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**

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

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:

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

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 Q1 2024, total
                      Ib   for basic aggregates in Q1 2024, 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 1834.7 thousand in Q1 2024, we use the table to find the row closest to the figure 1834.7 in the column of the Czech Republic. This is 33.8 thousand for the estimate size 1800.0 thousand. The next closest figure – 34.5 thousand – corresponds to the estimate 1900.0 thousand. Since the difference between 1834.7 and 1800.0 makes approximately one-fifth of the difference between 1900.0 and 1800.0, we shall add corresponding part of the difference between 34.5 and 33.8 to 33.8, getting 34.0 in the end. The resulting 95% confidence interval for the estimate of the number of university graduates in Q1 2024 is approx. 1834.7 ± 34.0 thousand, i.e. there is a 95% probability that the actual number of university graduates in the Czech Republic was not below 1800.7 thousand and not above 1868.8 thousand.

For the sake of comparison: When substituting the variables into the above-mentioned formula we get the same interval 1800.7 to 1868.8.

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 Q1 2024, total
                      IIb   for partial aggregates in Q1 2024, 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 Q1 2024, which was 1289.5 thousand out of the total of 5201.0 thousand employed persons (i.e. 24.8% of total employment), we use the table to find a figure in the row closest to 5201.0 and in the column approximately corresponding to 24.8. We can also make the following correction by a simple linear interpolation:

	25	24,8	30
5000	0,55		0,58
5201,0	cca 0,537 =0,55-(5201,0 -5000) / (5500-5000) * (0,55-0,52)	**cca 0,536 =0,537+(24,8-25) / (30 -25)* (0,568-0,537)**	cca 0,568 =0,58-(5201,0 -5000) / (5500-5000 * (0,58-0,55)
5500	0,52		0,55

This implies that there is a 95% probability that employment in manufacturing was not below 24.8% minus approx. 0.536% (1261.7 thousand) and more than 24.8% plus approx. 0.536% (1317.4 thousand).

For the sake of comparison: When substituting the variables into the above-mentioned formula we get the same interval 1261.7 to 1317.4.

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 (Q1 2024)

	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	**5201.0**	**41.2**	**0.8%**	**149.1**	**10.8**	**7.3%**	**2.8%**	**0.2%**
Regions:								
Hl. m. Praha	709.4	17.3	2.4%	15.2	4.3	28.3%	2.1%	0.6%
Středočeský	698.7	15.2	2.2%	12.0	3.2	26.4%	1.7%	0.4%
Jihočeský	314.9	9.5	3.0%	8.3	2.4	28.8%	2.6%	0.7%
Plzeňský	300.8	8.5	2.8%	5.1	1.8	34.6%	1.7%	0.6%
Karlovarský	141.6	5.7	4.0%	6.1	1.8	30.2%	4.1%	1.2%
Ústecký	373.2	12.0	3.2%	15.5	3.7	23.8%	4.0%	0.9%
Liberecký	207.0	7.8	3.8%	6.7	2.1	31.7%	3.1%	1.0%
Královéhradecký	260.1	9.1	3.5%	10.9	2.8	26.0%	4.0%	1.0%
Pardubický	251.4	8.6	3.4%	6.0	2.1	34.3%	2.3%	0.8%
Kraj Vysočina	246.7	7.8	3.2%	4.9	1.7	34.8%	2.0%	0.7%
Jihomoravský	581.8	14.1	2.4%	18.3	3.9	21.2%	3.1%	0.6%
Olomoucký	287.3	10.6	3.7%	11.6	3.2	27.3%	3.9%	1.1%
Zlínský	276.8	9.7	3.5%	5.5	2.1	38.3%	1.9%	0.7%
Moravskoslezský	551.3	14.0	2.5%	23.1	4.3	18.5%	4.0%	0.7%

III. C. *Sources and classifications used*

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

Population   For all quarters of a given year, the demographic projection for the labor force sample survey is based on the final population statistics data as of 31 December of the previous year after deducting the estimate of persons living outside private households or outside the apartments.

CZ-ISCED 2011   Data on the level (degree) of education according to the International Standard Classification of Education (ISCED 2011), UNESCO, November 2011.

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   Occupation is classified by the Classification of Occupations (CZ-ISCO), which replaced the extended classification of occupation (KZAM-R). This classification is compatible with the international classification ISCO-08. It is valid from 1 January 2011.

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.

CZ-ISCED 2011   CZ-ISCED 2011 is the Czech version of the international standard ISCED. This is a translation of the international standard that is used terminology established and commonly used in the Czech Republic. ISCED serves as a tool for collecting and presenting statistics of education both at national and international level. Member States applied ISCED 2011 classification in reporting education statistics from 2014.

Achieved (i.e. Complete) education level according to ISCED-A (ISCED-Attainment) has the following breakdown:

0 Less than primary education
1 Primary education
2 Lower secondary education.
3 Upper secondary education
4 Post-secondary non-tertiary education
5 Short cycle of tertiary education
6 Bachelor's or equivalent level
7 Master's or equivalent level
8 Doctoral or equivalent level

Achieved education of an individual is defined as the highest ISCED level that the individual has successfully completed.

Achieved education may be included depending completed (or partially completed) ISCED level, program orientation and access to higher ISCED levels. If an individual has successfully completed the same ISCED level more than once (eg. By selecting two different programs that are commonly offered as parallel options) should be shown characteristics final qualification awarded.

CZ-NACE Since Q2 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.

CZ-ISCO 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-08 (International Standard Classification of Occupations).

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. E. *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 NUTS 1 – Czech Republic
xxx / 2 NUTS 2 – Czech Republic and Areas
xxx / 3 NUTS 3 – Czech Republic and Regions

III. E. 1. Population characteristics of the Czech Republic
(Tables 101 to 106)

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   *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.

104 / 1   *Level of formal education and participation in non-formal education in the age group 15–64*
          The level of educational attainment, number of persons in non-formal education and reason non-formal education.

105 / 2   *Age and education level of the population: by economic activity status and area*
          Rough age structure and educational attainment of population aged 15 and over by category of economic activity status in the Czech Republic and Areas.

106 / 3   *The age structure of the economically inactive*
          The age structure of the economically inactive population of the CR and Regions.

III. E. 2.   Employment (Tables 201 to 212)

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.

203 / 3   *Employment in national economy: by region – part 3*
Number of first job holders, employees (including members of producer cooperatives), employers and own-account workers in sectors of the Czech Republic and Regions.

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

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

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 at individual levels of educational attainment.

207 / 1   *Employment: by status in employment, classification of occupations and educational attainment*
First job holders in the national economy by status in employment, field of occupation (CZ-ISCO classification) and level of education (CZ-ISCED 2011).

208 / 1   *Employment: by status in employment and CZ-NACE section*
First job holders in the national economy by status in employment and CZ-NACE section.

209 / 1   *Classification of occupations: by CZ-NACE activity*
The representation of major groups of CZ-ISCO in individual CZ-NACE activities of the Czech national economy.

210 / 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.

211 / 1   *Employment in national economy: by status in employment, type of contract and job duration and underemployment*
The employed in the national economy 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.

212 / 1   *Employment by age: 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 (CZ-ISCO classification).

III. E. 3.   Working hours (Tables 301 to 306)

The tables list the indicators relating to working hours.

301 / 3   *Hours usually and actually worked in the week: by Region*
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.

302 / 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 total and in full-time and part-time jobs.

303 / 2   *Hours actually worked: by status in employment and Area*
The numbers of employed by status in employment broken down by hours actually worked in first job in the Czech Republic and Areas.

304 / 1   *Hours actually worked: by status in employment and age group*
The numbers of employed by status in employment broken down by hours actually worked in first job and by broad age groups.

305 / 1   *Employment by age: part-time jobs*
First job holders on limited duration of work by broad age groups, selected CZ-NACE section and selected field of occupation (CZ-ISCO classification) and level of education (CZ-ISCED 2011).

306 / 2   *Work activity: by area*
Main reasons why persons in the Czech Republic and Areas worked shorter working hours (part time) in the reference week or why they did not work in the reference week at all.

III. E. 4.   Unemployment (Tables 401-407)

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 and by region*
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 3 months at the latest, those not registered by labour offices, unemployed with disabilities).

402 / 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.

403 / 1   *Last CZ-NACE activity and occupation of unemployed persons: by educational attainment*
The selected industries and selected class of last job classification of the unemployed in the Czech Republic as their highest educational attainment.

404 / 1   *Reason for termination of last job and methods of searching for a job: by educational attainment*
The main reasons for the termination of the last job and the frequency of ways of looking for a job by the unemployed in the Czech Republic according to the level of education attained. Respondents have the opportunity to choose more than one job search method.

405 / 2   *Unemployment: by Area of the Czech Republic*
Unemployment in the Areas of the CR by age groups and by educational attainment.

406 / 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 (CZ-ISCO classification) and age groups.

407 / 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. E. 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 – 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 age group – 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. F. *Other notes*

❖ **ROUNDING – 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.

❖ **SYMBOLISM –** 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 – "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**. 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. G. *Availability of the publication*

This publication is issued in the following form:

Internet: Employment and unemployment (LFS) | Statistics (gov.cz)

Catalogue of products - Publications

Publication code   – English version: **250129-24**
– Czech version: **250128-24**

Word (*.doc), Excel (*.xls). Adobe Acrobat (*.pdf)