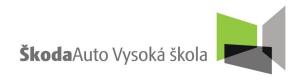# Labour market, Unemployment, Wages, Phillips curve

Ing. Helena Horska, Ph.D.

2011

7.1 Labour Market

Labour markets function through the interaction of workers and employers. Labour economics looks at the suppliers of labour services (workers), the demanders of labour services (employers), and attempts to understand the resulting pattern of wages, employment, and income.
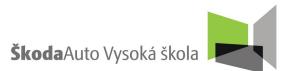
There are two sides to labour economics. Labour economics can generally be seen as the application of microeconomic or macroeconomic techniques to the labour market. Microeconomic techniques study the role of individuals and individual firms in the labour market. Macroeconomic techniques look at the interrelations between the labour market, the goods market, the money market, and the foreign trade market. It looks at how these interactions influence macro variables such as employment levels, participation rates, aggregate income and GDP.

7.1.1 Measurement of unemployment

There are also different ways national statistical agencies measure unemployment. These differences may limit the validity of international comparisons of unemployment data. To some degree these differences remain despite national statistical agencies increasingly adopting the definition of unemployment by the International Labour Organization. To facilitate international comparisons, some organizations, such as the OECD, Eurostat, and International Labor Comparisons Program, adjust data on unemployment for comparability across countries.

Though many people care about the number of unemployed individuals, economists typically focus on **the unemployment rate**. This corrects for the normal increase in the number of people employed due to increases in population and increases in the labour force relative to the population. The unemployment rate is expressed as a percentage, and is calculated as follows:

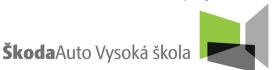Unemployment rate = Unemployed workers / Total labour force   (7.1)

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The labour force is defined as the number of individuals age 15 (in U.S. 16) and over, excluding those in the military, who are either employed or actively looking for work. As defined by the International Labour Organization, 'unemployed workers' are those who are currently <u>not working does for pay either one hour per week,</u> but are willing and <u>able to work for pay</u>, currently <u>available to work (at least within two weeks),</u> and have <u>actively searched</u> for work within the past four weeks. Individuals who are actively seeking job placement must make the effort to: be in contact with an employer, have job interviews, contact job placement agencies, send out resumes, submit applications, respond to advertisements, or some other means of active job searching within the prior four weeks. Simply looking at advertisements and not responding will not count as actively seeking job placement. Since not all unemployment may be 'open' and counted by government agencies, official statistics on unemployment may not be accurate.

The ILO describes 4 different methods to calculate the unemployment rate:

- Labour Force Sample Surveys are the most preferred method of unemployment rate calculation since they give the most comprehensive results and enables calculation of unemployment by different group categories such as race and gender. This method is the most internationally comparable.

- Official Estimates are determined by a combination of information from one or more of the other three methods. The use of this method has been declining in favor of Labour Surveys.

- Social Insurance Statistics such as unemployment benefits, are computed base on the number of persons insured representing the total labour force and the number of persons who are insured that are collecting benefits. This method has been heavily criticized due to the expiration of benefits before the person finds work.

- Employment Office Statistics are the least effective being that they only include a monthly tally of unemployed persons who enter employment offices. This method also includes unemployed who are not unemployed per the ILO definition. Usually, it is called **registered unemployment rate**.
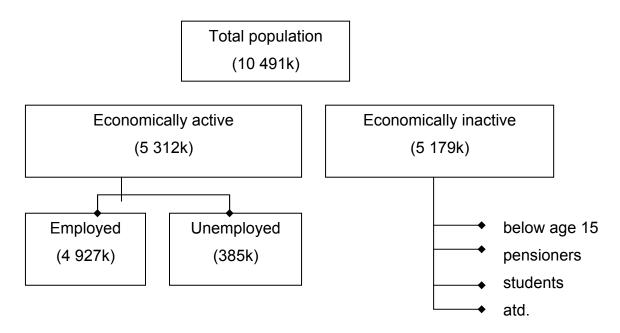
The primary measure of unemployment, the official unemployment rate per the ILO definition, allows for comparisons between countries. Eurostat defines unemployed

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as those persons age 15 to 74 who are not working, have looked for work in the last four weeks, and ready to start work within two weeks, which conform to ILO standards. Both the actual count and rate of unemployment are reported. Statistical data are available by member state, for the European Union as a whole (EU27) as well as for the euro area (EA16). Eurostat also includes a long-term unemployment rate. This is defined as part of the unemployed who have been unemployed for an excess of 1 year.

The main source used is the European Union Labour Force Survey (EU-LFS). The EU-LFS collects data on all member states each quarter. For monthly calculations, national surveys or national registers from employment offices are used in conjunction with quarterly EU-LFS data. The exact calculation for individual countries, resulting in harmonized monthly data, depend on the availability of the data.

Graph 1: Population in the Czech Republic (by 2009-end)

```
                    ┌─────────────────────┐
                    │  Total population   │
                    │     (10 491k)       │
                    └─────────────────────┘

┌─────────────────────┐          ┌─────────────────────┐
│ Economically active │          │ Economically inactive│
│      (5 312k)       │          │      (5 179k)        │
└─────────────────────┘          └─────────────────────┘

┌──────────────┐  ┌──────────────┐        ◆ below age 15
│   Employed   │  │  Unemployed  │        ◆ pensioners
│   (4 927k)   │  │    (385k)    │        ◆ students
└──────────────┘  └──────────────┘        ◆ atd.
```

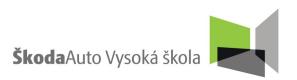Source: Own calculations based on CSU. Dec 2010.

7.1.2 Indicators of labour market

There is a wide range of labour market statistics e.g. labour market participation rate, the percentage of people aged between 15 and 64 who are currently employed or searching for employment, the total number of full-time jobs in an economy, the
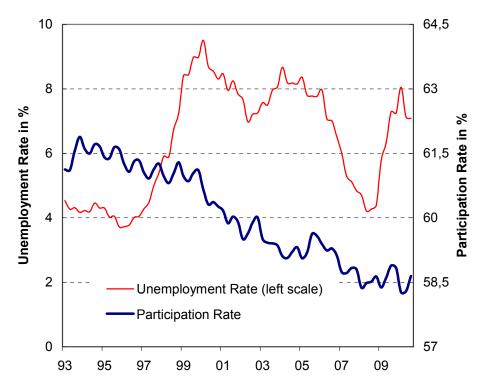
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number of people seeking work as a raw number and not a percentage, and the total number of person-hours worked in a month compared to the total number of person-hours people would like to work.

The participation rate is the number of people in the labour force divided by the population of working age. The nonlabour force includes those who are not looking for work, those who are institutionalised such as in prisons or psychiatric wards, stay-at home spouses, children, and those serving in the military. The unemployment level is defined as the labour force minus the number of people currently employed. The unemployment rate is defined as the level of unemployment divided by the labour force. **The employment rate** is defined as the number of people currently employed divided by the adult population (or by the population of working age). In these statistics, self-employed people are counted as employed. **Duration of unemployment** is an inverse value of the ratio of persons leaving the register of unemployed to total unemployment.

Variables like employment level, unemployment level, labour force, and unfilled vacancies are called stock variables because they measure a quantity at a point in time. They can be contrasted with flow variables which measure a quantity over a duration of time. Changes in the labour force are due to flow variables such as natural population growth, net immigration, new entrants, and retirements from the labour force. Changes in unemployment depend on: inflows made up of non-employed people starting to look for jobs and of employed people who lose their jobs and look for new ones; and outflows of people who find new employment and of people who stop looking for employment.
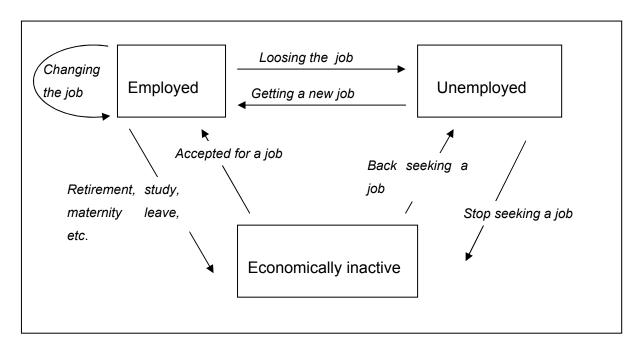
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Graph 2 Labour market in the Czech Republic

Source: CSU, Employment Statistics. March 2010.

Graph 3 Changes in labour market

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Types of unemployment

When looking at the overall macroeconomy, several types of unemployment have been identified, including:

Frictional unemployment — it reflects the fact that it takes time for people to find and settle into new jobs. If 12 individuals each take one month before they start a new job, the aggregate annual unemployment statistics will record this as a single unemployed worker. Technological advancement often reduces frictional unemployment, for example: internet search engines have reduced the cost and time associated with locating employment. Generally, there is enough adequate vacancies, the unemployment is only temporal.

Structural unemployment — it reflects a mismatch between the skills and other attributes (e.g. regional location) of the labour force and those demanded by employers. If 4 workers each take six months off to re-train before they start a new job, the aggregate unemployment statistics will record this as two unemployed workers. Rapid industry changes of a technical and/or economic nature will usually increase levels of structural unemployment, for example: widespread implementation of new machinery or software will require future employees to be trained in this area before seeking employment. The process of globalisation has contributed to structural changes in labour, some domestic industries such as textile manufacturing have expanded to cope with global demand, whilst other industries such as agricultural products have contracted due to greater competition from international producers.

Cyclical unemployment reflects the cyclical development of the economy. At the time of recession, when output is below potential, the number of unemployed increases. On the contrary, during the economic boom, when the product is near or even above potential, employment goes up and unemployment down. A characteristic feature of the cyclical unemployment is the fact that there is generally a surplus labor supply, i.e. a surplus of people looking for work over the demand by firms - employers. Unlike structural unemployment, cyclical unemployment affects the whole economy, although not equally. Please, notice, that in practice, in the early stages of an economic boom, unemployment often rises. This is because people join the labour market (give up studying, start a job hunt, etc.) because of the improving
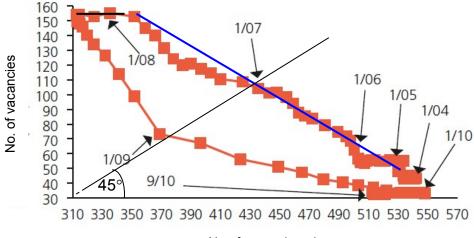
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job market, but until they have actually found a position they are counted as unemployed. Similarly, during a recession, the increase in the unemployment rate is moderated by people leaving the labour force or being otherwise discounted from the labour force, such as with the self-employed.

A **Beveridge curve** is a graphical representation of the relationship between unemployment and vacancies. It typically has vacancies on the vertical axis and unemployment on the horizontal; it slopes downwards as a higher rate of unemployment normally occurs with a lower number of vacancies. If it moves outwards over time, then a given level of vacancies would be associated with higher and higher levels of unemployment, which would imply decreasing efficiency in the labour market. Inefficient labour markets are due to mismatches between available jobs and the unemployed and an immobile labour force.

The position on the curve can indicate the current state of the economy in the business cycle. For example, the recessionary periods are indicated by high unemployment and low vacancies, corresponding to a position on the lower side of the 45 degree line, and likewise high vacancies and low unemployment indicate the expansionary periods, above the 45 degree line. The Beveridge curve can be use as the tool to distinguish between structural and cyclical unemployment.
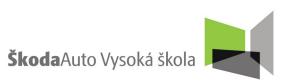
Graph 4 Beveridge curve

Note: Seasonally adjusted data.

Source: CNB. Inflation Report. Dec 2010.

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Natural rate of unemployment — This is the summation of frictional and structural unemployment, that excludes cyclical contributions of unemployment e.g. recession's. It is the lowest rate of unemployment that a stable economy can expect to achieve, seeing as some frictional and structural unemployment is inevitable. Economists do not agree on the natural rate, with estimates ranging from 1% to 5%, or on its meaning — some associate it with 'non-accelerating inflation' (NAIRU). The estimated rate varies from country to country and from time to time.

7.1.3 Costs of unemployment

Individual

Unemployed individuals are unable to earn money to meet financial obligations. Failure to pay mortgage payments or to pay rent may lead to homelessness through foreclosure or eviction. Unemployment increases susceptibility to malnutrition, illness, mental stress, and loss of self-esteem, leading to depression and higher crime rate. Moreover, not everyone suffers equally from unemployment. Some hold that many of the low-income jobs are not really a better option than unemployment with a welfare state (with its unemployment insurance benefits). But since it is difficult or impossible to get unemployment insurance benefits without having worked in the past, these jobs and unemployment are more complementary than they are substitutes. (These jobs are often held short-term, either by students or by those trying to gain experience; turnover in most low-paying jobs is high.) Another cost for the unemployed is that the combination of unemployment, lack of financial resources, and social responsibilities may push unemployed workers to take jobs that do not fit their skills or allow them to use their talents. Unemployment can cause underemployment, and fear of job loss can spur psychological anxiety.

Social and Socio-political

An economy with high unemployment is not using all of the resources, specifically labour, available to it. Since it is operating below its potential, it could have higher output if all the workforce were usefully employed. However, there is a trade-off between economic efficiency and unemployment: if the frictionally unemployed accepted the first job they were offered, they would be likely to be operating at below their skill level, reducing the economy's efficiency. During a long period of

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unemployment, workers can lose their skills, causing a loss of human capital. Being unemployed can also reduce the life expectancy of workers. Low unemployment can encourage xenophobia and protectionism as workers fear that foreigners are stealing their jobs. Efforts to preserve existing jobs of domestic and native workers include legal barriers against 'outsiders' who want jobs, obstacles to immigration, and/or tariffs and similar trade barriers against foreign competitors.

High unemployment can also cause social problems such as crime; if people don't have as much disposable income as before, then it is very likely that crime levels within the economy will increase. It can be causes of civil unrest, in some cases leading to revolution, and particularly totalitarianism.

Okun's law is an empirically observed relationship relating unemployment to losses in a country's production. The 'gap version' states that for every 1 percentage point (p.p.) increase in the unemployment rate above the natural rate of unemomployment, a country's GDP will be at an additional roughly 3 p.p. lower than its potential GDP. The name refers to economist Arthur Okun who proposed the relationship in 1962.

$$u - u * = - \phi (y - y*), \tag{7.2}$$

where (u - $u*$) is the cyclical unemployment rate, the difference between actual and natural rate of unemployment, (y - $y*$) output gap and the coefficient ϕ measures the sensitivity of unemployment to the output gap. The coefficient ϕ has a negative sign, since it is considered that the positive output gap ($y - y*$) > 0 leads to a decline in the unemployment rate, while the negative output gap ($y - y*$) < 0 raises the unemployment. According to the estimates conducted by Althur M. Okun on data from the U.S., this coeficient was equal to 1/3, so an increase in output by 3 p.p. above the potential reduces the unemployment rate by 1 p.p. below the natural level.

$$u - u * = - 0{,}33(y - y*). \tag{7.3}$$

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Self-study: Supply and demand on labour market

Self-study: FRANK, R.H. – BERNANKE, B.S. (2007) *Principles of Economics*. McGraw-Hill, 3th edition. 2007. Ch 21, p.585 -615. ISBN-13: 978-0-07-312567-1.

Self-study: FRANK, R.H. – BERNANKE, B.S. (2007) *Principles of Economics*. McGraw-Hill, 3th edition. 2007. Ch 25, p.699 -615. ISBN-13: 978-0-07-312567-1.

Self-study: BLANCHARD, O. (2002). *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch 6-9. p. 113-200. ISBN 0-13-110301-6.

7.2 Wage determination

Collective bargaining, reservation wage, efficiency wages

Self-study: BLANCHARD, O. (2002). *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch.6-9. p. 113-200. ISBN 0-13-110301-6.

7.3 The model of natural rate of unemployment

We introduce a very simple model in which the only (variable) factor of production is the labour of N. The production function can be written using the equation:

$$Y = AN, \tag{7.4}$$

where *Y* is the product, *N* employment (or number of person-hours worked), and *A* is labor productivity (output per hour or output per person).
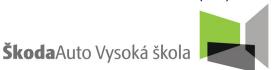
Unit labour costs:

$$ULC = \frac{W}{A} = \frac{W}{Y/N}, \tag{7.5}$$

where *W* is hourly wages, including indirect labor costs such as social and health insurance, payroll tax, payoffs and other benefits provided to employees.

Since we assume that labor productivity is constant, so any change in employment *N* leads to the same change in product *Y*, so that:

$$\Delta Y = \Delta N, \tag{7.6}$$

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The cost of increasing production by one unit is equal to the cost of one more workers, at wage W (since the marginal cost of production is eqult to W).

If goods market is not perfect competitive, the firms charge a price higher than their marginal cost depending on so-called the markup μ:

$$P = (1+\mu)W. \tag{7.7}$$

Collective bargaining

Assuming, the stable labour productivity, the labour unions tend to set the nominal wage claims as a fixed premium on the expected price growth:

$$W = (1+\tau)P^e, \tag{7.8}$$

where τ represents the premium to the expected price growth.

Graph 5 Self-fulfilling inflation expectations

$$W = (1+\tau)P^e \qquad\qquad P = (1+\mu)W$$

$\uparrow P^e \implies \qquad \uparrow W \implies \qquad \uparrow P$

The expected price level through the wage bargaining determines the actual price level. Inflation expectations are thus a key variable determining inflation in the medium term.

$$P = (1+\mu)(1+\tau)P^e. \tag{7.9}$$

Price-setting behaviour of firms determines the real wage paid by firms:

$$\frac{W}{P} = \frac{1}{(1+\mu)}. \tag{7.10}$$

Wage-setting relation reflects the fact that the real wage is a decreasing function of the unemployment rate (because it reduces the power of unions and workers to bargain a higher wage).
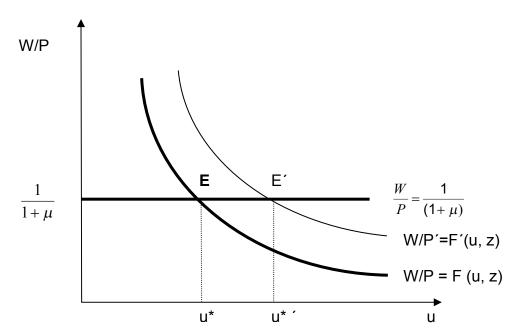
$$\frac{W}{P} = F(u, z), \tag{7.11}$$

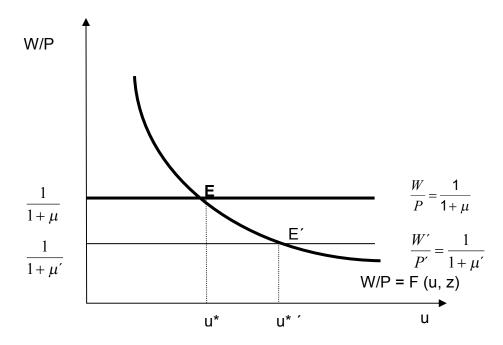where z are other factors such as minimal wage, unemployment insurance etc.

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Model of natural rate of uneymployment

Graph 6 Natural rate of unemployment – situation A

Graph 7 Natural rate of unemployment – situation B

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Dynamic version of the model of natural rate of unemployment

Inflation formula:

$$\pi = \frac{P_{t+1} - P_t}{P_t} = \frac{\Delta P_{t+1}}{P_t}.$$ (7.12)

Real wage growth (or real wage inflation) formula:

$$w = \frac{W_{t+1} - W_t}{W_t} = \frac{\Delta W_{t+1}}{W_t}.$$ (7.13)

Substituting:

$$w = F\ (\pi^e,\ u,\ z).$$ (7.14)

The change in real wage:

$$\frac{\dfrac{W_{t+1}}{P_{t+1}} - \dfrac{W_t}{P_t}}{\dfrac{W_t}{P_t}} = F\ (u,\ z).$$

Simplifying:

$$w - \pi = F\ (u,\ z)$$ (7.15)

$$w = F\ (\pi^e,\ u-u^*,\ z).$$ (7.16)
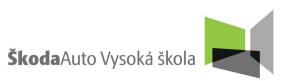
Reorganizing:

$$w - \pi = F\ (u-u^*,\ z).$$ (7.17)

Self-study: BLANCHARD, O. (2002). *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch 6. 113-133. Ch 7 p.153-157, Ch 13 p. 267-288. ISBN 0-13-110301-6.

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7.4 Hysteresis

Hysteresis is a hypothesized property of unemployment rates. It's possible that there is a ratchet effect, so a short-term rise in unemployment rates tends to persist. An example is the notion that inflationary policy leads to a permanently higher 'natural' rate of unemployment, because inflationary expectations are 'sticky' downward due to wage rigidities and imperfections in the labour market. Another channel through which hysteresis can occur is through learning by doing. Workers who lose their jobs due to a temporary shock may become permanently unemployed because they miss out on the job training and skill acquisition that normally takes place. This explanation has been invoked, by Olivier Blanchard among others, as explaining the differences in long run unemployment rates between Europe and the United States.

Self-study: BURDA, M. – WYPLOSZ, Ch. (2001) *Macroeconomics – A European Text*. 3th edition. Oxford University Press, 2001. Ch. 4 p. 70-98. ISBN 0-19-877-650-0.
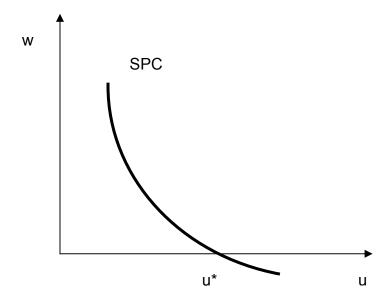
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7.5 Phillips curve

The traditional Phillips curve is a historical inverse relationship between the rate of unemployment and the rate of nominal wage growth in an economy. Stated simply, the lower the unemployment in an economy, the higher the nominal wage growth. The traditional PC assumes that there is a stable tradeoff between unemployment and 'wage inflation'.

The PC is a curve with (i) a negative slope, (ii) has the shape of a hyperbola (iii) and it intersect the horizontal axis.

Graph 8 The Traditional Phillips curve

The traditional Phillip's curve:

$$w = - \varepsilon (u - u^*), \qquad (7.18)$$

where *w* denotes the nominal wage growth rate, ε is the coefficient of the sensitivity of the nominal wages growth to a change in unemployment rate gap between the actual and natural rate, or the slope of the Phillips curve.
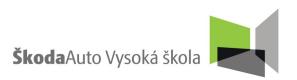
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Augmented Phillips curve

The **price-wage spiral** (also called the wage-price spiral) represents a vicious circle process in which different sides of the wage bargain try to keep up with inflation to protect real incomes. Thus, this process is one possible result of inflation. It can start either due to high aggregate demand combined with near full employment or due to supply shocks, such as an oil price hike. Wage-earners try to push their nominal after-tax wages upward to catch up with rising prices, to prevent real wages from falling. To maintain purchasing power equal to the rising costs reflected by a consumer price index (CPI), a taxable salary must increase faster than the CPI itself to result in an after-tax wage increase comparable to the increased cost of goods and services - unless tax brackets are indexed. So 'wages chase prices and prices chase wages', persisting even in the face of a (mild) recession. This price-wage spiral interacts with inflationary expectations to produce long-lived inflationary process.
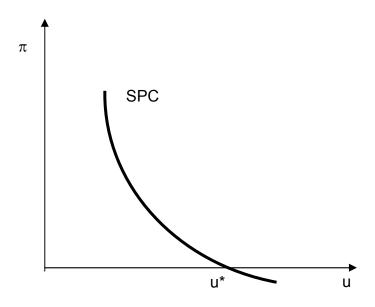
$$\pi = (1+\mu) \, F(\pi^e, - (u - u^*), z). \qquad\qquad (7.19)$$
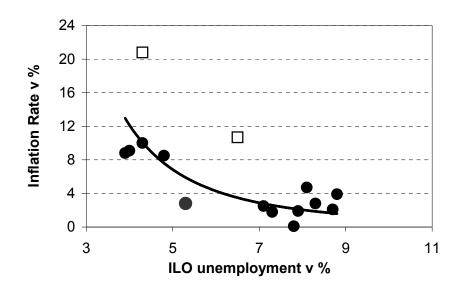
This equation offers below conclusions:

A) inflation rate as well as nominal wage growth is decreasing function of an difference between actual and natural rate of unemployment.

B) an increase in expected inflation leads to inflation

C) keeping the expected inflation rate constant, increase in the margin μ, or in other factors *z* cause higher inflation and

D) keeping the expected inflation rate constant, the reduction of the actual rate of unemployment below the natural rate accelerates inflation rate.
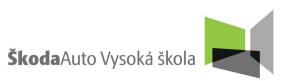
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Graph 9 Augmented Phillips curve

Graph 10 Augmented Phillips curve in the Czech Republic in the period 1993-2006

Source: CSU, April 2007.

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7.5.1 Inflation expectations

Rational expectations is a hypothesis in economics which states that agents' predictions of the future value of economically relevant variables are not systematically wrong in that all errors are random. An alternative formulation is that rational expectations are model-consistent expectations, in that the agents inside the model assume the model's predictions are valid. Formulating inflation expectation, the agents use all available information. The rational expectations assumption is used in many contemporary macroeconomic models, game theory and other applications of rational choice theory.

Adaptive expectations: under adaptive expectations, expectations of the future value of an economic variable are based on past values. For example, people would be assumed to predict inflation by looking at inflation last year and in previous years. Adaptive inflation expectations:

$$\pi^e_t = \pi^e_{t-1} + j(\pi_{t-1} - \pi^e_{t-1}). \tag{7.20}$$

The above equation states that the current inflation expectations (π^e_t) are formed from the previous expected inflation (π^e_{t-1}) adjusted for a previous estimation error, i.e. the deviation between the observed and excepted inflation ($\pi_{t-1} - \pi^e_{t-1}$). The parameter j expresses the degree and speed of adjustment of expected inflation to actual inflation rate. If j is low, inflation expectations adjust slowly, and the actual inflation rate has a little effect on expectations. Conversely, if j is high, the inflation path has a significant impact on inflation expectations. If $j = 1$, then inflation expectations are identical to the past inflation ($\pi^e_t = \pi_{t-1}$). This is a special form of adaptive (inflation) expectations called **static (inflation) expectations**.

If we assume the static inflation expectations, we can rewrite the function of the augmented Phillips curve and we finally get:

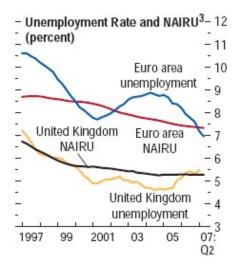$$\pi - \pi_{t-1} = (1+\mu) F(- (u - u^*), z). \tag{7.21}$$

Thus function shows that the unemployment rate in the case of static inflation expectations does not affect inflation but the change in inflation: an increase in actual unemployment rate above the natural rate of unemployment decelerate inflation,

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while a reduction of the current unemployment rate below the natural rate of unemployment accelerates inflation. If the current unemployment rate is identical with the natural rate of unemployment, inflation is stable.

NAIRU is an acronym for Non-Accelerating Inflation Rate of Unemployment, and refers to a level of unemployment below which inflation rises. It is widely used in mainstream economics, but is rejected by other economists such as James Tobin, and, in earlier forms, by John Maynard Keynes.

Graph 11 NAIRU
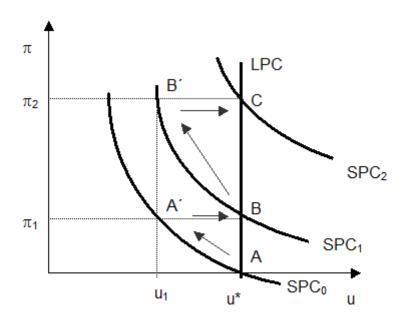

Source: IMF: World Economic Outlook, October 2007.

7.5.2 Short-run and long-run Phillips curve

Money illusion implies that the negative relationship between inflation and unemployment described by the Phillips curve might hold but only for the transitory period.

If workers use their nominal wage as a reference point when evaluating wage offers, firms can keep real wages relatively lower in a period of high inflation as workers accept the seemingly high nominal wage increase. These lower real wages would allow firms to hire more workers in periods of high inflation. The short-run trade-off means lower unemployment thanks to demand expansion and higher inflation. The

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economy moves to point *A'*. Sooner or later, employers will recognize that inflation has now increased to the higher level of π_1. They will ask for higher nominal wages that would reflect higher inflation. Demand on labour will go back down hand in hand with employment (unemployment rate will do back up to *u**). The economy will reach point *B*. So, in a sufficiently long period, there is no substitution between unemployment and inflation. There is only a short period thanks to money illusion employees.

Graph 12 Phillips curve in short- and long-run

Short-term Phillips curve (*SPC*):

$$\pi = \pi^e_t - \varepsilon(u - u^*), \qquad (7.22)$$

The conclusion: in the long run there is no substitution between inflation and unemployment; natural rate of unemployment is compatible with any rate of inflation, the long-term Phillips curve LPC - line connecting points A, B and C - is vertical. Substitution between unemployment and inflation stems from unexpected inflation (see money illusion). Change in inflation expectations is the reason causing the shift of the short-run Phillips curve (increase in inflation expectations moves the SPC northeast, while a decrease in inflation expectations to southwest).
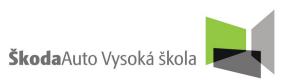
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Acceleration of inflation: only another even more radical policy expansion might lead to a decline in unemployment rate below the natural rate. But the result is the acceleration of inflation rate. The economy moves along the the SPC_1, to point B'. The result is a sharp acceleration in inflation, to π_2. The efforts to keep unemployment below the natural rate leads to a significant acceleration of inflation.

Original Phillips curve, NAIRU, augmented Phillips curve, short-run and long-run Phillips curve

Self-study: BURDA, M. – WYPLOSZ, Ch. (2001) *Macroeconomics – A European Text*. 3th edition. Oxford University Press, 2001. Ch. 12 p. 279-300. ISBN 0-19-877-650-0.

Self-study: BLANCHARD, O. (2002). *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch 8-9. p. 161-200. ISBN 0-13-110301-6.

ŠkodaAuto Vysoká škola
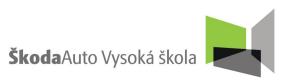
Assigned reading

- FRANK R.H. – BERNANKE, B.S. (2009) *Principles of Economics*. Chapter 18 and Chapter 22 p. 619-625. Fourth Edition. USA: McGraw-Hill, 2009. 836 s. ISBN 978-0-07-128542-1.
- BURDA, M. – WYPLOSZ, Ch. (2001) *Macroeconomics – A European Text*. Ch. 4 'Labour Markets and Unemployment' p. 70-98. 3th edition. 2001. Oxford University Press. ISBN 0-19-877650-0.
- BLANCHARD, O. (2002). *Macroeconomics*. Ch 6. 'The Labour Market' p. 113-133. 5th edition, 2002. Prentice-Hall.

Self-study

- BLANCHARD, O. (2002). *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch.6&8. ISBN 0-13-110301-6.
- BALDWIN R.- WYPLOSZ, Ch. *The Economics of European Integration.* McGraw-Hill, 4th edition. 2012. ISBN: 9780077131722.

Sources

- HORSKA H., www.horska.com
- FRANK R.H. – BERNANKE, B.S. (2009) *Principles of Economics*. Chapter 18 and Chapter 22 p. 619-625. Fourth Edition. USA: McGraw-Hill, 2009. 836 s. ISBN 978-0-07-128542-1.
- BLANCHARD, O. *Macroeconomics.* 5th edition, Prentice-Hall 2002, Ch. 3. ISBN 0-13-110301-6.
- BURDA, M. – WYPLOSZ, Ch. (2001) *Macroeconomics – A European Text*. 3th edition. Oxford University Press, 2001. Ch. 4. ISBN 0-19-877-650-0.

7.6 Exercises

1. Fulfill the below table:

	Country A	Country B
1. Population	800	850
2. Economically active	400	?
3. Unemployment rate	?	5%
4. Employment rate	?	?
5. No of unemployed	50	20
6. No of employed	?	380

2. Assume that the average profit margin in the economy is 10%. And the level of nominal wages in the economy is determined by the equation: $W = P(1-2u)$, where 'u' denotes the unemployment rate. What is the level of real wages that firms offer to workers? What is the level of the natural rate of unemployment? What will happen if the average profit margin in the economy fall to 5% due to a drop in aggregate demand?

3. What's the level of cyclical unemployment, if a recessionary gap in the economy reaches 2 percentage points and the coefficient measuring the sensitivity of unemployment to the output gap is equal to 0.5?

4. Describe the emergence of stagflation in an economy using the model of short-term amd long-term Phillips curve together with the AS-AD model.

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