ECONOMICS 2

Authors: Anikó Bíró, Gábor Lovics

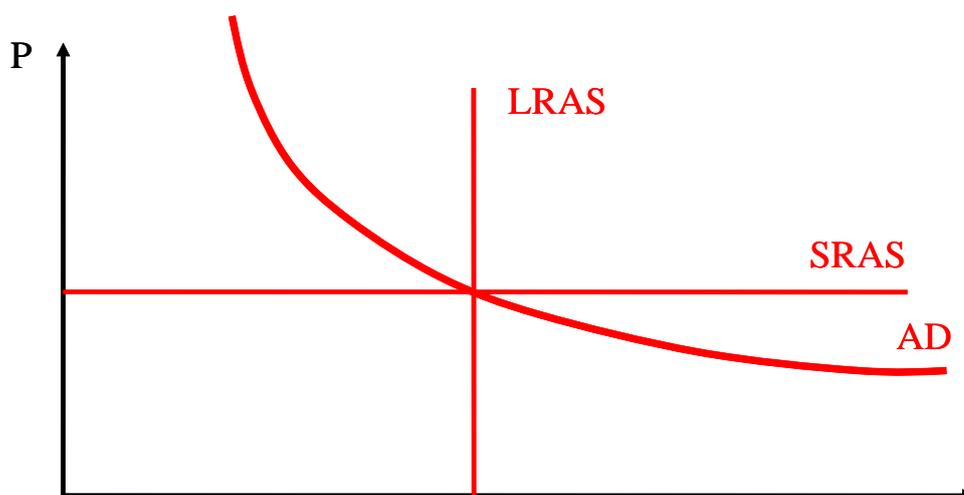Supervised by Gábor Lovics

June 2010

Week 10

Aggregate supply

Chapters 12

Outline

- Models of aggregate supply
- The Phillips curve
- Inflation expectations

What we said up to now

4 short run models of aggregate supply

- Model of sticky wages
- Model of misconceptions
- Model of limited information
- Model of sticky prices

$$Y = \overline{Y} + \alpha(P - P_e)$$

1. Model of sticky wages

- Observation: nominal wages adjust slowly, especially in those sectors where trade unions are strong.
- If nominal wages are rigid then rising price level decreases real wages and increases the levels of employment and output.

Formal relations

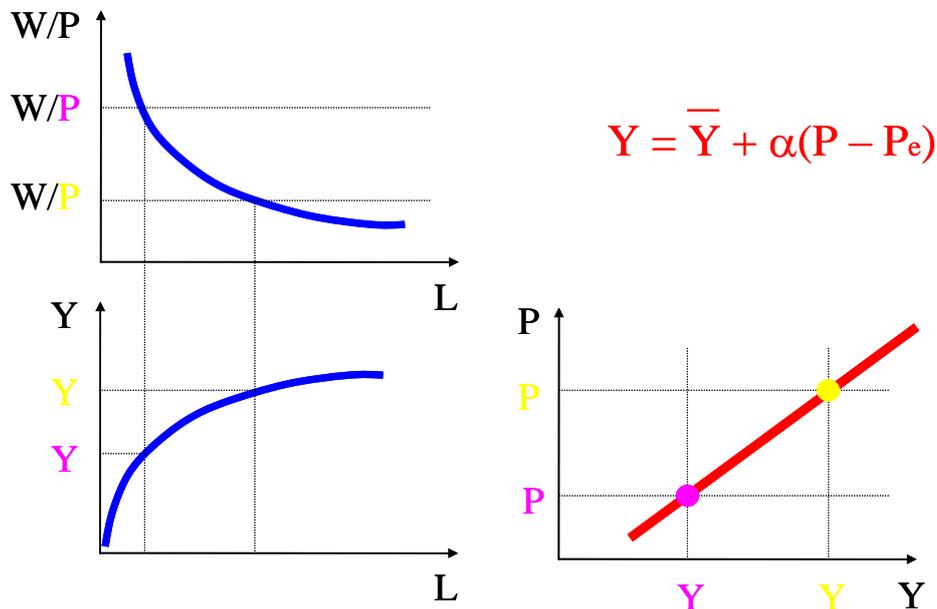$$W \quad = \quad w \quad x \quad P_e$$

Nominal wage = planned real wage x expected price

$$W/P = w \; x \; P_e/P$$

$$L = L_d(W/P)$$

$$Y = F(L)$$

Derivation of supply

$$Y = \overline{Y} + \alpha(P - P_e)$$

2. Model of misconceptions

- Demand and supply are always in equilibrium in the labor market.
- The employees temporarily consider the nominal wage as real wage.

$$L_d(W/P) = L_s(W/P_e)$$

Formal derivation

$$W/P_e = W/P \times P/P_e$$
$$L_d(W/P) = L_s(W/P \times P/P_e)$$

The price level can increase according to or differently from the expectations of the workers.

In the first case nothing changes, in the second case the supply curve shifts.

Labor market equilibrium

Conclusions from the first two models

- The starting point was imperfect labor market in the first two models.
- In both cases the higher than expected inflation resulted in lower real wages and thus higher output.
- Accordingly high output goes together with low real wages, thus the real wage is **contracyclical** in these models.
- This result is not confirmed by empirical observations.

3. Model of limited information

- In this model everyone produces one product but consumes infinite products.
- The producer is informed about the price of his/her own product, but has limited information on the prices of other products.
- If the price level changes, the producer mistakenly might conclude that the price of his/her product increased relative to the other products (if the price level rose more than expected).
- If everyone thinks the same way, the output becomes larger than the potential output.

4. Model of sticky prices

Assumptions:
- s ratio of the firms can change prices, 1 – s ratio can not.
- Higher price level (P) results in higher costs, thus the price of the product of the firm increases with the price level.
- Higher income level (Y) increases the demand for the product of the firm, thus its price also increases.

What happens on the labor market?

- If income decreases then the demand for the products of firms decreases.
- The firms can not change the prices, thus they sell less and want to employ less workers.
- Given real wages the demand curve of labor shifts (unlike in the first two models), and thus the real wages decrease.
- Therefore in this model the real wages can change **procyclically**.

Short run and long run

According to the Phillips curve the inflation depends on three factors:

1. Expected inflation
2. Deviation of unemployment rate from its natural rate
3. Supply shocks

Formally:
$$\pi = \pi_e - \beta(u - u_n) + \varepsilon$$

The Phillips curve

According to the Phillips curve the inflation depends on three factors:

- Expected inflation
- Deviation of unemployment rate from its natural rate
- Supply shocks

Formally:

$$\pi = \pi_e - \beta(u - u_n) + \varepsilon$$

From the aggregate supply to the Phillips curve

$$Y = \overline{Y} + \alpha(P - P_e)$$

$$P = P_e + (1/\alpha)(Y - \overline{Y})$$

$$P - P_{-1} = P_e - P_{-1} + (1/\alpha)(Y - \overline{Y})$$

$$\pi = \pi_e + (1/\alpha)(Y - \overline{Y})$$

Using Okun's law.

$$\pi = \pi_e - \beta(u - u_n)$$
$$\pi = \pi_e - \beta(u - u_n) + \varepsilon$$

Adaptive expectations

If expectations are adaptive then

$$\pi_e = \pi_{-1}$$

The Phillips curve in this case is:

$$\pi = \pi_{-1} - \beta(u - u_n) + \varepsilon$$

Conclusions

$$\pi = \pi_{-1} - \beta(u - u_n) + \varepsilon$$

- Inflation is persistent: it can be high just because it was high before.
- The second term in the equation relates cyclical unemployment to inflation. If inflation is caused by this term then it is called **demand inflation**.
- If inflation is caused by the third term, thus it is generated by a supply shock then it is called **cost inflation**.

Sacrifice ratio

- Based on what we learned up to now the economic policy decisions affect the aggregate demand.
- If the aim of the economic policy is to mitigate the inflation rate then it can achieve it only through increasing the unemployment or decreasing the output.
- The % of GDP which disappears due to 1 percentage point decrease in the inflation is called the sacrifice ratio.

Rational expectations and disinflation without harm

- If inflation expectations are not based on the past then the economic policy can influence that as well.
- The model of rational expectations assumes that the economic agents use all the available information in order to predict inflation.
- Then it is enough for a credible economic policy to promise that the inflation will be reduced, then the inflation will decrease by itself.