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**Abstract:**

The present paper deals with the development of wage distribution by educational attainment in the Czech Republic in the years 2003–2012, analysing fifty wage distributions as the object of research and the gross monthly wage in CZK as the research variable. It examines the development of wage distribution in time and the gross monthly wage in relation to the level of educational attainment. It also pursues the development of the minimum wage in the monitored period. The author pays special attention to the lowest guaranteed wage levels classified according to wage classes and work capability assessment, comparing the minimum wage to the wage of subsistence. The forecasts of future wage distribution are an integral component of the research, the financial standing of Czech households being evaluated in an international context within the European Union.

**Keywords:** wage distribution, stages of education, characteristics of wage location and differentiation, development of wage, forecasts of wage distribution, income distribution

**JEL Classification:** J31, G01, H24, E24, D31, O15

## 1. Introduction

The level of remuneration is indicative for the labour market in terms of an objective assessment of the value of work done. The wage level and behaviour play an indisputable role in the economy of every country. The wage level can be used as a characteristics of a quantitative aspect of living standard, the level of social security and equality in the division of material goods provided by the state. The wage behaviour of employees is related to the behaviour of other important macroeconomic indicators such as the gross domestic product, unemployment, purchasing power of the population, the amount of taxes paid to the state budget, *etc.* The wage development analysis should create a decision-making basis for the government budget and social policy makers.

A number of domestic and foreign authors deal with the issue of wages or related indicators. Here is just a short list of their publications: Behr (2007), Dagum (1997), Franta (2010), Kaasa (2006), Mallick (2008), Marek (2010), Monti (2009), Pacáková (2007), Večerník (2007), Wessels (2008).

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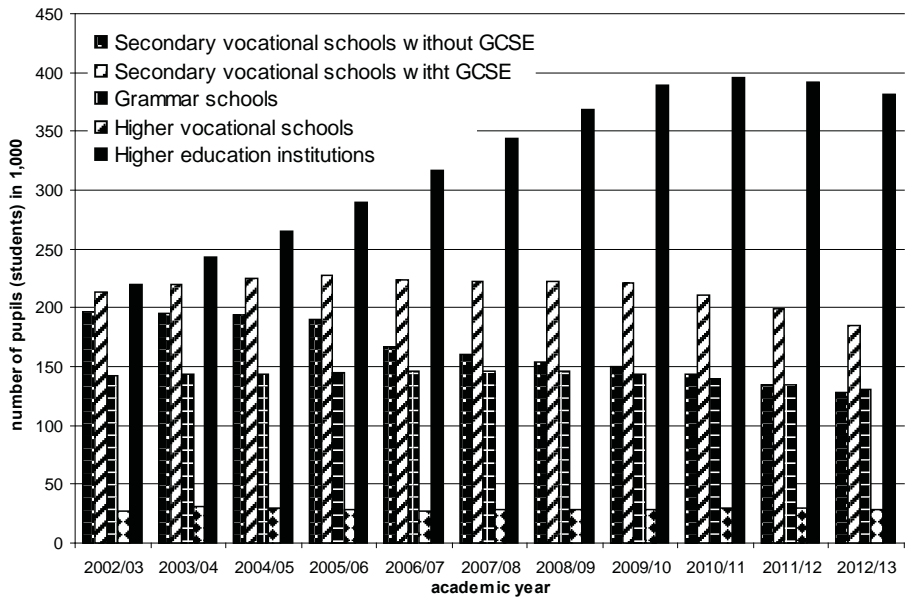
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In the Czech Republic, the disproportion between increasing numbers of university graduates and declining numbers of vocational school leavers has been widely debated in recent years. This discrepancy may have far-reaching consequences for the Czech economy. There are quite a lot of hardly employable graduates, particularly in humanities, the rising unemployment thus threatening even well-educated people. On the other hand, there is the lack of skilled manual workers.

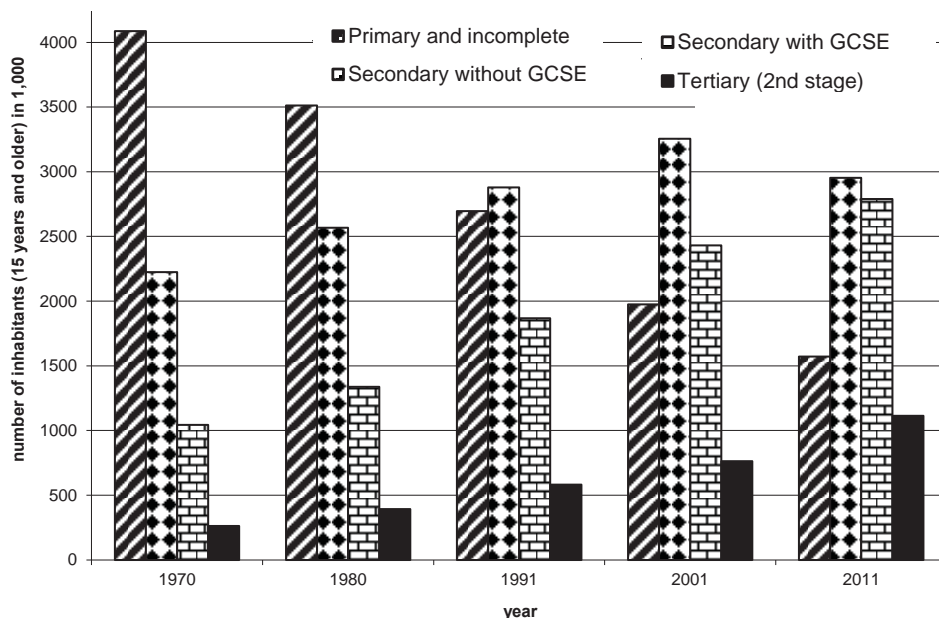
Figure 1 provides an overview of the development of numbers of pupils (students) at various stages of education from the academic year 2002/2003. We can observe that the numbers of college graduates rose steadily from the beginning of the period until 2010/2011, having stayed at almost the same high level in the following years. As we can see in the figure, however, the number of vocational school graduates without GCSE decreased markedly throughout the period. Figure 2 gives a long-term overview of the development of the population structure in terms of educational attainment. An increasing number of university graduates and a steady decrease in the number of vocational school leavers without GCSE (the decline having almost doubled in comparison to 1970) are noticeable. Figure 3 also indicates the growing proportion of people with tertiary education in a lower age group (with the exception of those between the ages of 15 and 24 years who receive their secondary or university education). As shown in this figure, educational attainment of the population decreases with an increasing age. A higher level of education in the Czech Republic is a positive factor in terms of the general advancement of the country. Due to the existing overeducation, however, some employees who have acquired certain qualifications often enter low-skilled jobs because of the lack of those in their respective field of expertise, this being the case of smaller towns in particular; see Borghans (2000). A number of authors deal with the issue of educational attainment and/or its relationship to the income of employees; see, for example Botelho (2004), Chevalier (2011), Christie (2001), Shin (2006) or Higgins (2013).

**Figure 1 | Development of the Number of Pupils (Students) at Various Stages of Education in the Research Period**



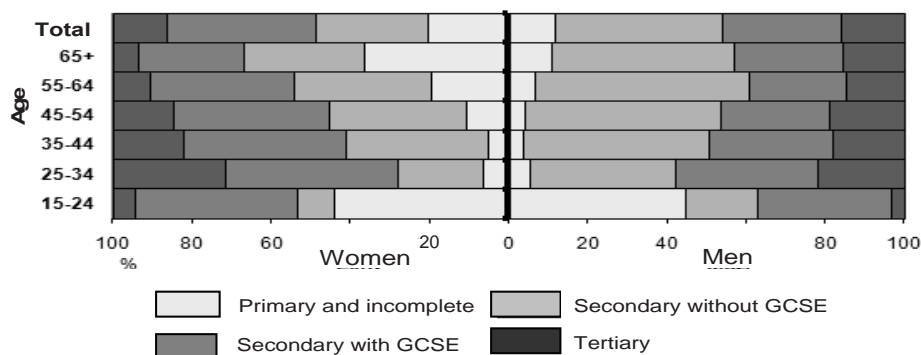
Source: Own research

**Figure 2 | Long-term Development in the Population Structure of the Czech Republic by Educational Attainment**



Source: Own research

**Figure 3 | Structure of Inhabitants of 15 Years of Age and above in the Czech Republic according to Educational Attainment Depending on Age and Gender in 2011**



Source: Own research

Since education can be perceived as an investment in an individual's high prospective income, the potential wage becomes one of the key factors in choosing among particular schools offering different types of education. The present paper provides an analysis of the level of remuneration in the Czech Republic focusing on its relation to the highest educational attainment.

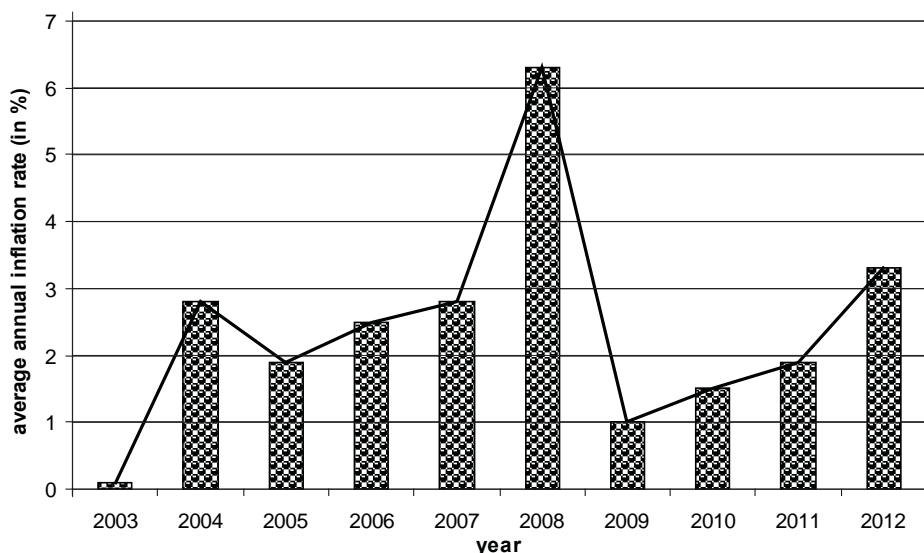
## 2. Database

The gross monthly wage in CZK monitored in the period between 2003 and 2012 represents the research variable. Since it is the nominal wage, Figure 4 indicates the development of an average annual inflation rate in the research period. This variable was studied in relation to employees' educational attainment broken down into five stages of education: primary and incomplete, secondary without GCSE, secondary with GCSE, higher professional and undergraduate (first degree) and postgraduate (second tertiary degree) education. The necessary data were taken from an official website of the Czech Statistical Office (CSO). They are the data on sample sizes (see Table 1) and interval frequency distributions with extreme open intervals presented by the CSO website table "Percentages of Employees in the Bands of Gross Monthly Wages by Education". All calculations related to wages were based on the interval frequency distribution (incl. characteristics published by the Czech Statistical Office calculated from the respective data) in order to ensure comparability of the results obtained. Outcome accuracy can be compared from this perspective.

The Czech Statistical Office draws information on the development of gross monthly wages from two sources – business reports and structural statistics. The former provide reliable data on wages in the national economy that can be classified by different criteria such as economic sectors and group sizes, not allowing, however, a more detailed classification. Structural statistics, on the other hand, offers the most detailed information on individual wages in terms of types of employment in particular, using various ways of classification.

The research includes a total of 50 wage distributions.

**Figure 4 | Average Annual Inflation Rate in 2003–2012 (in %)**



Source: Own research

**Table 1 | Sample Sizes of the Wage Distribution Divided by Educational Attainment**

Year	Stages of education				
	Primary and incomplete	Secondary without GCSE	Secondary with GCSE	Higher professional and undergraduate	Tertiary (2 <sup>nd</sup> degree)
<b>2003</b>	95,112	377,347	408,562	15,749	122,164
<b>2004</b>	119,480	470,688	560,237	29,144	224,947
<b>2005</b>	125,972	523,744	575,668	40,055	250,088
<b>2006</b>	129,027	553,522	621,306	42,856	267,661
<b>2007</b>	135,399	587,081	629,447	47,967	273,604
<b>2008</b>	137,190	591,669	644,576	54,439	283,937
<b>2009</b>	120,254	557,780	625,631	57,747	290,094
<b>2010</b>	116,383	555,266	627,073	64,684	299,423
<b>2011</b>	121,518	570,414	637,916	71,657	311,772
<b>2012</b>	205,400	1,239,300	1,244,700	122,800	564,800

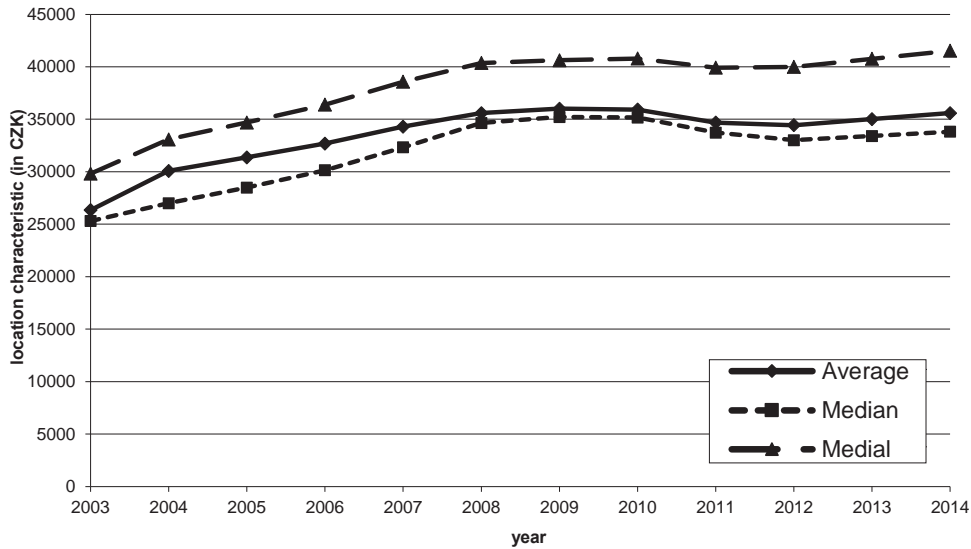
Source: [www.czso.cz](http://www.czso.cz)

### 3. Development of Sample Characteristics of the Wage Distribution

#### 3.1 Dependence of the wage on educational attainment of an employee

Sample characteristics of the location, variability and shape of the wage distribution were calculated in the research period. The arithmetic mean, median (the middle wage) and medial represent location characteristics. (The medial is a remarkable location characteristics; households with the wage lower or equal to the medial receive a half of the total wage in the sample, those with the wage higher or equal to the medial earning the other half, respectively.) Figure 5 presents the development of the three location characteristics for tertiary education during the research period, including the forecast for 2013 and 2014.

**Figure 5 | Development of Location Characteristics of the Gross Monthly Wage (in CZK) in 2003–2012 including Tertiary (2<sup>nd</sup> degree) Educational Attainment Forecast for 2013 and 2014**



Source: Own research

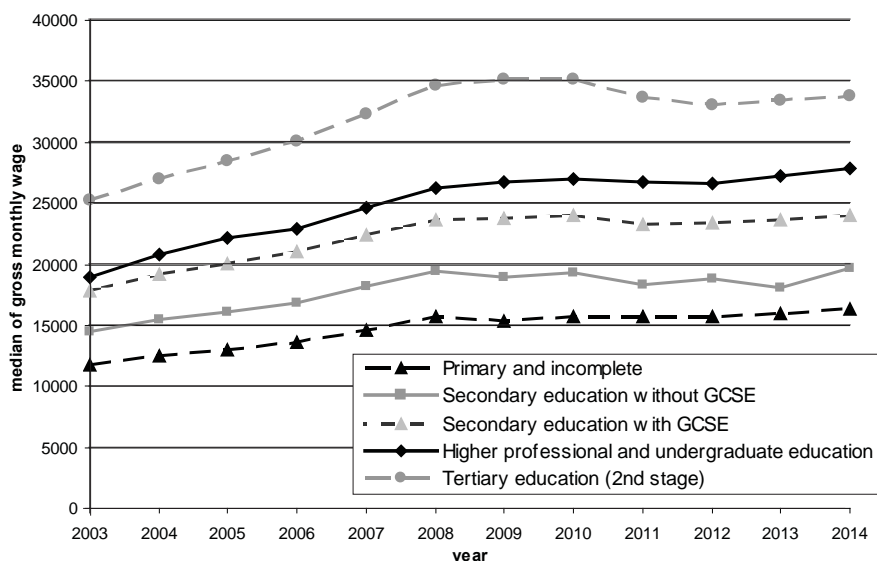
**Table 2 | Differences between the Arithmetic Mean and Median (in CZK)**

Year	Primary and incomplete education	Secondary education without GCSE	Secondary education with GCSE	Higher professional and undergraduate education	Tertiary (2 <sup>nd</sup> degree) education
2003	697	638	1,298	1,443	1,032
2004	82	377	1,541	2,121	3,081
2005	338	491	1,680	2,089	2,877
2006	836	738	1,749	2,463	2,548
2007	219	582	1,781	2,163	1,973
2008	318	701	1,960	2,251	946
2009	265	618	1,890	2,231	794
2010	341	633	1,819	2,236	749
2011	278	579	1,380	1,635	958
2012	271	558	1,476	1,768	1,428
<b>2013</b>	<b>236</b>	<b>913</b>	<b>1,423</b>	<b>1,757</b>	<b>1,604</b>
<b>2014</b>	<b>201</b>	<b>626</b>	<b>1,369</b>	<b>1,745</b>	<b>1,780</b>

Source: Own research

Figure 5 shows that for all researched wage distributions, the relation is valid. This relationship is typical of a positively skewed frequency distribution, the wage distribution being characterized exactly by positive skewness. Table 2 displays the differences between the arithmetic mean and median for all wage distributions including predictions. The median is more often used as a wage location characteristics since the absolute majority of employees do not reach the average wage. The median is a less frequent characteristics of the wage distribution level. Figure 6 presents the development of the median of the wage distribution according to the level of education completed. It gives an overview of the impact of educational attainment on the level of wages. As to be expected, well-marked differences in the level of wages by educational attainment are apparent. It is no surprise that the wage level grows with an increasing level of education. This dependence was verified by a one-way variance test analysis, having proved to be significant even at a 1% significance level. It means that the wage depends on the level of educational attainment with a 1% error probability. It is not, however, a linear rise. As expected, the largest difference between the last two levels of education, *i.e.* between higher professional or undergraduate and (second degree) tertiary education, is significant. Tertiary-educated employees are paid by far the highest salaries, their wage levels being markedly different from other groups. In 2012, for example, the middle wage of employees with tertiary education was more than twice as big as that of workers with primary or incomplete education.

**Figure 6 | Development of the Median of Gross Monthly Wage (in CZK) in 2003–2012 including Forecast for 2013 and 2014 by Educational Attainment**



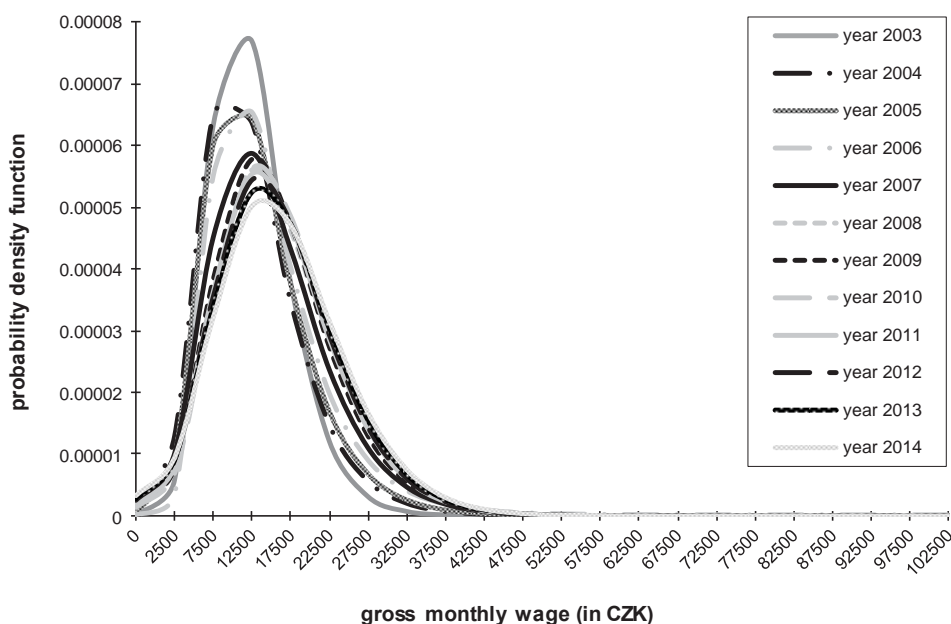
Source: Own research

### 3.2 Behaviour of the wage distribution within individual categories of educational attainment

Figures 7–9 provide information on the behaviour of the wage distribution within particular levels of educational attainment.

It is not surprising that the wage distributions of employees with primary or incomplete education are characterized by a lower level and variability as well as higher skewness and kurtosis since very low wages prevail in this group of employees (see Figure 7). This is due to the fact that the corporate employees enter low-paid less qualified or unskilled jobs, pay differentials between them being not too big. As mentioned above, the wage level increases with rising educational attainment, pay differentials growing adequately, the skewness and kurtosis decreasing gradually (see Figures 7–9). As already pointed out, the employees with tertiary education earn the highest wages. They are characterized by high variability, with pay differentials between individual employees in this group being large. In economic terms, this means that, for example, senior managers of multinationals earn huge wages compared to, for instance teachers. Since the lowest wages do not predominate in this group of employees, their wage distribution is characterized by lower skewness and kurtosis (see Figure 9).

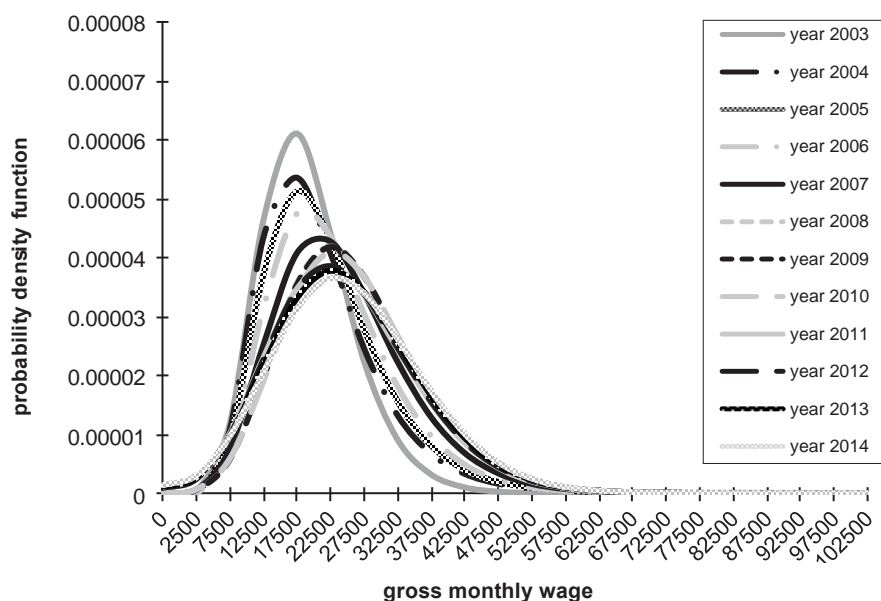
**Figure 7 | Development of the Model Wage Distribution of Employees with Primary and Incomplete Education in 2003–2012 including Forecast for 2013 and 2014**



Source: Own research

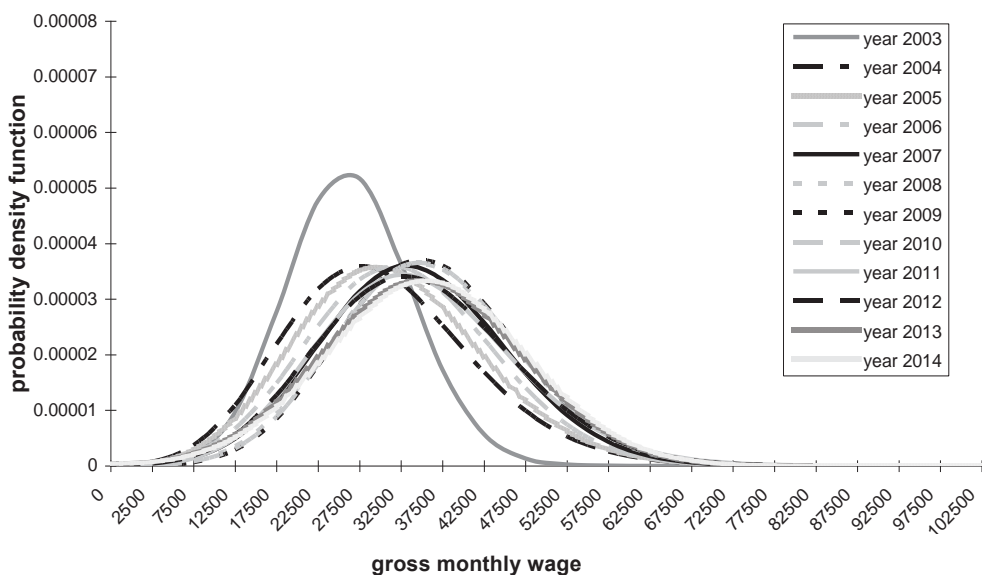


**Figure 8 | Development of the Model Wage Distribution of Employees with Secondary Education with GCSE in 2003–2012 including Forecast for 2013 and 2014**



Source: Own research

**Figure 9 | Development of the Model Wage Distribution of Employees with Tertiary (2<sup>nd</sup> degree) Education in 2003–2012 including Forecast for 2013 and 2014**



Source: Own research

From the point of view of the wage distribution development in time, distributions at all stages of educational attainment are characterized by progressively increasing levels and variability and gradually decreasing skewness and kurtosis (see Figures 7–9). The above mentioned findings indicate that the wages paid to individual employees of corporate and public organizations are becoming more diversified.

### 3.3 Impact of the global financial crisis on wage levels

Table 3 presents the development of the wage level in the Czech Republic both before and during the economic recession.

It can be assumed that the development of wages is closely tied to that of the gross domestic product and unemployment, Table 4 illustrating both these links over the same period. Figure 10 depicts the workings of economic cycles in the economy.

The expected and relatively rapid wage growth in all categories of educational attainment during the economic boom before the crisis (in years 2003–2008) is demonstrated in Table 3. In some cases, the wages exceeded the previous year’s level by 8%. The gross domestic product also grew considerably in this period (see Table 4). Surprisingly high unemployment, indicated in the same table, implies that the employers incline to keep their current employees and pay them reasonably well rather than recruiting new staff. The economic crisis brought a marked change in the development of wages whose growth virtually stopped in all categories of educational attainment. The same halt of GDP growth was not surprising at all. Rising unemployment may have been unexpected, since its level seems to be the same as before the crisis. We can observe a much smaller average annual growth rate of the wage level in the period 2009–2012 compared to the years 2003–2008. In the economic recession, only a slight increase in wages of employees with different levels of education was recorded.

**Table 3 | Annual Growth Coefficients and Average Annual Growth Coefficients of the Arithmetic Mean, Median and Medial of Gross Monthly Wage in 2003–2012 including Predictions for 2013 and 2014 in the Czech Republic according to Educational Attainment**

		Stages of education completed														
		Primary and incomplete			Secondary without GCSE			Secondary with GCSE			Higher professional and undergraduate education			Tertiary (2 <sup>nd</sup> degree)		
Period	Year	Arithme- tic- mean	Median	Medial	Arithme- tic mean	Median	Medial	Arithme- tic mean	Median	Medial	Arithme- tic mean	Median	Medial	Arithme- tic mean	Median	Medial
Pre-crisis period	2003	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2004	1.009	1.062	1.082	1.044	1.064	1.077	1.082	1.074	1.095	1.121	1.095	1.137	1.142	1.067	1.109
	2005	1.053	1.033	1.035	1.048	1.042	1.040	1.045	1.041	1.044	1.060	1.068	1.067	1.043	1.055	1.049
	2006	1.086	1.050	1.052	1.062	1.048	1.052	1.052	1.052	1.045	1.045	1.032	1.026	1.042	1.058	1.049
	2007	1.030	1.077	1.086	1.068	1.080	1.087	1.060	1.063	1.076	1.058	1.077	1.080	1.049	1.072	1.060
	2008	1.077	1.071	1.058	1.070	1.066	1.063	1.061	1.058	1.058	1.064	1.066	1.066	1.038	1.072	1.046
	2009	0.979	0.982	0.974	0.972	0.975	0.971	1.002	1.005	1.001	1.018	1.020	1.016	1.012	1.017	1.006
	2010	1.027	1.023	1.024	1.020	1.020	1.023	1.006	1.010	1.010	1.006	1.007	1.006	0.997	0.999	1.004
Period of crisis	2011	0.995	0.998	1.007	0.951	0.952	0.977	0.954	0.969	0.985	0.970	0.990	0.979	0.966	0.959	0.979
	2012	0.997	0.997	1.007	1.023	1.025	1.019	1.007	1.003	1.003	1.002	0.997	1.001	0.993	0.979	1.002
	2013	1.019	1.021	0.948	0.982	0.962	0.953	1.013	1.016	1.021	1.022	1.024	1.025	1.017	1.012	1.019
	2014	1.018	1.021	1.110	1.070	1.089	1.104	1.012	1.015	1.021	1.022	1.023	1.025	1.017	1.012	1.019
Ø 2003–2008			1.051	1.058	1.062	1.058	1.060	1.064	1.060	1.058	1.063	1.069	1.068	1.075	1.065	1.062
Ø 2008–2012			0.999	1.000	1.003	0.991	0.993	0.997	0.992	0.996	1.000	0.999	1.003	1.001	0.992	0.998
Ø 2003–2012			1.027	1.032	1.035	1.028	1.029	1.034	1.029	1.030	1.035	1.037	1.039	1.041	1.030	1.033
Ø 2012–2014			1.019	1.021	1.026	1.025	1.024	1.026	1.013	1.016	1.021	1.022	1.024	1.025	1.012	1.019
Ø 2003–2014			1.026	1.030	1.034	1.027	1.028	1.032	1.026	1.027	1.032	1.035	1.036	1.038	1.027	1.031

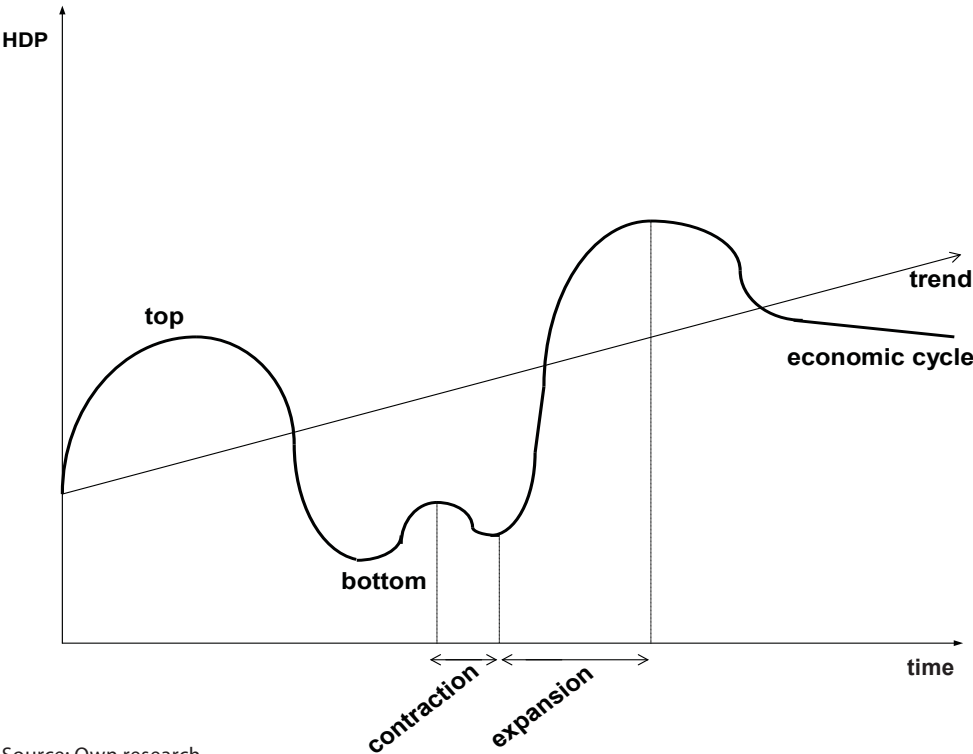
Source: Own research

**Table 4 | Annual Growth Coefficients of Gross Domestic Product Calculated Using the Pension Method and General Unemployment Rate (Annual Averages in %)**

Indicator	Year									
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Gross domestic product	1.047	1.090	1.064	1.076	1.092	1.051	0.977	1.008	1.009	1.006
General unemployment rate	7.8	8.3	7.9	7.1	5.3	4.4	6.7	7.3	6.7	7.0

Source: www.czso.cz, own research

**Figure 10 | Economic Cycle**



Source: Own research

### 3.4 Forecasts of the wage distribution according to educational attainment

Predictions of the wage distribution according to educational attainment are constructed using three-parametric lognormal curves and the L-moments method of parametric estimation. Exponential smoothing is employed in the construction of the first L-moments

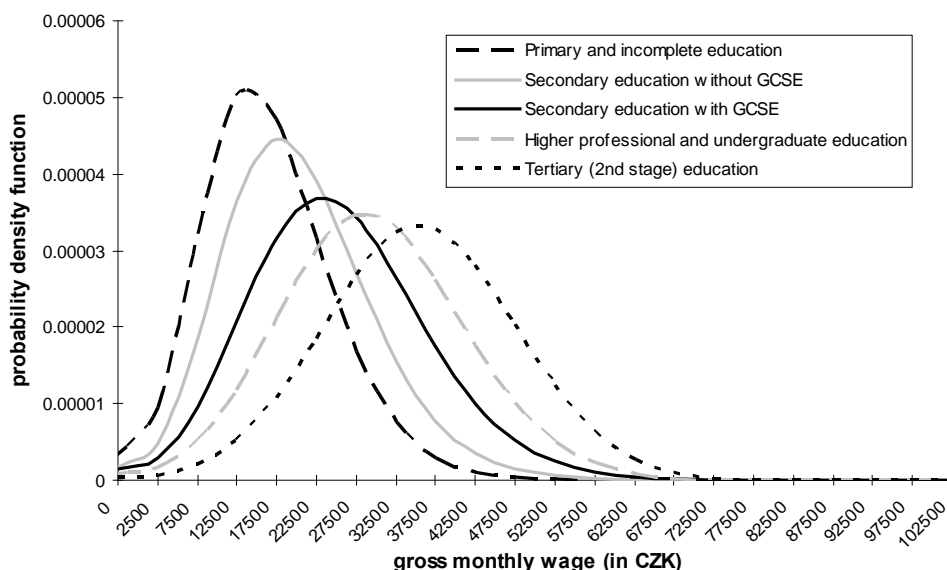
sample for 2013 and 2014 since this method's emphasis on more recent observations of the time series increases the accuracy of predictions.

**Table 5 | Forecasts of the Arithmetic Mean (in CZK), Median (in CZK) and Medial (in CZK) for 2013 and 2014 Based on Previous Years' Development**

Stages of education	Arithmetic mean		Median		Medial	
	Year 2013	Year 2014	Year 2013	Year 2014	Year 2013	Year 2014
Primary and incomplete education	16,260	16,560	16,024	16,359	17,775	19,729
Secondary education without GCSE	19,032	20,360	18,119	19,734	21,012	23,194
Secondary education with GCSE	25,134	25,447	23,711	24,078	27,895	28,470
Higher professional and undergraduate education	29,035	29,660	27,278	27,915	31,451	32,226
Tertiary education (2nd degree)	35,012	35,591	33,408	33,811	40,762	41,533

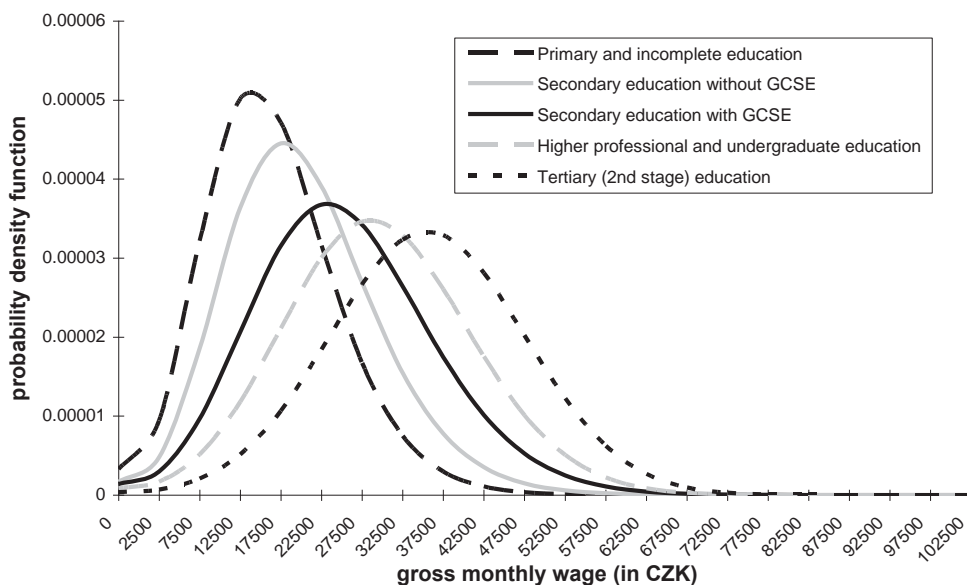
Source: Own research

**Figure 11 | Forecast Models of the Wage Distribution for 2013 according to Educational Attainment**



Source: Own research

**Figure 12 | Forecast Models of the Wage Distribution for 2014 according to Educational Attainment**



Source: Own research

Figures 11 and 12 represent forecast models of the wage distribution for 2013 and 2014 according to educational attainment. As expected, differences in the behaviour of the wage distribution between different categories of educational attainment remain constant. This also applies for the prediction of the wage distribution for 2013 and 2014, the wage level increasing with a rising level of educational attainment. The higher the educational attainment, the more diverse are the wages of individual employees. Table 5 shows forecasts of the wage level for 2013 and 2014 according to educational attainment.

Annual growth coefficients in Table 3 reveal that the wage level will rise by 1–3% annually in 2013 and 2014 in accordance with educational attainment. Since this is the nominal wage, it is not expected that wage costs of companies and institutions will go up considerably.

## 4. Minimum Wage

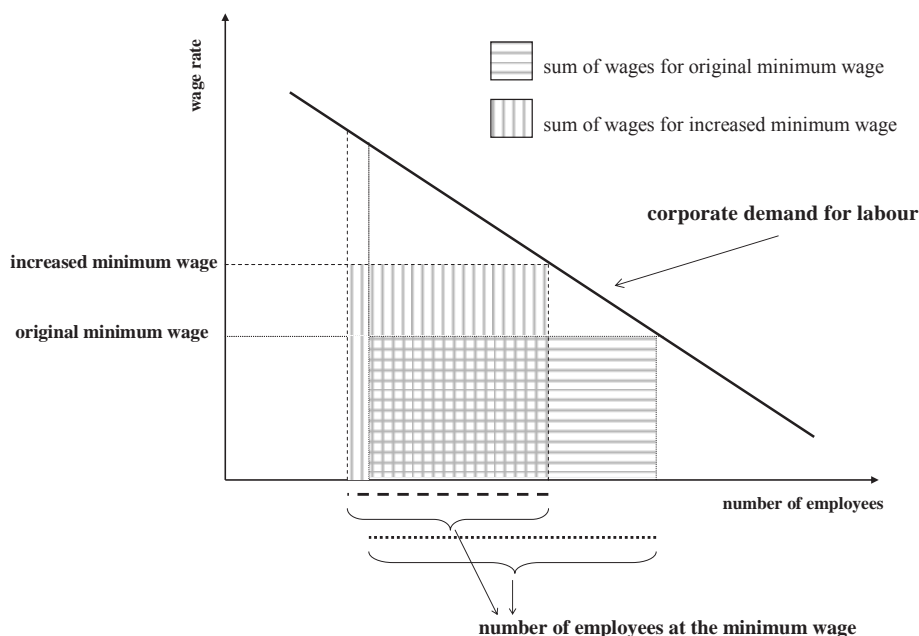
### 4.1 Relationship between the minimum wage, unemployment and social benefits

Fixing the minimum wage is a special case of the price regulation. If a given minimum wage was lower than all market wages, such an (unlikely) arrangement would have no effect. The minimum wage is fixed at a higher level than some market-set wages. This affects the workers whose income would otherwise be below the minimum wage, their employers being apparently another affected group. If workers receive wages equalling the marginal product of labour before the implementation of the minimum wage legislation,

the introduction of the minimum wage may lead to the decline in their employers' profits. Under otherwise identical circumstances, the employer can increase the profit by making these workers redundant. The company is not supposed to lay off all the workers whose wages were initially below the minimum wage. It would be sufficient if an adequate number of these workers were dismissed so that the marginal product of labour could reach at least the level of the minimum wage. Moreover, the growth of a relative price of goods leads to the point when a company does not have to reduce the workforce to the level where the marginal product equals the minimum wage at the initial price. The introduction of the minimum wage results in some redundancies in particular sectors of economy. This, however, results in an increase of the real value of wages in some sectors at the expense of real wages in other sectors. Figure 13 presents the effect of the increased minimum wage on the number of employees.

Real wages of workers who receive the minimum (or nearly minimum) wage would probably decrease if it was reduced or completely abolished. Employers would hire new workers with a lower marginal product of labour and the price of goods would also decline. As a result, the conditions of current employees would deteriorate. Trade unions usually support this group of low-income workers, opposing minimum wage cuts. Employers and business owners, on the other hand, are against (raising) the minimum wage as it lowers their profits. Political parties differ in their approach to the implementation and existence of the minimum wage depending on which side of the political spectrum they represent.

**Figure 13 | Effect of Minimum Wage Increase on the Number of Workers Employed**



Source: Own research

Interaction between the minimum wage and social benefits is also important. When deciding on the supply of labour for a given minimum wage, workers have to compare it with the amount of unemployment (or other social) benefits they would receive if they did not work. An increase in the minimum wage would make the difference between the wages and benefits bigger. That would lead to a new (*i.e.* higher) minimum wage of some previously unemployed people and a decline in the unemployment rate due to the minimum wage increase. This, however, does not explain why new jobs should be created. If no new jobs arose, some voluntarily unemployed people would just become involuntarily unemployed.

Under certain conditions, an increase in the minimum wage could result in employment growth, the existence of the so called monopsony in the labour market being the crucial condition. The monopsony position of employers means that they – as a demand-side factor – have a negligible effect on the level of wages in the market and, moreover, they are aware of that. Economists disagree whether the conditions of monopsony in the labour markets prevail or whether they are just a theoretical possibility.

There are some measures taken in order to prevent wage increases, the wage control being one of them. It is an extreme economic and political arrangement made exceptionally by the governments in market economies.

## 4.2 Minimum and guaranteed wage and social benefits in the Czech Republic

Table 6 indicates the development of the minimum gross monthly wage in the years 2003–2012. Since 1 August 2013, the minimum wage has been CZK 8,500. It is evident from the table that the minimum wage did not change from 2007 until 2012 having stayed at CZK 8,000.

**Table 6 | Minimum Gross Monthly Wage (in CZK) for 40-hour Working Week**

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Minimum wage	6,200	6,700	7,185	7,570 <sup>1</sup> 7,955 <sup>2</sup>	8,000	8,000	8,000	8,000	8,000	8,000

Source: [www.mpsv.cz](http://www.mpsv.cz)

The minimum wage is the lowest permissible level of remuneration an employer must pay to employees for their work. Its basic legal provision can be found in the Labour Code. The minimum wage applies to all employees or people hired on the basis of a work contract.

The minimum wage concept is often misinterpreted. It seems obvious that the remuneration cannot be lower than CZK 8,500 *per* month (or CZK 50.60 *per* hour), which is the amount of money provided by the government. However, a lot of people are unaware of the fact that most employees receive a much higher minimum. This is the guaranteed wage, *i.e.* minimum tariffs for different groups of workers. The minimum wage, in fact, forms a real basis valid for the least skilled workers. Higher rates – the so called guaranteed

1 from 1 July 2006 to 31 December 2006

2 from 1 January 2006 to 30 June 2006



wage levels – are crucial for most employees. There are higher levels of minimum wages for specific occupations. The guaranteed wage has eight levels. They are known as the previous “minimum wage tariffs” or “wage groups”. Different levels are distinguished by the complexity, responsibility and strenuousness of work from the least-skilled and worst-remunerated work (the first group) to the most-qualified and best-paid (the eighth group) (see Table 7). The table provides an overview of minimum levels of the guaranteed wage for the given weekly working time of 40 hours graded according to the complexity, responsibility and strenuousness of work done, valid since 1 August 2013. The minimum amount set for the lowest group equals the minimum wage, other groups receiving a higher amount.

In practice, remuneration may not be lower than the wage guaranteed for particular jobs by the government. This applies not only to people in employment, but also to employment agreements or contracts for work; no matter whether it is a contract for a fixed or indefinite period. It is not relevant either whether it is just a second job or an extra income. The entitlement to the minimum wage arises independently in such a case. All levels of the minimum (guaranteed) wage apply to all private entrepreneurs, the system of sixteen wage tariffs being applicable to a non-business sphere as well.

**Table 7 | Current Minimum Levels of the Guaranteed Wage for 40-Hour Working Week Graded according to Complexity, Responsibility and Strenuousness of Work Performed – Classified into Eight Income Brackets (in CZK)**

Group work		Hourly wage	Monthly wage
1	Work in the first and second grade	50.60	8,500
2	Work in the third and fourth grade	55.90	9,400
3	Work in the fifth and sixth grade	61.70	10,400
4	Work in the seventh and eighth grade	68.10	11,400
5	Work in the ninth and tenth grade	75.20	12,600
6	Work in the eleventh and twelfth grade	83.00	13,900
7	Work in the thirteenth and fourteenth grade	91.70	15,400
8	Work in the fifteenth and sixteenth grade	101.20	17,000

Source: [www.epravo.cz](http://www.epravo.cz)

Table 8 presents gross minimum wage rates for employees with limited work ability valid by the end of 2012. A monthly rate of the minimum (guaranteed) wage allowed for a weekly working time of 40 hours. If an employee negotiated shorter working hours, the minimum wage was reduced in proportion to his/her real hours of work. If this was the first employment of a person aged from 18 to 21, the corresponding minimum was reduced to 90% (see Table 8). The reduction, however, was valid only in the first six months after the conclusion of the first employment contract. Juvenile employees who were under eighteen years of age were entitled to only 80% of the corresponding minimum. The minimum was reduced for people receiving partial or full disability pension to 75 and 50%, respectively.

**Table 8 | Gross Minimum Wage Rates for Workers with Limited Work Ability**

Percentage of the basic amount of gross monthly minimum wage	Limited work ability reasons
90% that is CZK 7,200 monthly, <i>i.e.</i> CZK 43.30 hourly	the first employment of a person aged from 18 to 21, namely a period of six months from the start of the employment
80% that is CZK 6,400 monthly, <i>i.e.</i> CZK 38.50 hourly	a young employee
75% that is CZK 6,000 monthly, <i>i.e.</i> CZK 36.10 hourly	an employee who receives a partial disability pension
50% that is CZK 4,000 monthly, <i>i.e.</i> CZK 24.10 hourly	an employee who receives a full disability pension, or a young employee who is totally disabled and is not entitled to a full disability pension

Source: business.center.cz

Since 1 January 2013, only one rate has been valid, the above rates having become invalid. As disability pension beneficiaries are – due to their reduced working ability – verifiably less efficient than other employees, a distinct minimum wage (CZK 48.10 *per* hour or CZK 8,000 *per* month) has been in force again since 1 August 2013 so as to secure their adequate protection in the labour market. The lowest levels of the guaranteed wage earned by employees with limited work capability in a standard 40-hour working week are graded into eight groups according to the complexity, responsibility and strenuousness of work (see Table 9).

**Table 9 | Current Minimum Levels of the Guaranteed Wage of an Employee with Limited Work Capability for Standard 40-hour Working Week Graded according to Complexity, Responsibility and Strenuousness of Work Performed – Classified into Eight Income Brackets (in CZK)**

Group work		Hourly wage	Monthly wage
1	Work in the first and second grade	48.10	8,000
2	Work in the third and fourth grade	53.10	8,900
3	Work in the fifth and sixth grade	58.60	9,800
4	Work in the seventh and eighth grade	64.70	10,800
5	Work in the ninth and tenth grade	71.50	12,000
6	Work in the eleventh and twelfth grade	78.90	13,200
7	Work in the thirteenth and fourteenth grade	87.10	14,600
8	Work in the fifteenth and sixteenth grade	96.20	16,100

Source: www.epravo.cz

If a monthly wage drops below the minimum, the employer is supposed to pay off the balance regardless whether the employee him/herself is to blame for poor work performance. It should be pointed out that various premiums (for overtime, holiday, weekends, night-shift work, *etc.*) and wage compensations (including travel expenses and shutdown refunds) are not included in the above mentioned monthly amount.

Various social benefits are related to the minimum wage. The subsistence wage is an approved amount of money covering basic personal needs. The subsistence level plays a crucial role in measuring material poverty, fulfilling a social protective function. Basic subsistence does not include the necessary housing costs covered by housing allowances. Jointly assessed persons are as follows: parents and dependent minors (children under 15), a husband and wife or registered partners, parents and children (both minors and adolescents) if they share an apartment with parents and are not raised by other people, other persons sharing an apartment (if they do not supply evidence of neither living nor bearing the costs of living together permanently). Table 10 shows the monthly subsistence wages valid in the Czech Republic.

**Table 10 | Current Subsistence Amounts Valid in the Czech Republic (in CZK) per Month**

Type of household in terms of its members		From 1 January 2007 to 31 December 2011	From 1 January 2012
For individuals		3,126	3,410
For the first adult in the household		2,880	3,140
For the second and other adults in the household		2,600	2,830
For a dependent child aged up to:	6 years	1,600	1,740
	15 years	1,960	2,140
	26 years	2,250	2,450

Source: portal.mpsv.cz

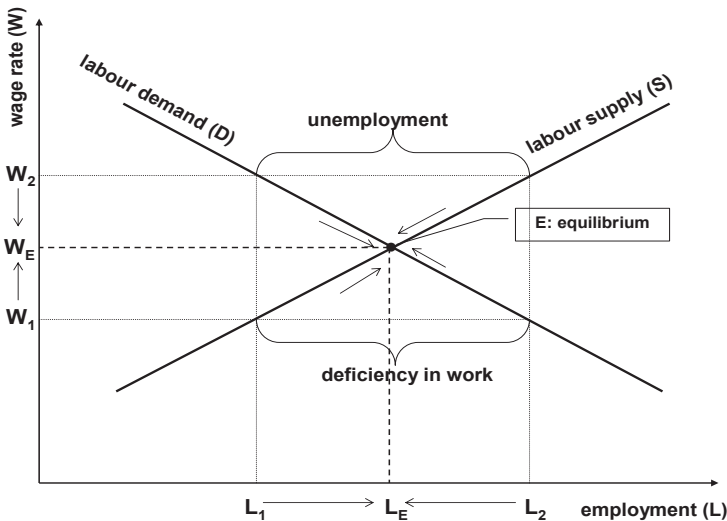
### 4.3 Relationship between labour demand and supply and the Phillips curve

Labour supply and demand is created by wage earners and employers who meet in the labour market. On the supply side, people decide between the amount of work, leisure and goods that can be purchased for the wage earned. Arousing interest in remunerative employment, the growth of wages may lead to the so called substitution effect, *i.e.* the replacement of leisure time by a well-paid job. The wage growth, however, may also increase interest in spending leisure, thus leading to a pension effect, *i.e.* the replacement of work by leisure time, since a better-paid employee can afford either to buy more goods and services or to enjoy his/her spare time. The two effects contradict each other. It follows from empirical research that the substitution effect is most prevalent when the wages are low in general, the pension effect prevailing if they are high.

Figure 14 determines the relationship between labour demand and supply in a classical labour market model. It is clear from the figure that labour supply grows with an increasing wage rate while labour demand declines. If labour supply exceeds the demand, unemployment rises. On the contrary, labour demand exceeding the supply leads to deepening labour shortage.

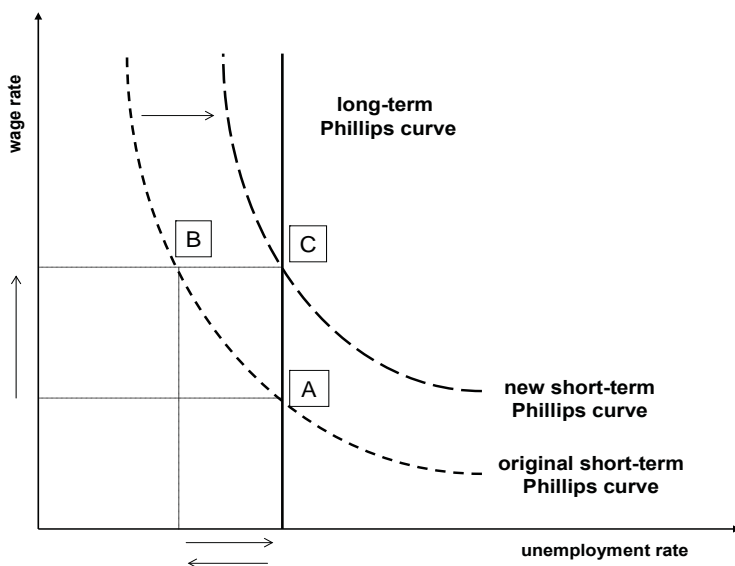
The Phillips curve in Figure 15 shows graphically the relationship between unemployment and wage rates. It is clear from this figure that the declining unemployment rate is related to an increasing wage rate, and *vice versa*, the rising unemployment rate is related to a declining wage rate. The so called money illusion means that employees and organizations do not distinguish, in the short term, between nominal and real wages. If a central bank increases the money supply in the economy, the nominal wage growth happens. Employees may mistakenly interpret it as the growth of the real wage and increase their labour supply. Employers do not distinguish between the inflation growth of the price level and an increase in the relative price of their products due to higher demand. They respond by expanding the production and hiring new staff, thus reducing unemployment. The movement of the Phillips curve actually occurs only in the short term until economic entities on both sides of the market learn from the mistakes they made and restore their equilibrium enjoying long term stability with its natural unemployment rate. The so called adaptive inflation expectations indicate that the economic entities anticipate future development on the basis of previous experience and shortcomings. If there is long inflation, they start extrapolating their past experience to new contracts and projects, mere expectations thus becoming a reality. The expected inflation is transformed into real inflation that involves its expectations remaining the same even after the restoration of the natural rate of unemployment.

**Figure 14 | Relationship between Labour Demand and Supply in the Classical Model of Labour Market**



Source: Own research

**Figure 15 | Short-term and Long-term Phillips Curve in a Modified Model**



Source: Own research

## 5. Comparison within the European Union

This part of the paper deals with a comparison of Czech households' financial position with that of the EU member states households, the net annual household income *per* consumption unit (the equalized income) in EURO, *i.e.* the nominal income being the research variable. We used this variable for international comparisons within the European Union since EU-SILC (Statistics on Income and Living Conditions) uniform methodology has been employed across the EU. The variable was studied in relation to the educational attainment of the head of household. The three stages of education – based Eurostat terminology – are:

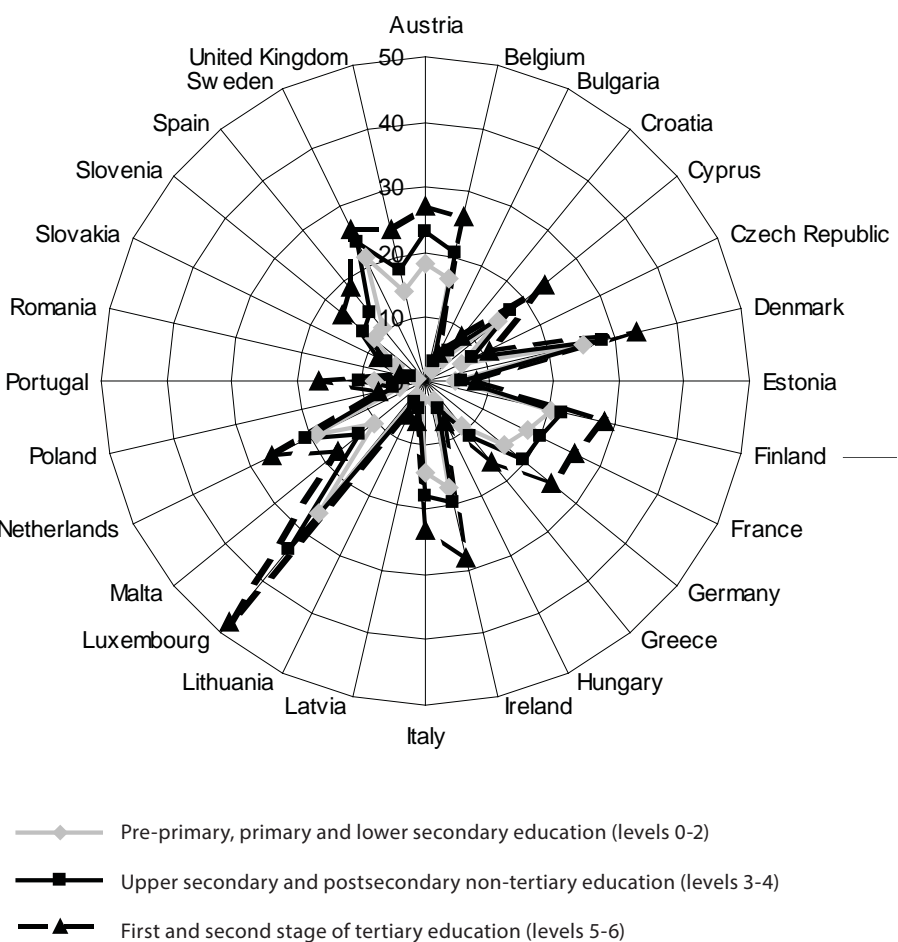
- Pre-primary, primary and lower secondary education;
- Upper- and post-secondary [non-tertiary] education;
- First and second stage of tertiary education.

The values of the median (the middle income) in 2012 by educational attainment were obtained from an official Eurostat website, median income values having been used in an international comparison within the European Union.

Figures 16 and 17 allow a very illustrative comparison of income levels by educational attainment between the fifteen original EU member states (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom) and 13 new EU member states (Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia) in 2011 and 2012. A high income of Luxemburg is noticeable compared to the original fifteen EU countries. Among the thirteen new EU member states, incomes in Cyprus and Malta (none of them being a former Soviet bloc

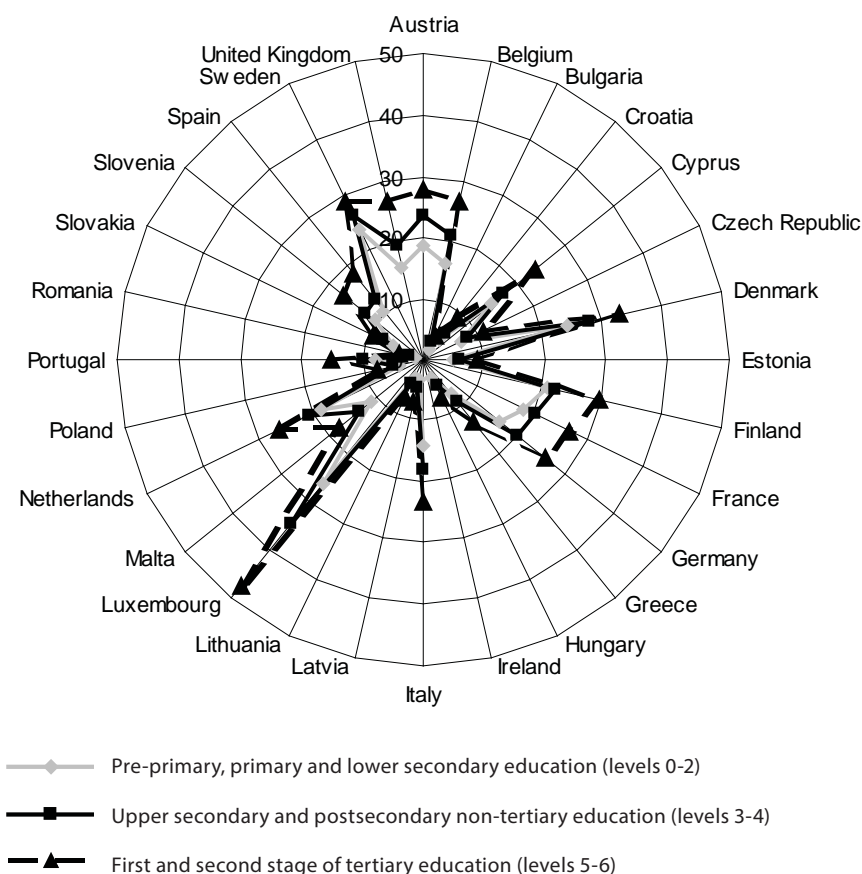
country) and Slovenia clearly exceed those in other countries, the other ten states having markedly lower incomes. Data for Ireland in 2012 are not yet available.

**Figure 16 | Median of the Net Annual Household Income per Consumption Unit in 2011 (in EUR) according to Educational Attainment**



Source: Own research

**Figure 17 | Median of the Net Annual Household Income per Consumption Unit in 2012 (in EUR) according to Educational Attainment (Ireland Excepted)**



Source: Own research

## 6. Conclusion

The present paper starts with a development analysis of descriptive characteristics of the wage distribution over the last years monitoring particularly wage distribution changes in the context of the economic recession at the end of the research period. We can conclude that wage growth has virtually stopped. Wage distributions are classified by the level of educational attainment, differences between particular wage levels being assessed on the basis of the given stages of education. The arithmetic mean, median and medial were applied. Since most employees do not reach the average wage, the median was employed as a fundamental characteristics of the level of the wage and income distribution. Research results show a clear impact of educational attainment on wage, this dependence being proved by test at any significance level. Both the wage range and

distribution are strongly influenced by the amount of the minimum wage. Employees' wages would presumably decline if the minimum wage was reduced or abolished. The changes are naturally reflected in the characteristics of the location, variability and shape of the wage distribution. It is worth noting that the number of highly paid employees was increasing steadily over the whole research period 2003–2012. The level of the wage distribution was rising until 2008, wage growth having almost stopped in the first year of the economic recession.

In terms of the income, the Czech Republic ranks pretty high among the new EU member states. The country shows the fourth highest income level, the growth rate of the income median being approximately in the middle of the ranking list. The population of neighbouring Slovakia has a slightly lower income, which is mainly due to the dissolution of former Czechoslovakia. Having lost its industrial capacity and resources located in the more advanced western part of the common state, the Slovak Republic suffered a significant reduction in the wage level and deeper exchange rate depreciation.

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