

Macroeconomics for E&BE

Lecture 4

1-12-2015

Chapter 8 and 9.1

What we did so far was looking at the short run economy. Today we will look at the medium run and determine the aggregate supply. In the previous weeks there was not really a price level in the goods market, the prices of goods and services were fully fixed. We are going to drop the assumption that supply will always follow demand, firms will determine aggregate supply. With the interaction between demand and supply in the goods market we can determine the price level.

Before, firms could determine how much output they were producing and thus focused on profit maximization. The supply curve was thus horizontal. With this horizontal curve we saw that expansionary fiscal policy would make the demand for goods increase (Z) and that production would follow. Today we get rid of the horizontal supply curve. With the new supply curve you will not always have the same price level. The supply curve is upward sloping because the curve is based on the labour market. This is the fifth and last market we are going to introduce. When demand goes up, the price level also will go up.

In chapter 8 we are focusing on the labour market and in chapter 9.1 on aggregate supply.

Aggregate supply

In the previous weeks we said that Z is equal to Y and Y was just a number. From now, Y is determined by the behavior of firms. Firms use Capital (K), Labour (N) and Technology (A) to produce goods and services. This is summarized in the production function:

The formula says that any change in (one of the) factor inputs affects the level of output. In the medium-run we assume that capital and technology are fixed, so we are focussing on labour. Changes in employment determine changes in output. That's why we focus on the labour market first.

Labour market

Last week we could read in the newspaper (Volkskrant) the good news: 'the unemployment rate rose!'. This is good news because now the economy is improving the people who stopped looking for a job may reconsider looking for a job again. They now belong to the labour force so the unemployment rate is increasing.

The labour market has a sort of demand and supply curve: the wage determination curve and the price determination curve. The equilibrium exist in the point where we know how much labour to hire and how much goods to put into the market.

This is one way to analyse the labour market, as any other market:

- Supply of labour: workers seeking employment
- Demand for labour: firms offering employment
- Price of labour: the wage rate in real terms

With the neo-classical thinking the employment is determined by the equality of supply and demand, in equilibrium everyone has a job. The classical analysis has the assumption that the real wage is flexible and adjusts to ensure that the supply of labour equals demand. In reality this is not the case:

- Wages are not flexible (or to a certain extend)
For example in a contract wages are not going to adjust.

- Given the wage-setting procedure, real wages in the economy may be above the market clearing level and be unresponsive to movements in supply and demand.

The three reasons why wages may not follow supply and demand are:

1. Collective Bargaining
Wages are set after a process of bargaining between worker unions and firms.
2. Minimum wage laws
The lowest wage permitted by law that firms should adhere to.
3. Efficiently Wage Considerations
Firms may want to pay the workers more than their reservation wage in order to provide them with incentives for higher work productivity.

In the classical thinking there is no unemployment. To understand where unemployment comes from, we must understand how real wages are determined. Therefore, we will analyse how firms set (nominal) wages and prices. When we know wages and prices, it is able to derive the natural rate of unemployment.

Wage determination

Wages are determined by market forces:

- **Bargaining power** between worker unions and firms.
If only one person is suitable for a particular job, he has high bargaining power and can ask a high salary. The firm has to pay a high price, that is the real wage rate. A higher unemployment rate leads to low bargaining power, so the real wage rate will also be low.
- Workers do not accept wages that are below the **reservation wage**.
This is the wage that makes them indifferent between working and being unemployed. If the reservation wage is high, the employee has more bargaining power. The real wage rate must be a little higher than the reservation rate. For example for unemployed people who receive a grant, the firm must offer a higher salary than the grant.
- Wages depend on labour market conditions: a low **unemployment rate** will lead to higher wages.

Wages are determined as follows:

P^e = the expected price level'

u = employment rate

z = all other variables

Let's assume that $z = 1$, then it holds that

If the unemployment rate goes up the unemployed have less bargaining power and wages will decrease. If z goes up the nominal wage rate will also go up. z can imply for example the unemployment insurance, minimum wages or employment protection.

Price determination

The marginal cost of production is equal to the wage rate (W).

From microeconomics we know that under perfect competition, firms set their price (P) equal to the marginal cost of production (W), what gives $P = W$. Under imperfect competition, firms set prices higher than the marginal cost of production (W), what gives $P > W$.

Firms set prices according to the following rule:

= inverse proxy for the degree of competition in the market.
measure of degree for market competition. If μ is high, competition is low and firms are able to set prices higher than marginal cost.

Natural rate of unemployment

and

Combining the wage setting relation and the price setting relation gives the following formula. The unemployment rate that fulfils this formula is called the natural rate of unemployment.

On slide 26 from lecture 4 you can see a graph according to the natural rate of unemployment. The equilibrium occurs where $P = P_e$. The price setting relation is a horizontal curve because PS doesn't depend on the unemployment rate. Firms will set their price independent on it because p is based on the market power (μ). If it is more expensive to produce, the firm will set higher prices.

WS is downward sloping because of the bargaining power. If μ is high the employees will have low bargaining power so the firms can set low wages.

If the government is increasing unemployment benefits the reservation wages will be higher. This will lead to higher wages set by firms, so the WS curve will shift upwards and the unemployment rate increases.

Associated with the natural rate of unemployment is a **natural level of employment**:

Employment in terms of the labour force and the unemployment rate equals:

The natural level of employment ($N(n)$) is given by:

Associated with the natural level of employment is the **natural level of output**:

The AS curve

Having discussed the labour market, we can put all markets together in the AD-AS model. The AS curve can be derived from the wage and price setting equations. The AD curve can be derived from the IS-LM model. Then, we will focus on the equilibrium and how it is affected by monetary and fiscal policy.

The aggregate supply relation captures the effects of output on the price level. It is derived from the behavior of wages and prices. **Derive the AS curve**:

The price level depends on the expected price level and the unemployment rate. The other variables are assumed to be constant.

Expressing the unemployment rate in terms of output:

Then we will get:

This is the curve for aggregate supply. It is an upward sloping curve because there is a positive relation between Y and P . If Y increases it means that more people are working. This means that there are less unemployed people what provides more bargaining power. They will ask higher wages so the cost of production will increase. Firms will ask higher prices so P goes up.

The AS relation has two important properties:

An increase in output leads to an increase in the price level. This is the result of four steps:

1. An increase in output leads to an increase in employment.
2. The increase in employment leads to a decrease in unemployment and therefore to a decrease in the unemployment rate.
3. The lower unemployment rate leads to an increase in the nominal wage.
4. The increase in the nominal wage leads to an increase in the prices set by firms and therefore to an increase in the price level.

An increase in the expected price level leads, one-for-one, to an increase in the actual price level. This effect works through wages:

1. If wage setters expect the price level to be higher, they set a higher nominal wage.
2. The increase in the nominal wage leads to an increase in costs, which leads to an increase in the prices set by firms and a higher price level.

When the expected price level increases, then the actual price level will increase for a given level of income (Y). This is an upward shift of the AS curve.