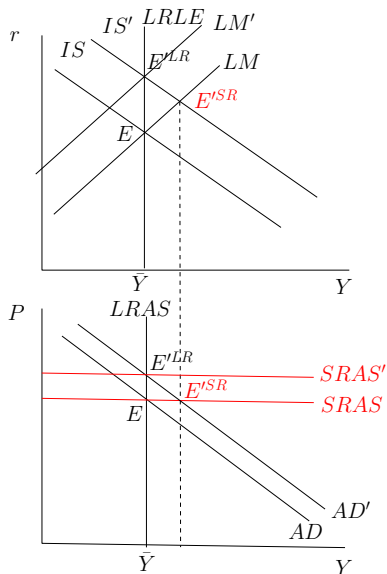
A cheat sheet

(Y, r) space	Short run	Long run
Labour market	-	LRLE $Y = \bar{Y}(\bar{z}, \mu)$
Goods market	IS $Y = \bar{C} + c(Y - \bar{T}) + a - br + \bar{G}$	
Money market	LM $\frac{M}{P} = YL(r + \pi^e)$	

(Y, P) space	Short run	Long run
Labour market	SRAS $P = \bar{P}$	LRAS $Y = \bar{Y}(\bar{z}, \mu)$
Money market	AD	$Y = Y^{AD}\left(\frac{\bar{M}}{P}, \bar{Z}, \pi^e\right)$

Only difference is the labour market.
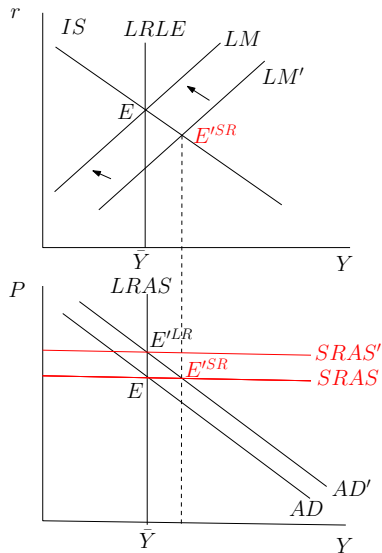
Goods market shocks

E.g. $\bar{G} \uparrow$

Goods market shock: intuition

- ▶ The shock increases total desired expenditure (goods market)

- ▶ In the SR, firms are willing to accomodate the increase in expenditure by expanding output and employment (labour market).

- ▶ The increase in output increases money demand putting upward pressure on the nominal, and real, interest rate (money market).

- ▶ The increase in the interest rate depresses investment but less than one-for-one as output can adjust (crowding out is only partial in the SR).

- ▶ In the LR, firms raise prices and output returns to its LR value. The interest rate increases by more to crowd out investment 100%.

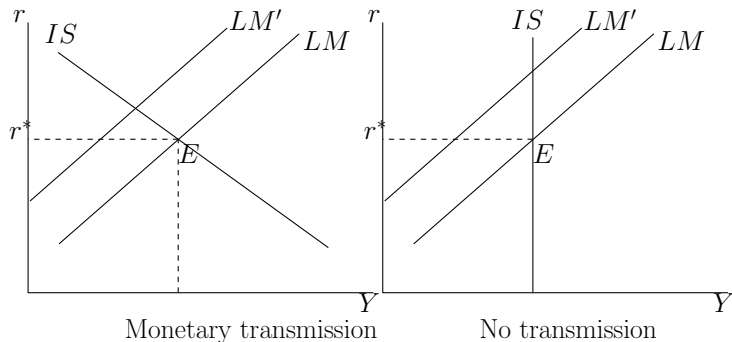# Money market shocks

E.g. $\bar{M} \uparrow$

How do money market shocks affect output

- A money market shock causes a change in the **nominal** interest rate $r + \pi^e$ (money market).
- For given expected inflation, this is a change in the **real** interest rate r
- If investment is affected by the real interest rate, the change in the real interest rate affects investment and total desired expenditure.
- This effect goes under the name of **monetary transmission mechanism**
- Firms adjust output and employment at fixed price in response to the change in desired expenditure (labour market).
- In the LR firms raise prices and output returns to $\bar{Y}$. The change in the price level ensures that the money market clears.

The monetary transmission mechanism: a graphical illustration

In a closed economy, the monetary transmission mechanism takes place through the effect of the interest rate on investment. No transmission if investment is independent of the interest rate (vertical IS, right figure).

Monetary transmission   No transmission

Cheat sheet n. 2: short vs long run

Response to an **expansionary** shock.

Goods market shock

	Short run	Long run
Y	+vely affected	unaffected
r	+vely affected	+vely affected
P	unaffected	+vely affected

Money market shock

|	Short run	Long run
Y	+vely affected	unaffected
r	-vely affected	unaffected
P	unaffected	+vely affected

Policy mix: interaction between monetary and fiscal policy

- ▶ When considering a change in monetary or fiscal policy one must take into account that they are in the hands of two different groups of policymakers who may respond to what the other group is doing.

- ▶ A change in one policy may induce a change in the other.

- ▶ Alternatively the two groups of policymakers can coordinate if they want to achieve more than one objective.

- ▶ This interdependence is important.

Policy mix II

- ▶ Consider a fiscal contraction; e.g. a tax increase.
- ▶ The effect depends on how the Central Bank respond to the tax increase.
- ▶ We consider three alternative scenarios.
  1. CB holds the money supply constant.
  2. CB holds the interest rate constant.
  3. CB adjusts monetary policy to keep output constant
     - Clinton-Greenspan expansion in the early 90s
     - Current policy mix in the UK, but output still below LR equilibrium as monetary policy is not powerful enough (liquidity trap)

Alternative policy mixes
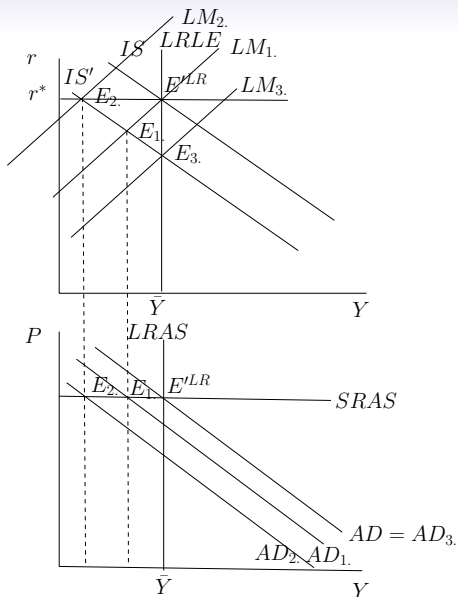
Policy mix: the main message

► The **general equilibrium** multiplier of fiscal policy depends on the stance of monetary policy.

  • The **general equilibrium** multiplier is zero if the central bank aims to keep output constant (case 3).
  • When thinking about the effect of a change in one policy in the real world one has to make an assumption on how the other policy will respond.
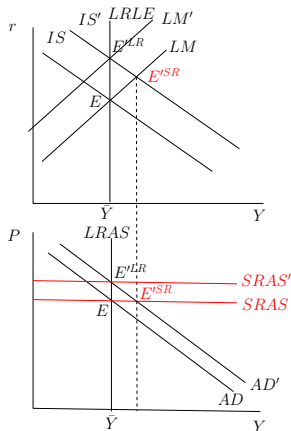 • The most appropriate assumption may change from case to case.

Case study: the 2001 US recession

Fall in investment (burst of dot.com bubble + 9.11): IS → IS'

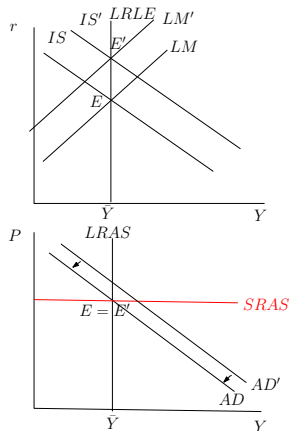Policy response: tax cuts + Gulf War (fiscal expansion - IS' →
IS") + monetary expansion (LM → LM')
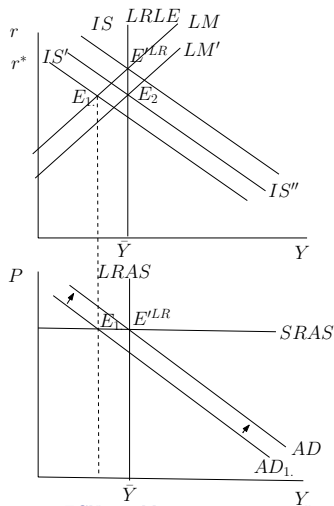
GE fiscal multiplier at the LR equilibrium output level

Passive monetary policy   Offsetting monetary policy

GE fiscal multiplier at the LR equilibrium output level

▶ Most modern (independent) central bank would offset a fiscal expansion starting from the LR equilibrium output level by means of a contractionary monetary policy to keep output and the price level constant.

▶ Intuition: the economy is not in a recession and the expansionary fiscal policy would result in higher prices in the long run.

▶ The central bank cuts the money supply to nip the price increase in the bud.

▶ The **general equilibrium** multiplier of fiscal policy starting from the LR equilibrium output level is therefore most likely zero.

Policy mix: multiple independent targets

- ▶ Sometimes it is desirable to achieve a number of *independent* targets: e.g. boosting investment without depressing output in the short run.

- ▶ You need as many independent instruments as the number of objectives you want to hit (Tinbergen) → a number of policies need to be coordinated.

Policy mix: multiple independent targets II

E.g to boost investment without depressing output in the short run $\rightarrow$ appropriate policy mix is a contractionary fiscal policy coupled with expansionary monetary policy.
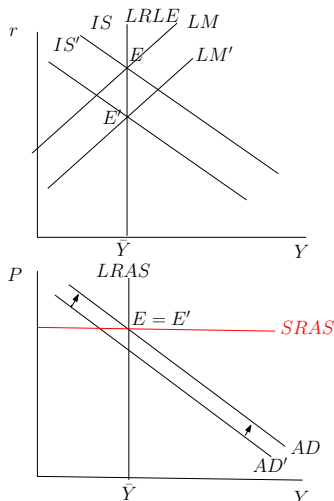
What monetary policy instrument
The money supply or the interest rate?

- ▶ In most of our discussion of monetary policy, we have assumed that CB control the money supply.
- ▶ In fact, the Monetary Policy Committee of many CB sets a target for some interest rate (base rate in the UK).
- ▶ The two are related: in order to keep the interest rate on target, bond traders at the Bank of England have to buy/sell bonds in exchange for money to supply any quantity of money the market may demand at the given interest rate.
- ▶ Though the interest rate is the (short-term) target, the instrument is the money supply.