III. Technical notes

III. A. *Estimates of confidence intervals*

Sample surveys are usually connected with sampling and non-sampling errors. The latter are a result, for instance, of administrative drop-outs of dwellings out of the sample, intentional non-response or errors produced by filling in the questionnaire. With these errors, one cannot determine a deviation of estimate without rather wide knowledge of the universe. On the other hand, the sampling errors, which arise by applying characteristics of the sample to the universe, can be interpreted by means of confidence intervals. The confidence intervals are intervals build around the estimate in such a way there is certain probability that the value of an estimated characteristic is just within this interval. The most widely used is 95% confidence interval (determined by multiplying the respective standard normal distribution quantile and the standard estimate deviation), i.e. an interval, within which the actual value of the estimated characteristic is found with 95% probability.

The theory of sample surveys distinguishes between two most widely used types of aggregates: **basic aggregates** and **partial aggregates**. The former are some primary aggregates (employment, unemployment, ...) for a certain universe (men, women, persons at working age, men aged 20-24, ...). The latter includes some sub-aggregates in a basic aggregate. For example, the breakdown of the CZ-NACE in the group of employed persons refers to sub-aggregates. The aggregates by age groups are not sub-aggregates – they are basic aggregates in the population aged 15-19, 20-24, etc.

The confidence intervals in **Annex Tables I** and **II** are calculated for the sample size in a given quarter. In order to calculate confidence intervals of aggregates for other quarters and partial aggregates for the Regions and Areas, the following formula and Table **III** should be used.

a) For the **basic aggregate**

$$95\%\ C.I.of\ estimate\ Y = y \mp 1.96 \cdot s_y\ ,\ where\ s_y \cong N \cdot \sqrt{(1-f) \cdot \frac{\frac{y}{N} \cdot (1-\frac{y}{N})}{f \cdot N}}\ ,$$

where N is the size of the universe
y is the estimate of aggregate Y in the universe
f is the respective relative size of sample

b) For the **partial aggregate**

where N is replaced by the estimate of basic aggregate y and
y is replaced by the estimate of partial aggregate y_A

the following formula is used:

$$95\%\ C.I.of\ \ partial\ estimate\ Y_A\ =\ y_A\ \mp\ 1.96 \cdot s_{yA}\ ,\ where\ s_{yA} \cong y \cdot \sqrt{(1-f) \cdot \frac{\frac{y_A}{y} \cdot (1-\frac{y_A}{y})}{f \cdot y}}\ .$$

Making the calculations, we should bear in mind that although the aggregates are published in thousands, units should be used in the formula. Both formulas are simplified approximations of precise formulas, but the deviations between the approximations and the precise formulas are not statistically significant. However, the formula for partial aggregates may produce inaccurate results for small estimates of the basic aggregate.

Generally in the whole publication, sums lower than 4500 persons are considered as data with very low reliability. In real terms it means that their relative standard error (i.e. coefficient of variation) is higher than 20%. Data lower than 750 persons are not published, as their relative standard error is higher than 50%. Instead of them there is a dot in the tables and for cases where the existence was not identified at all there is a slash in the tables.

III. B. *Use of Annex tables*

Table I Estimates of 95% confidence interval of basic estimates for population aged 15 and over

(thousand)

Variants: Ia for basic aggregates in Q3 2009, total
Ib for basic aggregates in Q3 2009, for one gender

The table is designed to calculate an approximate 95% confidence interval of **basic estimates** for the universe of the population aged 15 and over in the whole country and all its regions. For example, if we need to determine the confidence of the estimated total number of university graduates, which was 1168.1 thousand in Q3, we use the table to find the row closest to the figure 1168.1 in the column of the Czech Republic. This is 25.6 thousand for the estimate size 1100.0 thousand. The next closest figure – 26.5 thousand – corresponds to the estimate 1200.0 thousand. Since the difference between 1168,1 and 1100.0 makes up almost one fifth of the difference between 1200.0 and 1100.0, we shall add corresponding part of the difference between 26.5 and 25.6 to 25.6, getting 26.2 in the end. The resulting 95% confidence interval for the estimate of the number of university graduates in Q3 2009 is approx. 1168.1 +/- 26.2 thousand, i.e. there is a 95% probability that the actual number of university graduates in the Czech Republic was not below 1141.9 thousand and not above 1194.4 thousand.

For the sake of comparison: When substituting the variables into the above-mentioned formula we get the same interval 1141,9 to 1194,4.

Table II Estimates of 95% confidence interval of partial estimates for population aged 15 and over at national level

Variants: IIa for partial aggregates in Q3 2009, total
IIb for partial aggregates in Q3 2009, for one gender

The table is designed to calculate an approximate 95% confidence interval of **partial estimates** for the universe of the population aged 15 and over **at the level of the Czech Republic only**. For example, if we need to determine the confidence of the estimated number of employed persons in manufacturing in Q3 2009, which was 1208.7 thousand out of the total of 4921.7 thousand employed persons (i.e. 24.6 % of total employment), we use the table to find a figure in the row closest to 4921.7 and in the column approximately corresponding to 24.6. We can also make the following correction by a simple linear interpolation:

	20	24.6	25
4500	0.49		0.53
4921.7	cca 0.473 =0.49-(4921.7 -4500)/ (5000-4500)* (0.49-0.47)	**cca 0.502 =0.473+(24.6-20)/(25 -20)* (0.505-0.473)**	cca 0.505 =0.53-(4921.7 -4500)/ (5000-4500* (0.53-0.50)
5000	0.47		0.50

This implies that there is a 95% probability that employment in manufacturing was not below 24.6% minus approx. 0.502% (1183.9 thousand) and more than 24.6% plus 0.502% (1233.4 thousand).

For the sake of comparison: When substituting the variables into the above-mentioned formula we get the same interval 1183.8 to 1233.5.

Table II can also be used for basic aggregates in the age groups and gender at the level of the Czech Republic, provided the basic aggregate is substituted by the size of the universe and the partial aggregate by the respective estimate.

The aim of this chapter is to instruct the reader how to roughly determine error which arises through applying characteristics of the sample to the universe. This error depends on three variables (in the case of partial aggregates on four variables), namely size of the sample and size of the estimate and, to a lesser extent, on size of the universe. Giving an objective overview of errors in all the estimates would require compiling a very large annex of tables difficult to understand by readers of ordinary economic publications. This is why all of the methods used are considerably approximating but still fully sufficient for getting an idea of the accuracy of the estimates.

95% confidence intervals to estimate numbers of the employed in the national economy, unemployed and unemployment rates (Q3 2009)

	Estimate	95% confidence interval		Estimate	95% confidence interval		Estimate	95% con. interval
		Abs. -/+	Rel. -/+		Abs. -/+	Rel. -/+		Abs. -/+
	Employment (thousand)			Unemployment (thousand)			Unempl. rate (%)	
Czech Republic	**4921.7**	**38.9**	**0.8%**	**387.0**	**15.9**	**4.1%**	**7.3%**	**0.3%**
Regions:								
Hl. m. Praha	654.9	17.2	2.6%	27.3	5.5	20.2%	4.0%	0.8%
Středočeský	597.7	12.9	2.2%	31.2	4.4	14.2%	5.0%	0.7%
Jihočeský	308.2	8.2	2.7%	14.9	2.7	18.2%	4.6%	0.8%
Plzeňský	274.2	8.3	3.0%	20.9	3.4	16.1%	7.1%	1.1%
Karlovarský	142.3	5.3	3.8%	19.8	2.8	14.3%	12.2%	1.8%
Ústecký	364.0	12.9	3.5%	43.3	6.2	14.3%	10.6%	1.5%
Liberecký	197.8	7.3	3.7%	19.2	3.2	16.9%	8.9%	1.5%
Královéhradecký	256.7	9.2	3.6%	21.1	3.8	18.2%	7.6%	1.4%
Pardubický	239.4	7.7	3.2%	17.9	3.1	17.2%	7.0%	1.2%
Vysočina	243.7	7.7	3.2%	16.9	3.0	17.7%	6.5%	1.2%
Jihomoravský	527.8	13.3	2.5%	41.7	5.4	12.9%	7.3%	0.9%
Olomoucký	290.7	10.3	3.5%	26.0	4.4	16.8%	8.2%	1.4%
Zlínský	268.9	8.7	3.2%	23.7	3.7	15.5%	8.1%	1.3%
Moravskoslezský	555.4	13.7	2.5%	63.1	6.5	10.3%	10.2%	1.0%

III. C. *Classifications used*

CZ-NUTS Territorial administrative structure is defined in compliance with CZ-NUTS effective from 1 January, 2008.

Population Demographic projection of quarterly middle states for Labour Force Sample Survey on the basis of the population statistics results at 1 January 2009 and the prediction of both development of natural movement and migration balance in Q3 2009.

ISCED 97 Data on the level and groups of fields, or fields of education in compliance with international standard ISCED 97, UNESCO, November 1997.

CZ-NACE Data on CZ-NACE activities are split by sections and divisions of the Classification of Economic Activities (CZ-NACE), which replaced the Industrial Classification of Economic Activities (OKEČ). The classification is compatible with the international classification NACE Rev.2.

CZ-ISCO-88 Occupations are classified in compliance with the national Classification of Occupations (*KZAM*) (Rev. 2) published by the CZSO in 2001. This classification is compatible with the international classification ISCO-88.

CZ-ICSE Status in employment is classified by the group of CZ-ICSE of 1998, which correspond to individual groups of the international classification ICSE-93.

III. D. *Characteristics of classifications*

CZ-NUTS : NUTS (La Nomenclature des Unités Territoriales Statistiques) was implemented by the Statistical Office of the European Communities in co-operation with the other EU authorities to allow to classify the standard unified structure of territorial units. It has been used in EU legislation, particularly for subsidies from the EU Structural Funds, since 1988.

There are 6 NUTS levels (NUTS 0, NUTS 1, NUTS 2, NUTS 3, NUTS 4 and NUTS 5), which represent the territorial size groups. The definition of each level depends on population and area. CZ-NUTS describes the territorial administrative structure of the Czech Republic, using units that comply with the criteria of the European Union and approved by Eurostat for statistical purposes. This publication uses the following levels: NUTS 1 for the Czech Republic, NUTS 2 for Areas and NUTS 3 for Regions.

ISCED 97 : Published data on the level and groups of fields, or fields of education are in compliance with international standard ISCED 97 (International Standard Classification of Education) issued by UNESCO in November 1997. Since 1 January 2003 the classification of field of study for 3 digits is fully implemented in LFSS, it was taken over from the Institute for information on education - Ministry of Education of the CR.

According to ISCED 97, the levels of education break down as follows:

0 ***pre-primary education*** – preschool education programmes. Also included are persons without any education.
1 ***primary education*** – first stage of basic education attained by completing the 5th grade of the basic school.
2 ***lower secondary education*** – above all the second stage of basic education, usually attained by completing the 9th grade.
3 ***secondary education*** – technical and general secondary education at secondary technical, general and vocational schools, usually attained by passing *maturita* examination or final examination. Also included are graduates from the lower practical school, for it is a sort of secondary education for persons who have been out of the educational system for a long time.
4 ***postsecondary education*** – after-*maturita* education not included in tertiary education.
5 ***first stage of tertiary education*** – bachelor and master programmes not leading to an advanced research qualification.
6 ***second stage of tertiary education*** – leading to an advanced research qualifications.

The criterion of "follow-up education or objective" is applied within individual levels of education. This publication uses this for level 3 (e.g. graduates from 3A level can continue studying for a bachelor or master degree, while graduates from 3C level are coming to the labour market).

CZ-NACE : Since Q1 2009 for the Labour Force Sample Survey only the Classification of Economic Activities (CZ-NACE) has been used. CZ-NACE classification is based on the international classification of economic activities in compliance with the Regulation of the European Parliament and of the Council No. 1893/2006 of 20 December 2006, establishing the statistical classification of economic activities NACE Rev. 2. The annex tables 502, 504 and 506 include data broken by industry in the quarters of 2008 and also by CZ-NACE because in 2008 both OKEČ (Industrial Classification of Economic Activities) and CZ-NACE classifications were used.

CZ-ISCO-88 : Classification of occupations, i.e. activity carried out by the employed (though it may not be their occupation) which is the main source of income from work. The classification is based on ISCO-88 (International Standard Classification of Occupations) adopted by the 14th International Conference of Labour Statisticians in November 1987.

CZ-ICSE : CZ-ICSE is based on the revised International Classification of Status in Employment – ICSE-93, approved by the 15th International Conference of Labour Statisticians in January 1993. The ICSE-93 is obligatory at the one-digit level, more detailed breakdown is recommended. CZ-ISCE is obligatory down to the four-digit level. Only economically active persons are included.

III. F. *List of tables*

In connection with the territorial administrative structure of the Czech Republic effective since 1 January 2000, the structure of tables has been changed to cover not only the factual, but also territorial view of the labour market in the Czech Republic accordingly, i.e. the levels of NUTS 1 (Czech Republic), NUTS 2 (Areas) and NUTS 3 (Regions). In view of the considerably increased size differences between individual regions and, as a result, between the sample sizes in comparison to the previous territorial administrative structure, the data published have been selected to enhance the reliability.

The tables are divided into five basic **groups** characterising the sample and categories of the employed and unemployed, all broken down by gender. The table numbers have three-digits, the territorial detail of the table is found after the slash as follows:

xxx / 1 NUTS1 - Czech Republic
xxx / 2 NUTS2 - Czech Republic and Areas
xxx / 3 NUTS3 - Czech Republic and Regions

III. F. 1. Population characteristics of the Czech Republic (Tables 101 to 109)

The block of tables gives basic demographic information on the population of the Czech Republic. The basis is projected demographic data on the population of the country at the midpoint of the reference period and population indicators from the LFSS.

101 / 3 *Population of the Czech Republic: by age group*
Age structure of the population of the CR and Regions – LFSS projected demography.

102 / 3 *Population of the Czech Republic: by educational attainment*
The highest educational attainment of respondents in the CR and Regions in absolute and relative figures.

103 / 3 *Selected fields of education – ISCED 97*
Selected fields of education by ISCED 97 in the CR and Regions.

104 / 3 *Population aged 15 and over: by economic activity status*
The absolute and relative structure of population aged 15 and over in the Czech Republic and Regions by economic activity status and broad age groups.

105 / 1 *Level and field of education: by age group*
Educational attainment by broad age groups in the Czech Republic and groups of fields by ISCED 97. Groups of fields of education at various levels of education.

106 / 2 *Age and education level of population: by economic activity status*
Rough age structure and educational attainment of population aged 15 and over by category of economic activity status in the Czech Republic and Areas.

107 / 3 *Main reasons for economic inactivity*
Main reasons for economic inactivity of population aged 15 and over in the Czech Republic and Regions and main reasons for economic inactivity of population aged 20-59.

108 / 1 *People with disabilities*
Rough age structure and educational attainment of the employed, unemployed and economically inactive aged 15 and over with disabilities, compared with total population aged 15 and over.

109 / 1 *Population aged 15 and over: by economic activity status one year ago*
Population aged 15 and over by economic activity status in the reference week and usual economic activity status one year ago, incl. status in employment and reasons for economic inactivity.

III. F. 2. Employment in the national economy (Tables 201 to 207)

The tables cover persons classified by ILO as employed in the national economy, i.e. including regular members of the armed forces. Persons on parental leave are excluded.

201 / 3 *Employment in national economy: by Region – part 1*
First job holders in the national economy of the Czech Republic and Regions by age groups of the employed, educational attainment and selected field of education.

202 / 3 *Employment in national economy: by Region – part 2*
First job holders in the national economy of the Czech Republic and Regions by basic classifications - CZ-ICSE, CZ-NACE and CZ-ISCO-88.

203 / 1 *Employment in national economy: by age group – part 1*
Age groups of first job holders in the national economy of the Czech Republic by educational attainment and selected group of fields of education.

204 / 1 *Employment in national economy: by age group – part 2*
Age groups of first job holders in the national economy of the Czech Republic by basic classifications – CZ-ICSE, CZ-NACE and CZ-ISCO-88.

205 / 2 *Employment in national economy: by Areas*
First job holders in the national economy of the Czech Republic and Areas by basic classifications – CZ-ICSE, CZ-NACE and CZ-ISCO-88.

206 / 1 *Employment in national economy: by educational attainment*
First job holders in the national economy of the Czech Republic by basic classifications – CZ-ICSE and CZ-ISCO-88 at individual levels of educational attainment.

207 / 1 *Classification of occupations: by CZ-NACE activity*
The representation of major groups of CZ-ISCO-88 in individual CZ-NACE activities of the Czech national economy.

III. F. 3. Employment in the civil sector (Tables 301 to 314)

Employment in the civil sector (CS) of the national economy includes all persons classified by ILO as employed in the national economy, excluding regular members of the armed forces. Also excluded are persons on parental leave.

301 / 3 *Status in employment: by sector*
The representation of first job holders in the civil sector, employees (incl. members of producer cooperatives), employers and own-account workers in sectors of the Czech Republic and Regions.

302 / 1 *Employment in CS: by status in employment and CZ-NACE section*
First job holders in CS by status in employment and CZ-NACE section.

303 / 1 *Employment in CS: by status in employment, classification of occupations and educational attainment*
First job holders in CS by status in employment, field of occupation (ISCO 88 classification) and level of education (ISCED 97).

304 / 1 *First job holders: by selected CZ-NACE section and division*
First job holders in the CR by selected most frequent sections and divisions of CZ-NACE.

305 / 1 *Employment in CS: by status in employment, type of contract and job duration*
The employed in CS of the Czech Republic and their status in first job by kind of work contract (time-limited or unlimited work contract, other contract), by working hours and duration of existing job.

306 / 1 *Employment in CS: time-limited work contract*
First job holders on time-limited work contract by broad age groups, level of education, CZ-NACE section, field of occupation (ISCO 88 classification) and reason for inactivity.

307 / 3 *Hours usually and actually worked in the week*
The average number of hours usually and actually worked in a week (full-time jobs) by status in employment, and the average number of hours worked (part-time jobs) in the CR and Regions.

308 / 1 *Hours worked: by CZ-NACE section, part-time job and full-time job*
The average number of hours usually and actually worked in a week in individual CZ-NACE sections in CS in total and in full-time and part-time jobs.

309 / 2 *Hours actually worked: by status in employment*
The numbers of employed in CS by status in employment broken down by hours actually worked in first job in the Czech Republic and Areas.

310 / 1 *Hours actually worked: by status in employment and age group*
The numbers of employed in CS by status in employment broken down by hours actually worked in first job and by broad age groups.

311 / 1 *Part-time jobs and underemployment*
The employed in CS in part-time jobs in broad age groups, by educational attainment and by main reasons for holding a part-time job. Underemployment.

312 / 1 *Employment in CS: part-time jobs*
First job holders on limited duration of work by broad age groups, selected CZ-NACE section and selected field of occupation (ISCO 88 classification).

313 / 1 *Atypical work-time in CS*
First job holders by age groups, status in employment, shift-work, work in the evening, at night, on Saturdays and on Sundays.

314 / 2 *Work activity and people with disabilities*
Main reasons why persons in the Czech Republic and Areas worked in the reference week fewer hours than contracted or why they did not work at all. Numbers of persons with disability in CS.

III. F. 4. Unemployment (Tables 401-408)

The tables cover persons classified as unemployed by international definitions and ILO recommendations, i.e. persons who were out of work in the reference period, actively seeking job and available for work within 14 days. Also included are persons who had found a job but their work was to start within 14 days.

401 / 3 *Unemployed persons: by age, education and specific groups*
The unemployed in the Czech Republic and Regions by broad age groups and by educational attainment. Specific groups of the unemployed (persons who have already found work which should begin within 14 days at the latest, those not registered by labour offices, unemployed with disabilities).

402 / 1 *Unemployed persons: basic indicators*
The unemployed in the Czech Republic with various educational attainment by economic activity status before they started to seek work and by the time of seeking job.

403 / 1 *Unemployed persons: by education and age group*
Broad age groups of the unemployed in the Czech Republic by educational attainment and by selected groups of education fields.

404 / 1 *Last CZ-NACE activity and occupation of unemployed persons: by educational attainment*
Main reasons for the termination of last employment, selected CZ-NACE sections and selected major groups of CZ-ISCO-88 of last job held by the unemployed in the Czech Republic by educational attainment.

405 / 1 *Job seeking conditions*
Type of job sought, required hours to be worked and the most frequent ways of seeking jobs by the unemployed in the Czech Republic, by educational attainment.

406 / 2 *Unemployment: by Area of the Czech Republic*
Unemployment in the Areas of the CR by age groups and by educational attainment.

407 / 1 *Long-term unemployment: by educational attainment*
Unemployed for 1 year and more by level of education, selected CZ-NACE section of last employment, selected field of occupation (ISCO 88 classification) and age groups.

408 / 3 *Long-term unemployment: by Region of the Czech Republic*
Unemployed for 1 year and more in regions of the CR by age groups and level of education.

III. F. 5. Time series of basic indicators (Tables 501 to 509)

The tables show certain basic indicators describing employment, unemployment, unemployment rate, participation rate and employment rate over the period of 1 year.

501 / 1 *First jobs – part 1*
First job holders in the national economy by Region and Area, by age structure and by educational attainment – time series of last five quarters.

502 / 1 *First jobs – part 2*
First job holders in the national economy by status in employment (CZ-ICSE), by section and sector (CZ-NACE) and by major group of CZ-ISCO-88 – time series of last five quarters.

503 / 1 *Second jobs – part 1*
Second job holders in the national economy by Region – time series of last five quarters.

504 / 1 *Second jobs – part 2*
Second job holders in the national economy by status in employment (CZ-ICSE) by industry and sector (CZ-NACE) and by major group of CZ-ISCO-88 – time series of last five quarters.

505 / 1 *Unemployment – part 1*
The unemployed by Region and Area, by age structure and educational attainment – time series of last five quarters.

506 / 1 *Unemployment–- part 2*
Unemployed persons previously employed, by CZ-NACE section of last employment – time series of last five quarters.

507 / 1 *Unemployment rate*
Unemployment rates in Regions of the Czech Republic by age group and educational attainment, long-term unemployment rates by broad age group – time series of last five quarters.

508 / 1 *Participation rate*
Participation rates in Regions and Areas of the Czech Republic by age group and educational attainment – time series of last five quarters.

509 / 1 *Employment rate*
Employment rates in Regions and Areas of the Czech Republic by age group and educational attainment – time series of last five quarters.

III. G. *Other notes*

The **absolute figures** are in thousands. The differences between totals and sums of constituent items are due to rounding (the totals are not sums of rounded constituent items but totals rounded). Absolute and relative figures in all the textual and Annex tables and in the text are calculated from non-rounded data.

The following standard statistical symbols are used in the tables to show marginal cases:

— is used to indicate that the phenomenon given did not occur in the sample.
0 is used to indicate that the phenomenon occurred in the sample, but at values which are below "0.1" when rounded off in a standard manner.
x is used to indicate that the phenomenon is not applicable.
• shows that the figure is not available or cannot be relied on.

"Not identified" in the tables comprises refused answers, answers "do not know" and any other cases of respondent's unidentified answer. Where more answers to the question asked are possible, the data are classified, in principle, according to the main variant of the answer.

When using the tables we should bear in mind that sampling methods were employed to collect the data and, therefore, **the accuracy decreases with the decreasing size of the sample** (e.g., the breakdown of the unemployed by various criteria in regional view).

The LFSS provides **representative results on unemployment on a quarterly basis only**. Monthly periodicity and data for smaller territorial units (districts) can only be provided by labour offices; this is why the two sources of information on the labour market should be used in parallel, but taking account of methodological differences.

III. H. *Availability of the publication*

This publication is issued in the following forms:

a)	***Internet :***	Excel (*.xls) . Adobe Acrobat (*.pdf) . Gif (*.gif)
	Czech and English versions	http://www.czso.cz
b)	***Electronic form :***	Excel (*.xls) . Adobe Acrobat (*.pdf). Gif (*.gif)
	Czech version	310109q3.zip