



Course:

## **Economics II (macroeconomics)**

### **Chapter 4**

#### **4.2 Aggregate Demand and Aggregate Supply, Part II**

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## Introduction

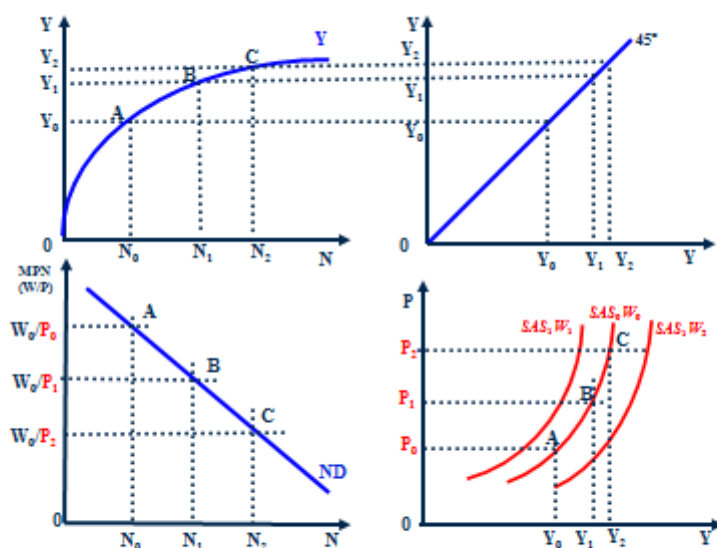
The aim of the lecture is to explain the effects of fiscal and monetary policy in various forms of short-term aggregate supply curve, and thus provide students with prerequisites for understanding the economic causes of macroeconomic fluctuations, inflation and unemployment.

Basic Keynesian situations, respectively basic Keynesian case is called the short run aggregate supply curve assuming constant (fixed) nominal wages. Default postulate for the derivation of the curve in the basic Keynesian situation is that nominal wages and prices in the short term do not adapt so quickly to the labor market equilibrium established. In the short term is not achieved full employment, respectively rigidities in nominal wages in this Keynesian model cause involuntary unemployment. In this model, which is also called static Keynesian model short run aggregate supply, we assume that nominal wages are fixed in the short term, while the price level changes.

### 1 Short run aggregate supply curve assuming fixed nominal wages (basic Keynesian situation - static model)

a) the derivation of Keynesian short run aggregate supply curve (the basic situation)

Fig. 4.2.1 The derivation of Keynesian short run aggregate supply curve (the basic situation)



In graphic derivation of the SAS curve, the starting point is the labor market, based on the fundamental ideas of the basic Keynesian model curve short run aggregate supply, whose essence lies in the fact that if the nominal wage rate fixed real wage  $W/P$  varies inversely compared to the price level and employment varies inversely with the movement of real wages. This means that:

- the higher the real wage, the lower employment and production;
- the lower the real wage, the higher the employment and production.

The connecting link between prices and production (employment) are real wages.

Short run aggregate supply curve in the basic Keynesian situation is positively sloped for fixed (constant) level of nominal wages and represents a combination of price levels and production levels, which are profit-maximizing firms willing to produce and offer.

The original Keynesian model includes: inflexible wages and involuntary unemployment - is growing if the price level, real wages falling and rising demand for labor and production. And vice versa: if declining price level, real wages are rising and demand for labor and hence the product falling.

Assuming inelastic (rigid) nominal wage and price levels will drop on the labor market imbalances, as real wages rise, demand for labor falls, but increase labor supply. The difference between supply and demand of companies for work represents the extent of involuntary unemployment. The cause (in this model) lies in market imperfections (imperfections, respectively obstacles. Wage agreements between unions and employers), which prevents the nominal and real wage to clean up the labor market.

#### b) Fiscal policy - short and long term effects

Short-term effects of fiscal expansion (to explain the use of the graphical model):

1. if the current increase in both production and price levels;
2. increase the interest rate (due to lower real money balances);
3. reduce the fair wage rate;
4. lower the marginal productivity of labor.

Long-term effects of fiscal expansion (to explain the use of the graphical model):

For short-term equilibrium point, the real wage is equal to  $W_0/P_1$ . Once the workers recognize a decline in their real wages, wage bargaining process occurs leading to an increase in the nominal and hence real wages ("adjustment process"). At the intersection curves of aggregate demand and aggregate supply, the real wage reaches the original level; there is a long-term point of equilibrium of the economy. At this point:

- real wage rate is equal to the initial equilibrium level of real wages;
- manufactured products conform to production at full employment, i.e. the potential product that is demanded;

- at the price level and the nominal wage corresponding long-run equilibrium of the economy, i.e. when the equilibrium real wage rate companies voluntarily produce and supply a variety of products ( $Y^*$ ) and demand  $N^*$  amount of employment.

Why is it necessary to distinguish between short-term and long-term equilibrium? This is necessary because due to inflexibility of wages in the short term (and slow adjustment of prices), the economy is not the result of impact (increase, decrease) in aggregate demand immediately, respectively quickly achieve long-term balance, but the adaptation takes place successively in time.

Long-term (final) effects of fiscal expansion provided positive sloping aggregate supply curve:

1. production and employment will not change,
2. price level will increase,
3. interest rate will increase,
4. total crowding-out effect will occur.

c) Monetary policy - short and long term effects

Short-term effects of monetary expansion (to explain the use of the graphical model):

1. increase in production and price levels;
2. in the short term interest rates will fall;
3. the real wage rate will be reduced.

Long-term effects of fiscal expansion (to explain the use of the graphical model):

1. production and employment will not change,
2. price level will rise at the same rate as the growth rate of nominal money stock,
3. real money balances will not change,
4. real wage will not change,
5. the interest rate will not change.

## **2 New classical macroeconomics**

a) Friedman short run aggregate supply curve

The following concept short run aggregate supply curve in 1967 developed as a reaction to Keynesian theory based on rigid nominal wages, leading the Chicago School by economist Milton Friedman.

Friedman's model assumes that wages are flexible and balance the demand and supply in the labor market. This new model is therefore called classics classical model, which "cleans", respectively "cleans" the market or also equilibrium model.

A key assumption of the model is that workers temporarily wrongly (wrongly) perceive the price level, respectively that workers temporarily misinterpret movement of real and nominal wages. Therefore, sometimes it is also called equilibrium model with imperfect information (i.e. fooling model).

Characteristics of the model.

In the model it is assumed that (similarly Keynesian model) labor demand curve depends on the actual real wages. However, the curve of labor supply in this model depends on the expected real wage, ie. The nominal wage divided by the expected price level workers. The amount offered to work depends on the actual real wage and the ratio of actual and expected price level, i.e. the degree of false (incorrect) perception of price level workers.

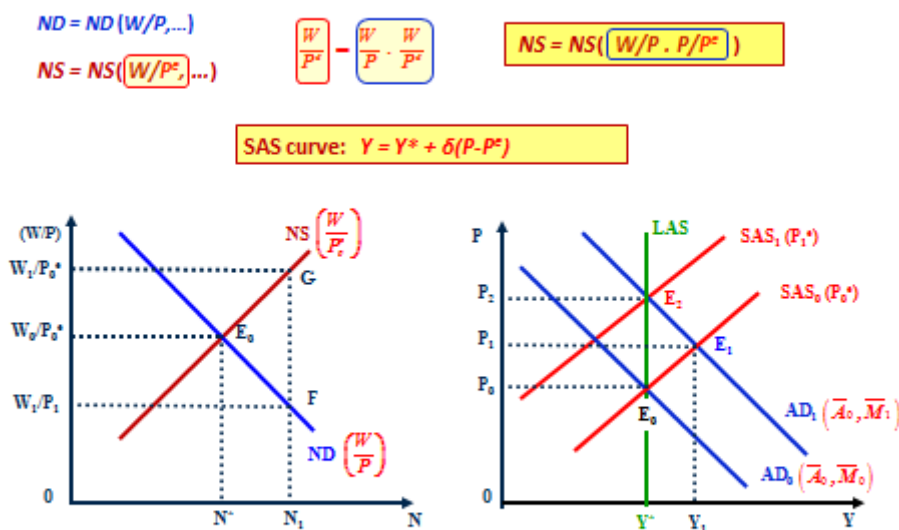
If e.g. the central bank unexpectedly increased nominal supply of money in a way that will increase the aggregate price level, the model assumes that only firms know that the price level rising, while workers continue to mistakenly expect a lower price level.

Production prices react to an unexpected increase in aggregate demand faster than nominal wages react. Therefore, even if the company increases in nominal wages lag behind these price rises, the real wage of workers is declining, but those in the mistaken belief they expect their real wage increase and offer a greater amount of work. Companies, however, know that the price level increased, so in the correct belief that real wages declined, hire additional labor, ie. Increase employment and thus the product.

Equation of aggregate supply curve - see study texts and ppt.

Long-run aggregate supply curve and the assumption (hypothesis) of the natural rate.

Fig. 4.2.2 Aggregate supply – classical approach



Vertical line, based on the level of potential output and passing through a long-term equilibrium curve is long-term aggregate supply (LAS), which is also called the curve "good expectations", ie a state where the actual and expected price level is equal. With the right expectations, the price level is always equal to the production potential of the product, i.e. a real natural product. From there, the name of Friedman's model as a model of "natural rate", but also the name of "real natural product" and "natural rate of unemployment", as the unemployment rate in the long-run equilibrium.

The assumption (hypothesis) natural rate means that changes (shocks) aggregate demand affect employment and production only in the short term. In the long run, the economy returns to a level of employment "natural rate, ie. The level described by the classical model.

Two controversial issues:

- hysteresis phenomenon (the problem of the nature of long-lasting impact of the economy on the "natural rate");
- acceleration theorem (in the context of criticism of the model emphasizing that the only change in the growth rate of money may lead workers to false expectations, but can also lead to inflation).

#### b) Lucas short run aggregate supply curve

Another representative of the new classical economics Robert Lucas comes in his concept of the aggregate supply curve using the same assumptions as Friedman, i.e. the assumption "cleansed" of markets and imperfect information; however, they

assigned Lucas and the assumption of rational expectations. Lucas' version of the short run aggregate supply curve is based on the fact that there are barriers to information not only on the part of workers, but also on the part of businesses, employers, i.e. does not imply that firms are better informed than workers.

Lucas concept assumes that the short run aggregate supply curve differs from the long-run aggregate supply curve due to short mistaken perception of prices, respectively due to the fact that workers and firms (manufacturers) an unexpected increase in aggregate demand, which is due to unforeseen or unexpected increase in the money supply, due to imperfect information erroneously confuse changes in the general level (aggregate price level to which the increase in the money supply during the neutrality of money leads) changes in relative prices of the goods produced by them.

To illustrate, it is possible to use the example of grain producer and his thinking when unexpected increase prices for its grain (bring to a conclusion that the farmer cannot distinguish changes in the aggregate price level from changes in relative prices (price relations). But because the farmer is not the economy itself, then we may assume that all suppliers (manufacturers) when unexpectedly increased price level, there is an increase in prices of their goods. We all judge rationally, but erroneously, that the relative price of goods they produce, increase: in fact increased aggregate price level, not relative price of goods produced by them. This leads to the fact that more works voluntarily and willingly produce more product, i.e. voluntarily increasing their offer and this leads to the growth of "cyclical component", i.e. the output growth above its potential level and employment growth above the level of full employment.

Equation Lucas aggregate supply curve (see study support a ppt) contains, inter alia called. Negative or positive "surprise price", i.e. the difference between the actual and the expected price level.

Important: the Lucas model shows that anticipated changes in the money supply do not affect output and employment, but only at the price level, since all economic agents form their expectations rationally. But experience shows that in real economic life and anticipated money (change) always acts on the real economy variables.

Partial conclusion: Although Lucas' concept of aggregate supply adequately explains economic fluctuations in the real economy, rational expectations equilibrium approach to this specific approach classical macroeconomics also called, is methodologically and theoretically beneficial for further development economics.

### c) the real business cycle theory

In response to empirical verification confirmed the adequacy of Lucas concluded that the anticipated changes do not affect real economic variables, founded in the early 90s alternative theory - the "real business cycle theory" (John Long, Edward Prescott,

Charles Plosser, Finn Kydland, Robert Barro and others), which tries to explain short-term economic fluctuations while preserving the assumptions of the classical model.

Real business cycle theorists assume that prices and wages are fully adapted so that it cleans up the markets. The cleaning of markets means that:

- the total supply of goods equals the total demand for goods;
- requested total holdings of bonds is equal to zero.
- the total quantity demanded equals the amount of money supplied.

If these conditions are met for all markets, a situation where the so-called "general cleaning markets."

The basic model of the purified, respectively cleaning market is created at the microeconomic foundations.

Real business cycle theory assumes that the causes of the economic cycle are in real changes, respectively in real (supply) shocks the economy, especially in changes in production technologies (which are very broadly conceived) and other changes, as well as in fiscal policy. The main source of fluctuations in production involves fluctuations in aggregate supply and in the long run and in the short term.

Real business cycle theory excludes nominal variables (prices, money etc.) Explanation of economic fluctuations. Fluctuations in production are exclusively caused by fluctuations in potential output.

The length and duration of the economic cycle caused by unfavorable (favorable i) supply shocks are not alone theories explained. In the model, these shocks the economy reacts in the spirit of the new classical economics, i.e. in the spirit of providing the market, which is due to the rapid adjustment of prices and wages as well as striking the equilibrium real interest rate continuously, maintain balance.

An adverse supply shock and its impact on output and employment.

The problem of intertemporal and substitution of labor supply - the concept of real business cycle assumes that the substitution effect dominates over the effect of pension and labor supply curve is positively sloped. In the context of the theory is a special type of "substitution effect, which is called the intertemporal substitution of labor, which means that the" good times "when real wages are high and when the high real interest rate, workers elect more work (than free time). In periods when the real wage is low (and also low real interest rate), workers choose more leisure and less work.

The real aggregate supply and real aggregate demand

In the real business cycle model, involving intertemporal substitution works are aggregate supply and aggregate demand functions of real interest rates (AS in



"positive direction" in AD "negative direction", i.e. the higher the real interest rate, the lower the real aggregate demand).

In the model, where the vertical axis is the real interest rate and the horizontal axis product has real aggregate supply curve is positive slope (higher interest rate increases the supply of labor, as work becomes more attractive, and it has resulted in an increase in the offered amount of production), the curve is not vertical!

In real business cycle theory there is no difference between the short and the long run, and so real curve short run aggregate supply and long-run aggregate supply are the same, and therefore is not a difference between the actual and the natural real product.

### *Fiscal policy and the role of money and prices in the real business cycle theory*

Fiscal expansion has real business cycle model similar to "progress" as the IS-LM model with the difference that the IS-LM model are fixed prices and wages and aggregate demand affects output and employment, fiscal expansion shifts the IS curve to the right and positively sloped curve LM, the growth rate (partially crowding-out effect) as well as production growth. In the IS-LM model (due to its assumptions) plays offer (labor and capital) any role.

Supply shocks are among the followers of the theory of real business cycle starting point (and cause) for justification (explanation) movement in the price level. Most often in literature, in connection with the interpretation of the problem of movement of price levels in response to changes in the quantity of money, but also a reaction to the change in the price level of money demand induced by exogenous supply shocks, uses arguments R. Barro. (Explain problem of "real money balances")

### **3 Microeconomic foundation inflexibility of wages and prices in the concept of the new Keynesian economics**

New Keynesian Theory (New Keynesianism) stems from the fact that wages and prices do not adjust quickly to clean up the market in a short period after the impact of aggregate demand (or supply), and are therefore markets for a long time and economy may be in a state of imbalance longer period.

General characteristics of the model:

- it tries to give a detailed microeconomic foundations (justification) inflexibility of wages and prices (and simultaneously responds to criticism of the classical economists);
- by developing the concept of unfiltered market significantly deeper microeconomic foundation school.

Sources rigidity of wages and prices:

a) nominal rigidity sources, representing barriers that hinder the full price and wage adjustment after the impact changes in aggregate demand, for example. "

- menu costs firms
- overlapping agreements on wages and prices for different groups of firms and workers with time divided beginnings and expiration,
- pricing surcharge and concluding long-term price agreements,
- marginal costs and inflexibility.

b) the real source of rigidity, which means the inflexibility of wages relative to other wages, wage rigidities relative to prices and price rigidity relative to other prices. This group includes:

- efficiency wage theory;
- impossibility of price coordination between suppliers and customers and others.

Menu costs = costs of various companies associated with changes in prices (eg cost of printing new price lists, catalogs and distribution.).

When at reducing demand (should be lowered price) menu costs are equal to or higher than the profit achieved by reducing prices, the company will not reduce prices. Inflexible rates may have an adverse effect on the economy as a whole, which lost consumer surplus. Consequence of a decision not to reduce the company's profit-maximizing price, though demand fell, which causes the loss of the economy as a whole, is called the demand macroeconomic externalities.

Long-term labor agreements and wage rigidities = nominal wages are determined on a regular (daily, weekly) auction market (spot), but are predetermined by the working arrangements for the period of their validity.

Implicit employment (wage) agreements are causing real wage rigidity. The efforts of companies to establish nominal wages so that workers maintain a constant real wage (based on the behavior of the asymmetry between firms and workers in relation to the risk of development of wages).

Long-term price agreements and pricing surcharge = existence of two types of prices: prices and auction prices fixed in advance, i.e. agreed and included in long-term pricing agreements between sellers and buyers are inflexible. Impact on the inflexibility of these prices is their method of forming a surcharge. Pricing surcharge is a method whereby a company sets a price based on the average cost of variable inputs (labor and materials), which adds volume of these variable costs multiplied by the percentage surcharge to cover the cost of capital and profits.

Real rigidities - efficiency wage model - the basis of the model: firms find it inconvenient to reduce wages to employees relative to wages of employees of other companies, although there is involuntary unemployment. This conclusion is based on the view of companies, firms that employee productivity is higher if the firm pays a higher wage at which workers make greater efforts to reduce the loss of work due to absenteeism, turnover, and thus reduce the cost of training new workers, etc. Apart of higher wages represent an opportunity to attract more skilled workers to the company, the reason for the growth of staff morale and loyalty to the firm.

For these reasons, companies are reluctant to decrease in response to the decline in aggregate demand wage rate, do not hire unemployed workers who may be willing to work for lower wages: Fears companies to reduce their productivity and increase in unit labor costs is lead to the fact they do not lower wages and thus preventing cleanup of the market.

Real rigidity - the absence, respectively coordination failures - comprises the existence of information barriers, which does not allow companies to predict what the reaction of their suppliers on a decline in aggregate demand.

#### *Model of the economic cycle in the new Keynesian economics*

It responds to the findings (Don Patinkin), the demand curve for labor (as it was previously postulated) is inconsistent with the Keynesian model of determination of equilibrium production. The model is enriched by the "effective demand curve for labor" that is compatible with the requirements of the labor market new Keynesianism, i.e. the nominal wage is in as a result of long-term wage agreements in a short period fixed in the short term is fixed and price level, material costs and markup. Therefore, the real wage is fixed.

Due to a lack of demand, firms will operate along the effective demand curve for labor, and thus in this model both workers and companies outside their aggregate labor supply and aggregate demand for labor.

Sources gradual adaptation of wages and prices (moving the economy from point-to-point short-term equilibrium long-run equilibrium):

Changes auction prices of goods (fall, and the fall and - with some delay - the marginal cost of the final production companies that are starting to gradually reduce the price); in order to stimulate sales of production companies tend to provide buyers a variety of discounts, rebates, rebates etc., i.e. reduced price premium; similarly to the labor markets of the company may not acquire new workers as "special price" bonuses, allowances, etc., may even to some extent, reduce labor costs.

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