



Course: Economics I (macroeconomics)

Study text

6th Chapter

Business Cycle Theory

Author: Ing. Vendula Hynková, Ph.D.

6 Business cycle theory

In this chapter the business cycle will be defined. It is an integral part of the development of a national economy and within the economic theory it is known as one of basic macroeconomic instabilities. The text focuses on substance of the mechanism of business cycle, the consequences on the economy will be explored, the possibilities of macroeconomic policy aimed to reduce fluctuations in economic activity will be described and the question of predicting business cycles will be answered.

6.1 Characteristics of the business cycle

Business cycles can be characterized as fluctuations in economic activity in the form of **actual real output fluctuations around potential output** of the economy (i.e. the trend). The economic activity is either accelerating or decelerating. The economic cycle means alternating periods of growth and decline in real output. In this case, there is changing in employment, investments, profits and other variables. In practice, the focus is on the fluctuation of the real product.

The business cycle may have a growth trend, in that case we are talking about an **expansion**, or fall trend, when talking about a **contraction**. Situation when the output does not decrease, or grow, and therefore has a zero change, is called **stagnation**.

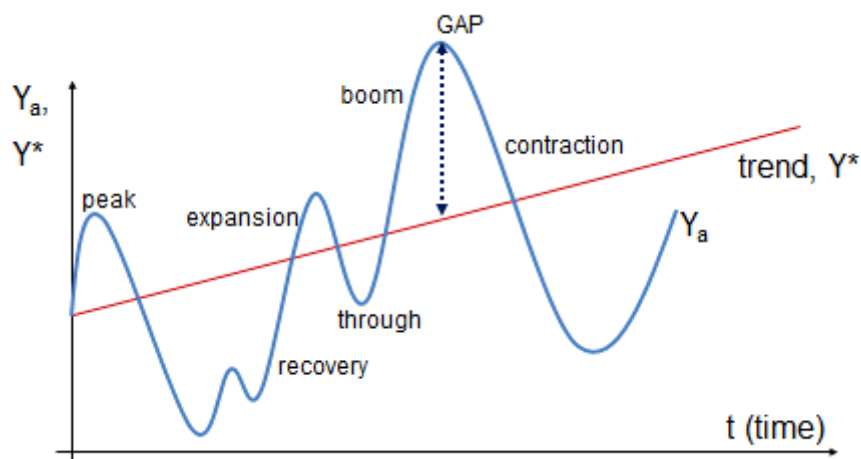
The expansion phase is terminated by a **peak** of business cycle and contraction by a **through**. These points are called the “**turning points**”.

If the economy is in a phase of expansion, but the actual real output is below the potential output, we call this situation as a **recovery**. If it is a phase of expansion, where the actual real output is greater than potential product, we are talking about a **boom**. (see Fig. 6.1).

Some economists choose the designation “**crisis**” instead of **contraction**. However, others use the term “**crisis**” to a **significant decline** in real output. When the contraction lasts longer than 6 months, this situation is called **the recession**. Particularly strong and long recession refers to **depression** and a sharp contraction refers to a **slump**.

The difference between actual and potential output is known as a **gap** (gap - a difference). A phase changing is described in Fig. 6.1. The x-axis represents the time (t) and y-axis represents actual (Y_a) or potential output (Y^*), the actual performance Y_a oscillates around a trend – the potential product. The trend is usually growing and is drawn as a **growing line**.

Fig. 6.1 Business cycle



The cyclical movement of the economy could be also expressed mathematically. More important to the phase of the cycle is not the amount of product changes (small or large), but its **positive or negative change**. The business cycle can be expressed in absolute changes in real output in the period Y_r (in time t) and the previous period ($t - 1$) as:

$$\Delta Y_r = Y_{r(t)} - Y_{r(t-1)}$$

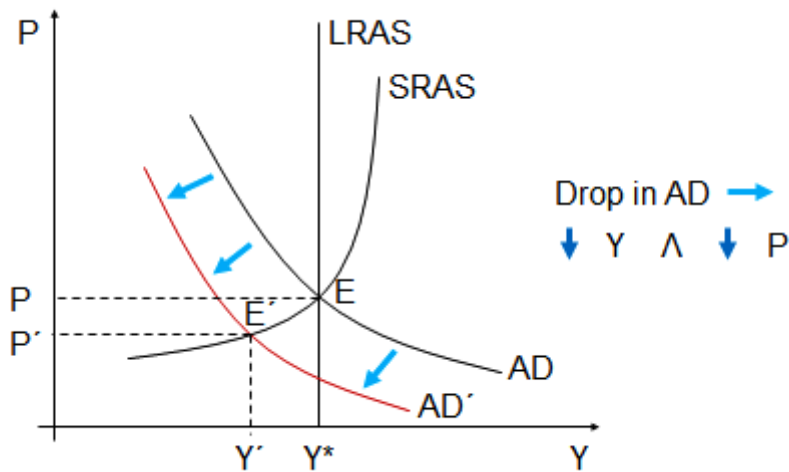
or by the percentage change in real output as:

$$\Delta Y_r = \frac{Y_{r(t)} - Y_{r(t-1)}}{Y_{r(t-1)}} \cdot 100 (\%)$$

One business cycle is defined as the period during which the economy performs motion between two consecutive turning points (e.g. between the two throughs). The duration, at which the economy passes such a movement, is referred to a **cycle period**.

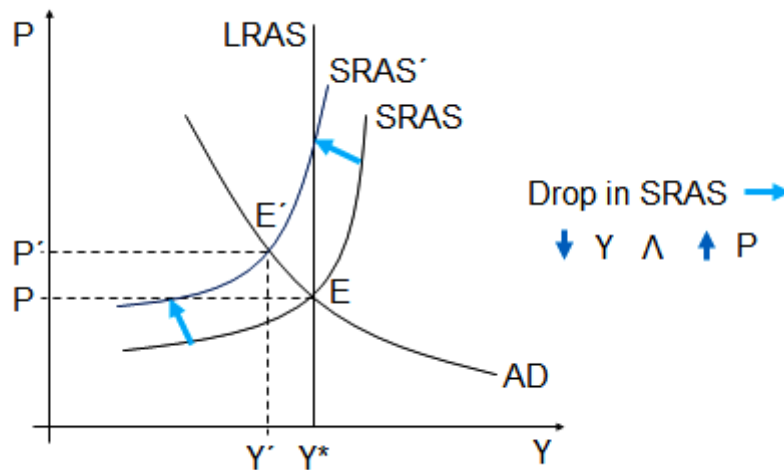
We can also demonstrate the business cycle by using the AS/AD model, in which we can see a change on the price level (price level is along the vertical axis). First we will focus on the phase of contraction. This may occur due either negative demand shock or negative supply shock. While the decline in aggregate demand reduces the aggregate price level in the economy, the decline in aggregate supply increases it. The decline in AD is shown in Fig. 6.2. Along the x-axis we measure actual and potential performance of the economy and along the y-axis there is aggregate price level. The new macroeconomic equilibrium E' determines the lower output Y' and lower price level P' . That situation is referred to a **classical recession**.

Fig. 6.2 Classical recession



In case of a decline in aggregate supply (e.g. due to growth in nominal wages and prices of raw materials at the world market), the SRAS shifts up and to the left as illustrated in Fig. 6.3 and the new macroeconomic equilibrium determines lower real output Y' and a higher overall price level P' . That situation is referred to **slumpflation**.

Fig. 6.3 Slumpflation

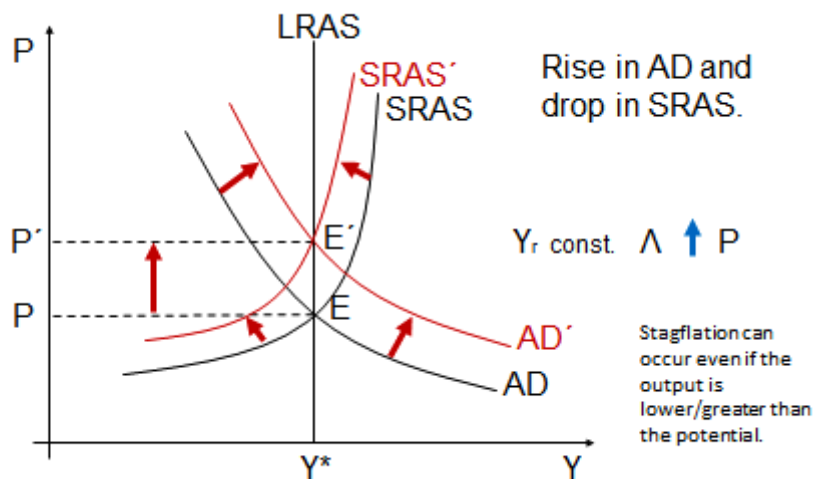


Analogously, the expansion phase can be shown by a positive demand shock or positive supply shock. The AD growth would cause the growth of the product (at least in the short term) and the increase in the aggregate price level. SRAS growth would result in output growth and a decline in the price level.

The economy may be in a situation where the real output is stagnating (unchanged), but there is an increase in the aggregate price level. This situation will be referred to stagflation (also mentioned in the Chapter on inflation). Stagflation is shown in Fig.

6.4. In this case, we presume the growth of aggregate demand and the fall in short run aggregate supply and we assume full use of resources in the economy.

Fig. 6.4 Stagflation when the actual output equals the potential output



Business cycles are distinguished in terms of their temporal dimension and there is their break down - we talk about the **types of business cycles**.

1. **Kitchin short-term cycles** – there are short-term fluctuations in real output in the various sectors in several months of consecutive seasons (reported up to 40 months), often under the influence of seasonal events (e.g. the growing demand at Christmas time, weather conditions in agriculture, holidays summer, etc.), economists talk usually about fluctuations in stocks;
2. **Juglar medium-term cycles** - often referred to as commercial or industrial, these cycles are the most important in economics. They represent the time horizon over approximately 8-10 years. In the literature there is also the name of the business cycle or business cycle fluctuations, these cycles are often associated with the development of investment in production;
3. **Kondratieff long-term cycles, long Kuznetz cycles** - in the range of about 50 to 60 years, sometimes even more. There are various theories explaining the events such as wars, discoveries of mineral resources, climate change or expansion of the world market or investment cycles in infrastructure. The other causes may be mentioned innovations (steam engines, development of infrastructure, scientific-technical revolution, the information revolution ...). Economists explain these cycles by various causes. Most of them are rather consistent in the cause of technological change.

Today, we meet with the resolution of long-term cycles (waves):

The first wave - related to the industrial revolution, especially with the invention of the steam engine.

The second wave - related to the development of railways, shipping and heavy industry.

The third wave - is associated with scientific-technical revolution.

The fourth wave - related to the development of the electronics industry.

The fifth wave - the present wave, it indicates the information revolution, microtechnology.

6.2 The mechanism of the business cycle

There are many different theories trying to explain the causes of economic fluctuations, and only a small portion of interpretation that is united to all economists. Regarding the causes of the business cycle, economists agree in saying that the causes of cyclical fluctuations are often different and specific and they arise from the **interaction of aggregate supply and aggregate demand** (as a result of an imbalance between growth in production capacity and the growth of final demand for products). Furthermore, the business cycles are rather like fluctuations in weather and will never be identical, i.e. their processes are not identical (not as some functions, such as cosine).

The way how to understand business cycles is to look for the typical characteristics during cyclical fluctuations. We can distinguish between **exogenous** (external) and **endogenous** (internal) causes. And also between **economic** and **non-economic** causes (e.g. natural disasters as non-economic), and there are causes **random** and those that are more or less regularly **repeated**.

Macroeconomic policy is included in **exogenous** causes, and also the growth rate of population, state of war or lack of awareness of market operators. **Endogenous** cause is e.g. the instability of capital expenditures.

Explaining the contraction phase alternating with phases of expansion of the business cycle is based on changes in aggregate demand and aggregate supply - in the traditional sense. Various explanations therefore specify or generalize fluctuations in aggregate demand or supply (demand and supply shocks) and explain the causes of the business cycle.

There are *many theories* of the business cycle. A brief description of them is following.

- **Keynesian theory** is based on fluctuations in aggregate demand under the influence of fluctuations in investment and consumption expenditures (employment is determined by the aggregate demand in the short run). These fluctuations may be caused by pessimistic expectations of businesses and households, or by fluctuations in wealth (e.g. a decrease in the prices of securities). The decrease in these expenses is not accompanied by an

increase in other expenses, as neoclassical economics anticipated on basis of Say's law of markets. According to Say's law of markets every supply generates any adequate demand, as manufacturers produce to sell in the wake, and therefore aggregate supply equals aggregate demand. Explanation of fluctuations in real output due to fluctuations in investment and consumer spending is accompanied by Keynesian assumptions.

- **Monetarist (monetary) theory** explains the fluctuations of the economy through monetary illusion caused by workers, respectively by their improper inflation expectations. Fluctuation causes in economic activity have only monetarist (money) nature and are based on changes in the money supply. Monetarist theory challenges the possibility of other influences such as fluctuations in the autonomous private sector spending. The cause of business cycles (including the Great Depression during 1929 - 1933), is inappropriate monetary policy according to monetarism.
- **The school of rational expectations** justifies fluctuations in aggregate demand via misinterpretation of relative prices development by economic entities. Only the unexpected change in aggregate demand can affect fluctuation in real output. Mistaken, but rational expectations of economic operators cause fluctuation in production when companies consider general increase in prices as the rise in their prices and households consider the wage growth as real wage growth and are willing to produce and produce more. Conservative directions are based on specific assumptions. One of them is the fact that labor markets clear off and are in balance. Economic fluctuations here are called "*the equilibrium business cycle*".
- **The theory of political business cycle** is based on the assumption that the causes of fluctuations in production represent interventionist actions of authorities, especially the use of the instruments of fiscal and monetary policy. Its theoretical starting point is the theory of public choice. According to this theory, the politicians make decisions to maximize their own benefit, not the benefit of the society. Changing in real output is due to the rhythm of elections. Before the elections, political parties prefer expansive type of policy and carry out popular measures in order to obtain or retain voters and thereby gain and maintain position. After the elections, on the contrary, political parties prefer the type of restrictive policies and implement unpopular measures for their voters.
- Another theory of the business cycle is **an innovative theory**, when medium-term cycles are due to innovations (some productive activities in the economy). They occur in the forms of inventions or ideas. Contraction phase as the economic downturn is explained as a healing process, during which unpromising investments expire. In contrast, during expansion new innovations are introduced. Innovations have different forms, e.g. the

introduction of new products (product innovation), using new production methods, new markets, obtaining new sources of raw materials or the introduction of a new organization of production. These innovations appear rather in cluster, rather than continuously. They are massively applied and undermine the economic growth. If their potential is exhausted, the economic downturn occurs that is also a sign of a lack of funds in the economy. Innovations are endogenous in nature, are part of the business, which is characterized by constant innovation activities in pursuit to gain profit. The main representative was *J. A. Schumpeter*.

- Another explanation of fluctuations is based on **principle of the accelerator and multiplier**. This theory is Keynesian approach with an emphasis on capital expenditure. Acceleration principle is based on the relationship between the volume of output produced and the capital required to produce products. Part of the total investment expenditure (induced investment) depends on the sold production in the economy and depends on the rate of acceleration. These capital expenditures have accelerated growth in comparison with GDP growth. The growth of investment spending is further connected to a multiplier effect. Investments, based on the principle of the multiplier, have a multiplier effect. And increase in the output causes induced investment according to the accelerator principle. However, output growth hits on the capacity of the economy and an increase in output ends to be zero. After it, acceleration principle will operate in the reverse direction, investment demand will fall, also product will drop and its decline will be deepened by a multiplier effect. Accelerator and multiplier now work together in the opposite direction. The product will fall until companies start buying capital goods in order to recover physically worn out and obsolete parts of fixed capital. Then the product can increase and multiplication effect starts. Within this theory, it is a self-generating economic cycle, but influenced by external causes, and it is difficult to prove the mechanism in practise. This theory assumes that capital expenditures will increase due to the accelerator principle after the initiation phase of expansion, but unused production capacity are expected to be involved. Basic principles of the multiplier and accelerator are expressed by the following diagram:

Neoknesian interpretation of business cycle - multiplier principle and the principle of accelerator

- **multiplier principle:**

$$\Delta Y = \alpha \cdot \Delta I$$

increase in investment \rightarrow increase in output (income)

α = investment multiplier

- **principle of accelerator:**

$$I_t = a \cdot \Delta Y$$

increase in output (income) \rightarrow increase in investment

a = accelerator coefficient

I_t = induced investment, induced by the increasing output

Both, multiplier and accelerator, act in the same direction, the upper limit is the potential output and the lower limit represents replacement investment.

- **Theory of real business cycles** focuses on the supply side of the economy. The theory distinguishes between the initial impuls of expansion phase or contraction phase of business cycle and business cycle inertia mechanism. Business cycles are invoked by real external shocks. These are the factors affecting particularly inputs productivity - technological change, government spending, as well as climate change, etc. The theory rejects the effects of changes in the nominal money supply growth affecting the product. Money is endogenous factor and its development adapts product development and not vice versa. The mechanism of inertia of economic cycles is in this theory based on stimulation of economic entities to higher activity growth in real income, or vice versa. Product fluctuation is explained by changes in the volume of labor employed. The volume of work employed depends on the willingness of employees to work in "good times", when the real incomes are at a high level. If real incomes are low, workers prefer leisure time in "bad times". This is called "intertemporal substitution" between work and free time. In the "good times" savings increase. Consumers spend less and save more, if the interest rate is growing. Therefore, it is possible to increase investment and the initial shock spreads in the future. If the initial shock begins to wear off, real income will fall and cause a downturn in economic activity. This theory is an equilibrium business cycle theory. The labor market is expected to exhibit only the existence of voluntary unemployment. Supply of labor equals the labor demanded. The economy operates at the level of potential output and fluctuations in the economy mean the fluctuations of potential output.

- Another explanation is based on the theory of **structural change between sectors**. It ranks among the neoclassical approaches. This theory emphasizes high cost generated by changes in the structure of employment. The essence is that recessions are periods that are associated with larger sectoral shocks that require sectoral adjustment processes. The sectoral adjustment processes are accompanied by increased levels of unemployment and lower incomes that reduce the aggregate demand for products for all sectors. The result is reduced labor supply and low movement of workers between sectors, even though the recession is primarily due to the need to reallocate labor input between sectors.
- In the early 80s of the 20th century new theory occurred. It emphasizes the effects of **economic shocks**, both short-term and long-term. This is referred to **the theory of random walk with the trend**. This theory explains the business cycle as fluctuations in aggregate economic activity under the influence of temporary demand shocks or permanently operating supply shocks. Temporary shocks cause random fluctuations around the trend. In the long term, economic performance increases due to the fact that the positive economic shocks are significant and outweigh the negative.

We also can explore the **monetary theory** explaining in a specific way the influence of interest rate fluctuations on investment (*K. WickSELL, L. E. Mises, F. A. Hayek*) or cause of business cycle in the form of a “**crisis of overproduction**” introduced by *K. Marx*, conditioned by insufficient purchasing power of the population.

Note. **In the past** there had been a variety of alternative theories explaining the fluctuation of the product. For example, *W. S. Jevons* (neoclassical school) explained the cause of business cycle by a cosmic rhythm and opined that the business cycle depends on the influence of sunspots on Earth. A similar view was upheld by the *H. L. Moore*, he said that fluctuations in production economy had been dependent on external climatic conditions, respectively on rainfall. Advanced theory of business cycles in agriculture explains that the following cycle period is determined by the current and past agricultural prices and the current price of production is determined by the current production. The theory of “underconsumption” indicates that compared with how much could be invested, too much income direct to the rich or savers (*J. A. Hobson, P. Sweezy* and others). At last, there are “psychological theory” explaining the fluctuations in production by behavioral changes of entrepreneurs or consumers. The business cycle is in this case a “contagion” in which one entity infects the second entity via pessimistic or optimistic expectations. (*A. C. Pigou, W. Bagehot* and others). These theories are referred to unicausal.

6.3 Consequences of business cycles and counter-cyclical economic policy

Revealing the real causes of cyclical fluctuations increases the potential limitations of cyclic motion. Economic cycles influence the economic entities. Probably the most striking result of the economic fluctuations is the **rise in unemployment** during

cyclical contractions. Employment is related to production gap (loss of production in comparison with the potential product).

The relationship between the change of real output and the unemployment rate in the US economy was examined by *Arthur M. Okun* (1928-1980). He used data on GDP and unemployment rate since World War II to r. 1960's.

A. M. Okun formulated a relationship that reflects the negative correlation between product growth coefficient and the unemployment rate:

$$u = u^* - \sigma \left[\left(\frac{Y}{Y^*} \cdot 100 \right) - 100 \right]$$

where u is the real unemployment rate, u^* is the natural rate of unemployment (unemployment rate in a situation of full inputs use), the fraction $\frac{Y}{Y^*}$ refers to the growth rate of actual output compared to its potential, σ (sigma) is the sensitivity coefficient in change of the unemployment rate (u) to change of product coefficient: $\frac{Y}{Y^*}$, Y is the actual product and Y^* is potential product. The expression in square brackets is the growth rate of actual output compared to the potential product in %:

$$\frac{Y}{Y^*} \cdot 100 - 100 = \left(\frac{Y}{Y^*} - 1 \right) \cdot 100 = \left(\frac{Y - Y^*}{Y^*} \right) \cdot 100 \quad (v \%)$$

Assuming $u^* = 4 \%$ (at Y^*) and coefficient sigma: $\sigma = 0.4$, the ratio of actual output to potential product: $\frac{Y}{Y^*} = 0.75$ (output gap is equal to 25 % of potential GDP), now we can calculate the size of the actual unemployment rate:

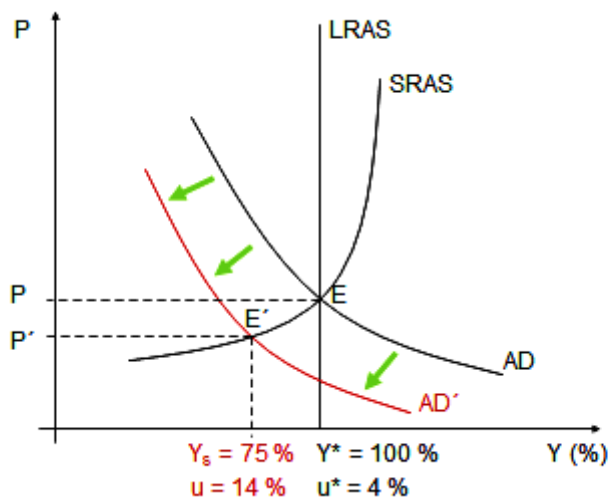
$$u = 4 - 0,4 \cdot (0,75 \cdot 100 - 100)$$

$$u = 4 - 0,4 \cdot (-25)$$

$$\mathbf{u = 14 \%}$$

We have calculated when the output gap was 25 % of potential GDP, the real unemployment rate is 14 %. The following Fig. 6.5 illustrates our calculation. Assume a decline in aggregate demand and output gap occurs when the actual output is 75 % of potential GDP ($Y^* = 100 \%$). This means that there is unused production capacity, including workforce. The unemployment rate has increased from 4 % to 14 % in comparison with the situation under full use of resources.

Fig. 6.5 Example of Okun's law



Okun's law is commonly interpreted in the way if a real product falls from potential output by **2 %**, the unemployment rate will increase by **1 %**. This ratio was derived from empirical data.

The impact of cyclical contraction phase is the decline in economic level (GDP per capita) and a decline in living standard. Unemployment brings **negative economic and social consequences**.

Fluctuation in the economy produces even more instability in the form of **rising inflation**. First, in case of overheating of the economy (demand-pull inflation) or due to a negative supply shock (cost-push inflation).

Cyclical fluctuation in the economy is also reflected in the fluctuations of the **external economic position**. For example, in case of contraction, import declines and current account of balance of payment usually improves (current account consists of exports and imports).

The consequences of economic cycles are also **political**, when the government tries to respond to problems arising from economic cycles (e.g. to a decline in living standard).

Existence of business cycles caused the important question - *How stable is the market economy and what the government can do to to promote stable economic growth?*

Countercyclical policy or policy alleviating the business cycle occurs most often as the regulation of aggregate demand (this is an activist Keynesian policy). This regulation takes the form of high employment policy by reducing cyclical unemployment or form of anti-inflationary policy.

Countercyclical policy based on **monetarist theory** of business cycle lies in the absence of regulation of aggregate demand. Cyclical fluctuation is the result of interference by the authorities in market functioning (called government failure). Stable economic growth will be ensured by adequate monetary policy in the form of compliance-known monetary rule of monetary growth in the economy - *money supply should grow proportionally to the real output growth*.

And **school of rational expectations** (new classical macroeconomics) casts doubt on the ability of stabilization policies affecting cyclical fluctuations. This school talks about the theorem of ineffectiveness of government policy. Its approach consists in focusing on aggregate supply. This school is more focused on the problem of long term preservation of the sources of economic growth rather than on the issue of alleviating the cycles.

6.4 Indicators of the business cycle

The effectiveness of counter-cyclical policies will be increased if it is possible to predict correctly the upcoming phases of the business cycle, as a general phenomenon accompanying the effect of counter-cyclical macroeconomic policy is a delay. Tools of such anticipation are referred to “**conjunctural indicators**”. These indicators are divided into three main groups: leading indicators, concurrent indicators and indicators delayed.

Among the **leading indicators** we can include in the stock market indexes, the number of contracts (especially in sectors producing investment goods), the number of building permits issued and others.

Concurrent indicators help identifying the current phase of the business cycle, among them we can include in e.g. the level of real GDP, unemployment rate, producer price index (PPI).

Delayed indicators mean decay of certain cyclical phase. We can examine the level of wages, retail sales and consumer prices.

References:

FRANK, R. H., BERNANKE, B. S. *Principles of Macro-economics*. 3rd Edition. NY: McGraw-Hill/Irwin, 2007. 561 p. ISBN 978-0-07-325594-1.

FUCHS, K., TULEJA, P. *Principles of Economics*. 2nd expanded edition. Prague: Ekopress, 2005. 347 p. ISBN 80-86119-74-2.

HOLMAN, R. *Economics*. Fourth updated edition. Praha: CH Beck, 2005. 710 p. ISBN 80-7179-891-6.

HYNKOVÁ, V., NOVÝ, J. *Macroeconomics I - for Bachelor, Part I*. 1st ed. Brno: University of Defence, 2008. 125 p. ISBN 978-80-7231-278-8.

HYNKOVÁ, V., NOVÝ, J. *Macroeconomics I - for Bachelor, Part II*. 1st ed. Brno: University of Defence, 2009. 82 p. ISBN 978-80-7231-578-9.

HYNKOVÁ, V., NOVÝ, J. *Macroeconomics I - for Bachelor, Part III*. 1st ed. Brno: University of Defence, 2010. 75 p. ISBN 978-80-7231-734-9.

LIPSEY, R. G., CHRYSTAL, K. A. *Economics*. Tenth edition. Oxford, NY: Oxford University Press Inc., 2004. 699 p. ISBN 978-0-19-925-784-1.

MANKIW, G. N. *Principles of Economics*. 2nd edition. South-Western Educational Publishing, 2000. 888 p. 978-0030259517.

MANKIW, G. N. *Essentials of Economics*. Prague: Grada Publishing, 2000. 763 p. ISBN 80-7169-891-1.

McCONNELL, C. R., BRUE, S. L. *Macroeconomics: Principles, Problems, and Policies*. 7th ed. McGraw-Hill, Irwin, 2007. 380 p. ISBN 978-0-07-110144-6.

SAMUELSON, P. A., NORDHAUS, W. D. *Economics*. 15th ed. McGraw-Hill, 1995. 1013 p. ISBN 0-07-054981-9.

SCHILLER, B. R. *The Macro Economy Today*. 13th edition. McGraw-Hill, 2013. 544 p. ISBN 978-0077416478.