ECON2004 Macroeconomic Theory and Policy

Lecture 3: The supply side.

Reading: see Moodle

Last week: consumption, investment and the IS curve

Moving along the IS curve:

Shifts in the curve:

The supply side

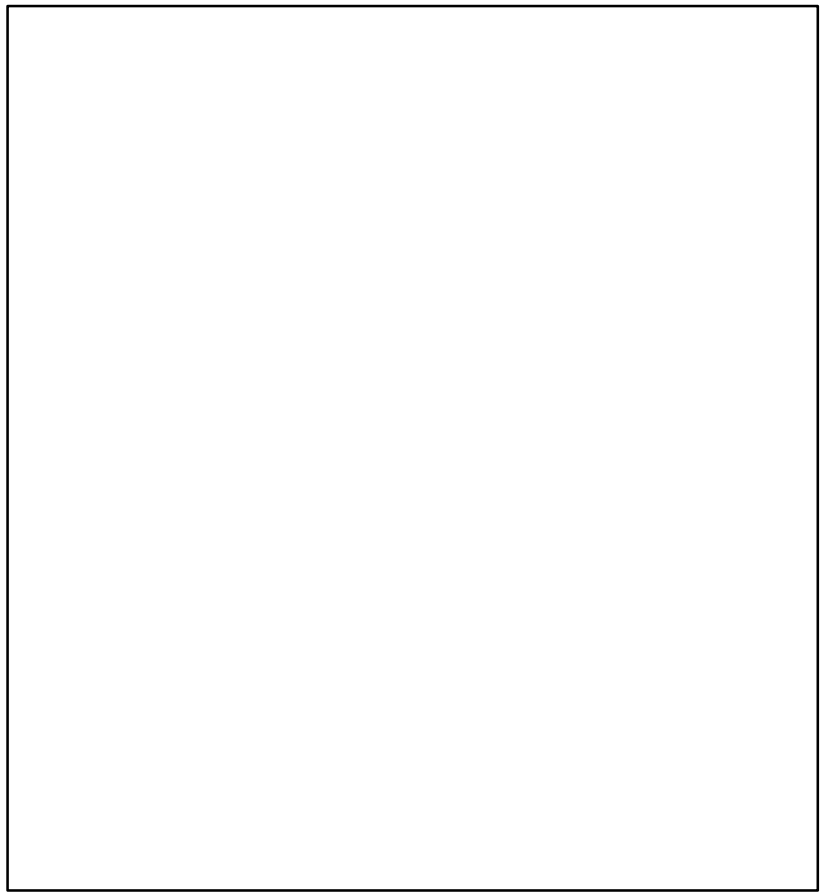
Production function:

$y = af(k,n)$:

Assume capital and aggregate productivity (a measure of the level of technology among other things) only change slowly so we can neglect them for the purposes of analysing the business cycle.

Why? Otherwise the model would become unmanageable…

Links between the demand side and the supply side:



This lecture: the labour market

Under perfect competition:	Under imperfect competition:
• Labour demand (LD) • Labour supply (LS) • Potential output • Often referred to as the “classical” model	• Wage setting (WS) • Price setting (PS) • Equilibrium output • Sticky wages • The Phillips Curve (PC)

The labour market under perfect competition

Labour demand

- Firms maximising profits
- The real wage paid is the marginal product of labour
- so diminishing marginal product of labour implies a downward sloping LD curve

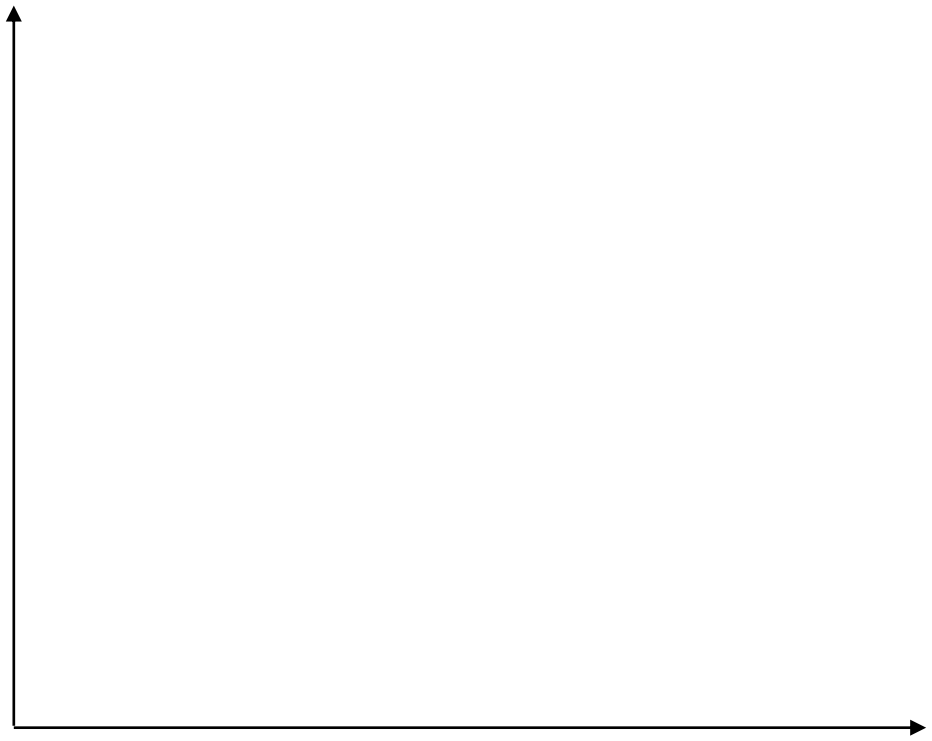
Labour supply

- Individuals maximising utility
- Tradeoff between disutility of work and utility of income (consumption)

A rise in the real wage leads to:

- Income effect:
- Substitution effect:
- Assume the latter dominates so the LS curve is upward sloping

The labour market under perfect competition



- Prices and wages and flexible so the labour market always clears at “full” employment and “potential”output
  - Unemployment is voluntary
  - This level of output is optimal (microeconomic welfare theorems)
  - What can policy do?

“Practical men [sic], who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist.” (Keynes, General Theory)

(Some of) the assumptions of perfect competition

1. No market power i.e. everyone is a price taker	Do these hold in the labour market?
2. Complete contracts	In the goods market?
3. Complete information	

The supply side of the labour market when these assumptions don't hold

Incomplete contracts:

- firms can't observe workers' effort so have to pay workers a real wage higher than the reservation wage to encourage them to exert effort
- the lower the unemployment rate, the higher this wage must be since workers will be less worried about getting fired

Workers with market power:

- market power can either arise because of unions or differentiated skills
- either of these will lead to workers asking for a real wage higher than their reservation wage
- unemployment is a measure of how much bargaining power workers have
- when unemployment is low, workers have more bargaining power so will obtain a higher real wage

The wage setting curve

$W = P(1 - au + z)$

1. P
2. u
3. z

- although workers and firms care about the real wage, in practice all wages are set in nominal terms (this will be important later when we talk about sticky prices)
- the WS lies above the LS curve so whatever happens in the goods market there will be involuntary unemployment
- the gap is a measure of the degree to which the assumptions of perfect competition fail to hold

Price setting

Under perfect competition:

Under imperfect competition:

Nominal marginal cost of labour:

$MC = (1+t)W/\lambda$

- where λ is the marginal product of labour = $af_n(k,n)$
- t are proportional taxes that the firm pays
- for simplicity, assume λ is independent of output
- then:

The price setting curve

$$\frac{W}{P} = \frac{\lambda}{(1+\mu)(1+t)}$$

Properties:

Horizontal by assumption

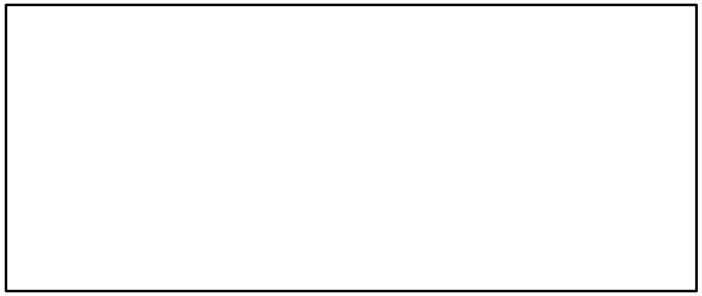
Shifts if:

- the marginal product of labour changes
- the markup changes
- firm taxes change
- anything else that takes a share of the marginal product of labour changes

Price setting, wage setting and aggregation

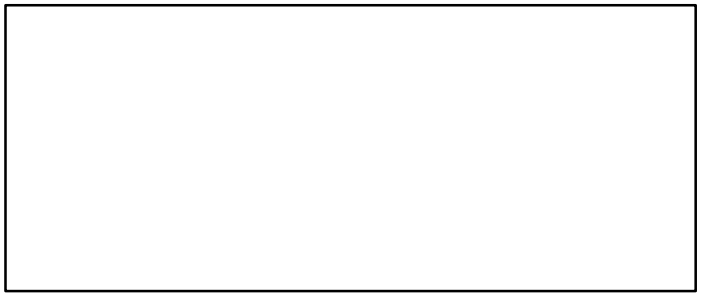
Wage setting:

- workers and firms agree on a nominal wage specific to them W^f
- to get the aggregate nominal wage, sum over all firms



Price setting:

- firms set the price of their own good P^f
- to get the aggregate price level (corresponding to the CPI) sum over all firms



The labour market under imperfect competition

WS / PS:

Properties:

- equilibrium output is where price and wage setting are consistent
- it corresponds to the NAIRU (non-accelerating inflation rate of unemployment)
- there is both voluntary and involuntary unemployment
- changes in the exogenous variables will shift the WS or PS curves so change equilibrium output
- if output is away from equilibrium there are no labour market forces which change it

Equilibrium output

Tax rates:

Oil prices:

A bit more on efficiency wages

Higher wages bring benefits to firms as well as costs

Why?

- Better nutrition (developing countries, UK in 19th century)
- Fairness / morale – gift exchange
- Turnover
- Adverse selection
- Moral hazard

"highly paid labour is generally efficient and therefore not dear labour; a fact which is more full of hope for the future of the human race than any other that is known to us" (Marshall)

Efficiency wages

Henry Ford and efficiency wages

In 1914 Ford offered workers $5 for an 8 hour shift. Wages had previously been $2.34 for 9 hour shift, a 240% pay increase.

	1913	1914	1915
Turnover Rate	370	54	16

	1913	1914
Absenteeism	10%	2.5%

Model this as a moral hazard problem:

- workers dislike effort and want to "shirk" (i.e. turn up at work but exert no effort)
- firms cannot monitor effort perfectly
- firms pay a wage above the reservation wage to encourage workers to exert effort
- if unemployment falls, workers are less scared of getting caught shirking and fired, so firms have to pay a higher wage
- the WS curve is upward sloping

Price and wage ("nominal") stickiness

Sticky prices:	**Sticky wages:**
• some prices are flexible • some prices are sticky • a very rough estimate of the average time between price changes is	• most wages are governed by periodic contracts, either formally with annual union-bargaining rounds or informally

Price and wage stickiness: in the model

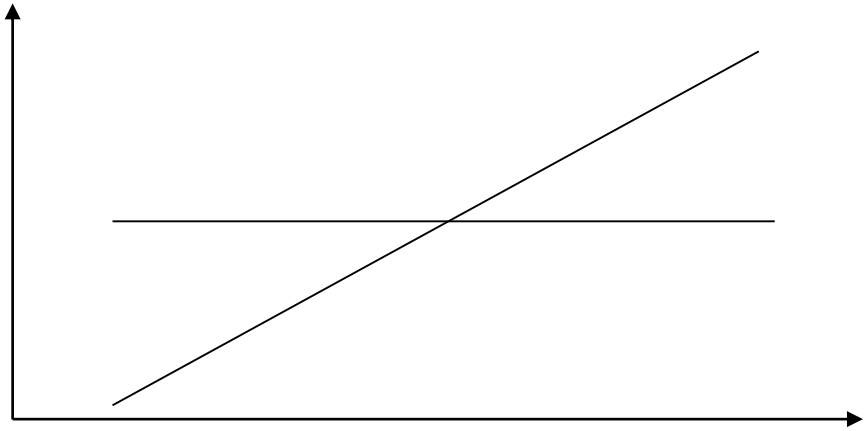
In what follows we'll assume

- wages are set for one period in advance, and cannot be changed during that period. "sticky wages". Then wage setting is:

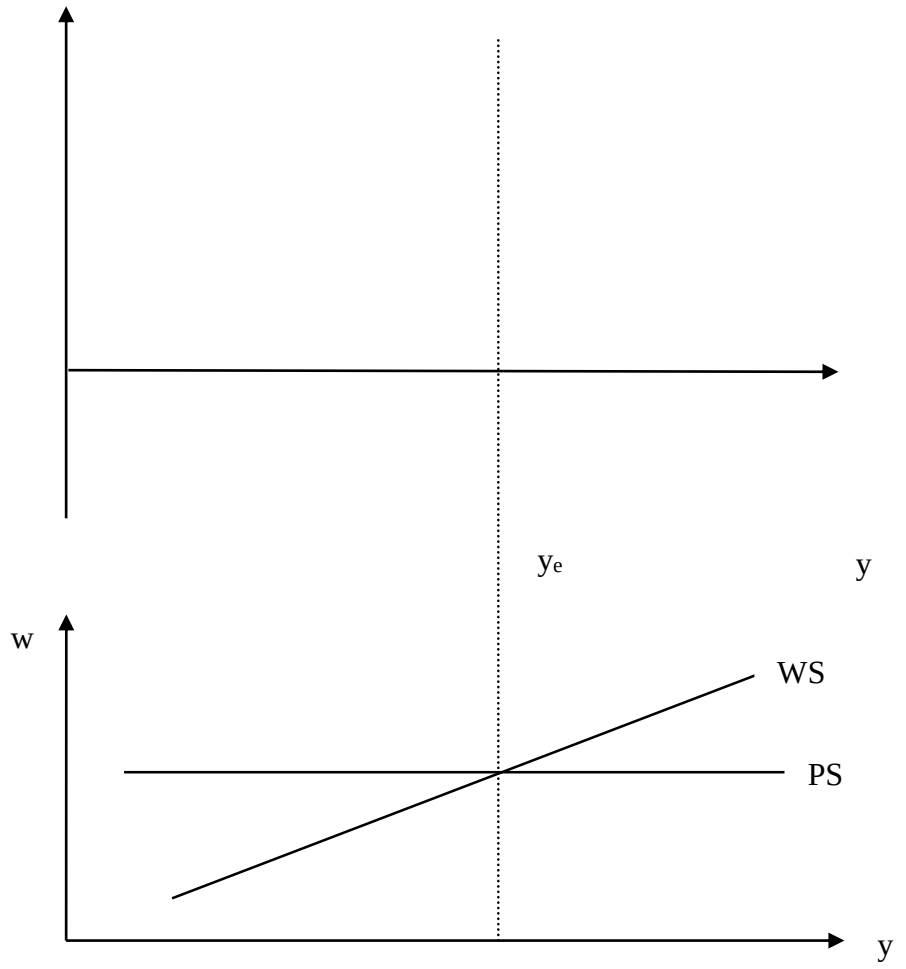
- prices are flexible so firms can change prices whenever they want

- this implies the economy is always on

- and, except when output is at equilibrium, workers will get a real wage different from the one they expected



The relation between y and π: deriving the Phillips curve



Treat expected inflation as exogenous

Expected inflation = 0%

	y_e	$y_1 > y_e$	$y_2 < y_e$
Wages			
Prices			

Expected inflation = 3%

	y_e	$y_1 > y_e$	$y_2 < y_e$
Wages			
Prices			

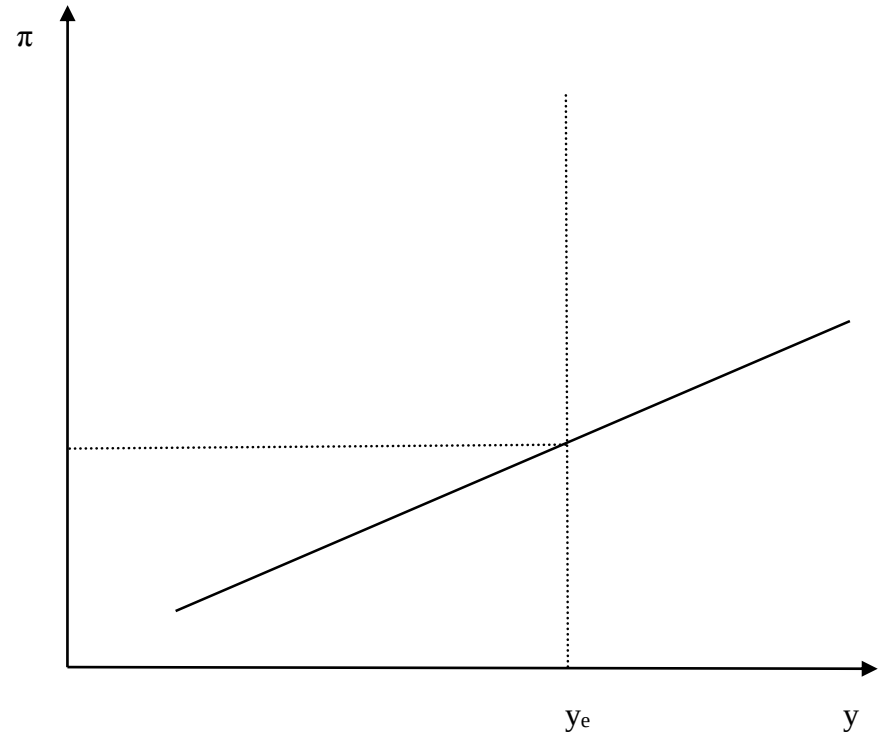
The Phillips curve and expected inflation

The PC can be written as:

$$\pi = \pi^e + \alpha(y - y_e)$$

There are a family of PCs, with each one corresponding to a particular level of expected inflation.

Only at equilibrium output is actual inflation equal to expected inflation.



The slope of the Phillips curve

If the period over which inflation is calculated is the same as the period over which wages are set, the PC is parallel to the WS curve.

If wages are set less frequently than inflation is calculated, the PC is flatter than the WS curve.

If wages are set more frequently, the PC is steeper than the WS.

In the limiting case of flexible wages the PC is:

and output is always at

If prices were sticky as well as wages, the PC would be flatter than with only wage stickiness.

Timing and expectations

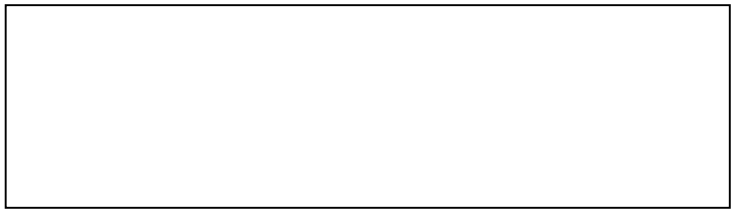
Timing:

We'll assume in each period events happen in the following order:

- Expectations are updated
- Nominal wages are set
- Then, knowing this wage, firms set their prices
- Then the economy is on the PS curve (and in general **off** the WS)

Expectations:

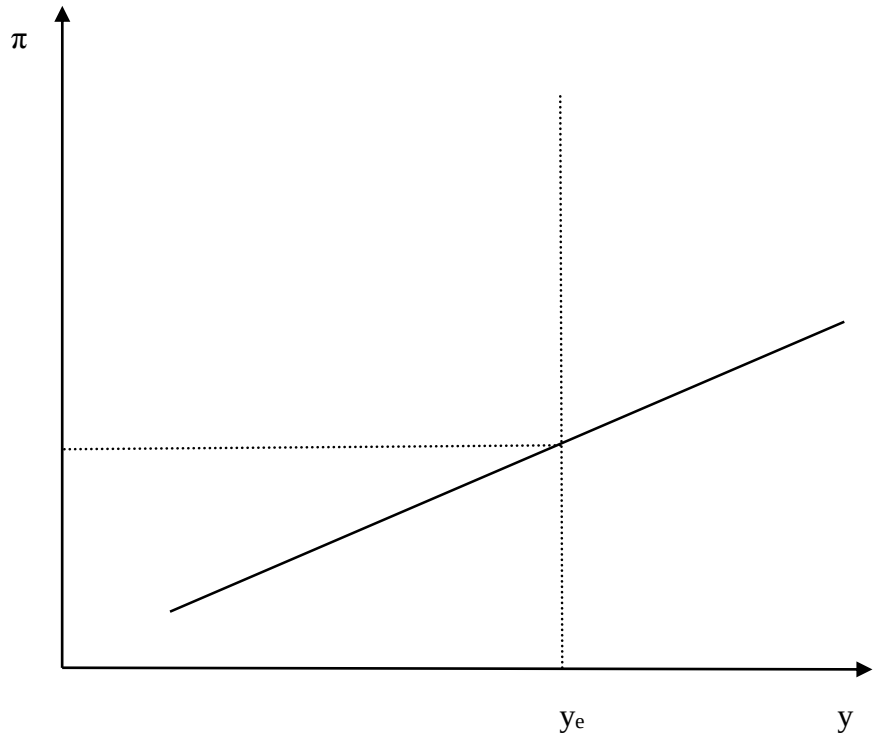
- For the moment, assume "adaptive expectations": expected inflation in the next period is equal to current inflation



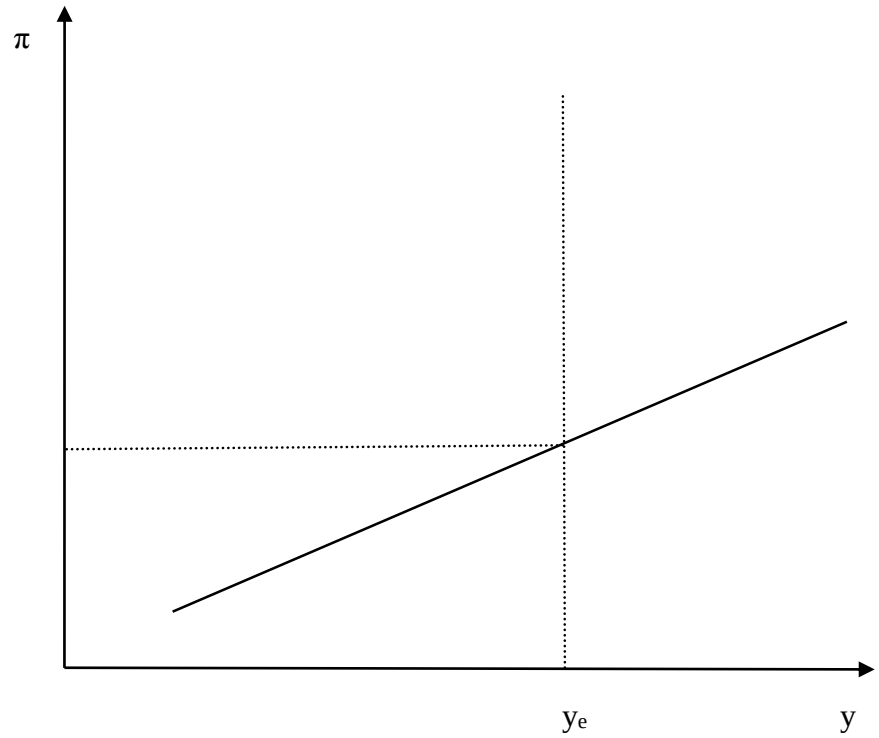
- See lecture 5 for more detail

The economy without policy

At equilibrium output:



Away from equilibrium output:



Is the economy unstable without policy?

Under perfect competition, any deviation from potential output is reversed by price or wage adjustment. Such mechanisms which return the economy to equilibrium without policy intervention are known as "classical" mechanisms.

Potential such mechanisms in the WS/PS model:

- expected high real wages could lead to entry into the labour force
- expectations: if workers consistently get a lower real wage than they expect, they will change the way they form expectations (see lecture 5)

Simplistic view:

- **Hayek**: classical mechanisms are powerful
- **Keynes**: no they're not, "in the long run were all dead"

However Keynes later came very close to agreeing with Hayek that there are powerful self-stabilising mechanisms…

… and a look at history says he was probably right to do so e.g. over centuries, unemployment rarely deviates much from its average for more than 5 – 10 years, unless caused by poor policy e.g. UK in 1920s; Eurozone…

Summary

This lecture:	Next lecture:
• The labour market under perfect competition • The labour market when the assumptions of perfect competition do not apply – WS, PS, PC • Timing and expectations • Remember the rest of the supply side: a,k and links between demand and supply	• Optimal monetary policy (MR) • Using the three – equation model