

# PRODUCTION OF THE STATISTICS

## Population by Labour market status (BAS)

Final statistics based on monthly data

### Subject area

Labour market

### Statistical area

Employment and working hours

### Product code

AM0210

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## 1 Context of the statistics

The purpose of Population by Labour market status (BAS) is to provide information on the supply of labour in Sweden on a monthly, quarterly and annual basis. BAS disseminates statistics on, among other things, the number of employed, unemployed and persons outside the labour force for the registered population aged 15 to 74. The statistics can be used to describe the current status as well as developments over time. It highlights the whole population as well as smaller groups, such as detailed age groups at municipal level.

BAS is based solely on administrative data from various authorities. The statistics has been made possible primarily thanks to the fact that the administrative source data – monthly pay as you earn income tax return at the individual level (PAYE return) – have been collected by the Swedish Tax Agency since 2019.

Both preliminary and final statistics are disseminated. The final statistics are disseminated annually for the reference periods ‘month’, ‘quarter’ and ‘year’. Publication takes place at the end of November of the year following the reference year. This documentation, *Production of the statistics*, refers only to the final statistics and describes BAS design and implementation in general terms. This document complements the quality report available on the Statistics Sweden website [Population by Labour market status \(BAS\)](#) under the heading *Documentation*. The quality report is also described separately for preliminary and final statistics, and for the annual register.

## 2 Survey design

### 2.1 Target characteristics

For monthly reference times, statistics are disseminated on the number of persons by labour market status, with the statuses ‘employed’, ‘unemployed’, ‘students’, ‘retirees’, ‘sick’ and ‘others’. ‘Employed’ and ‘unemployed’ together constitute the labour force, and the remaining statuses are outside the labour force. There are also target characteristics expressed as proportions:

- *employment rate*, which is the number of people employed as a proportion of the population,
- *percentage of population in the labour force*, which is the number of people in the labour force as a proportion of the population,
- *unemployment*, which is the number of unemployed as a proportion of the labour force.

For the quarterly and annual reference times, the number-type target characteristics are defined as averages of the corresponding target characteristics per month.

The statistics are disseminated according to different breakdowns in study domains. The variables used to create these groups are: sex, age, country of birth, industry, status in employment, sector, region of work and residence<sup>1</sup>, main source of income and work-related income level. These variables are used individually and in combination.

## **2.2 Frame procedure**

The Total Population Register (TPR), which is produced by Statistics Sweden based mainly on data from the Swedish Tax Agency, provides the frame population for BAS. The observation units consist of, or are derived from, records in TPR, each record corresponding to a person.

The frame population in the final BAS consists of all persons registered in the population records of Sweden according to TPR on the last day of the reference month.

## **2.3 Procedures for sampling and exclusion**

There is no sampling or exclusion in BAS.

## **2.4 Data collection procedure**

### **2.4.1 Data collection**

BAS is based on register data from several authorities. Data is collected by electronic transfer from the Swedish Public Employment Service, the Swedish Companies Registration Office, the Swedish Board of Student Finance, the Swedish Social Insurance Agency, the Swedish Pensions Agency, the Swedish Tax Agency and the National Board of Health and Welfare.

The administrative data from the authorities is transferred monthly, in the middle or end of the month following the reference month. Corrections of data submitted previously are also received in each monthly delivery of PAYE return data from the Swedish Tax Agency.

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<sup>1</sup> These statistics aim to describe the location of the places of work to which the employed persons are bound. As this is not the same as accounting for the employed part of the population according to where they are physically located during the day while work is carried out, the term daytime population is not used. As a consequence, the term night-time population is not used when disseminating by region of residence.

All corrections received up to and including the August following the reference year are taken into account for the final statistics.

Background variables are retrieved monthly from TPR and Statistics Sweden's Business Register. More information on TPR and the Statistical Business Register can be found on the Statistics Sweden website: [Data från Registret över totalbefolkningen \(RTB\)](#) and [Data från Företagsdatabasen \(FDB\)](#).

### **Additional information on workplace**

When submitting PAYE returns to the Swedish Tax Agency, enterprises with more than one workplace must specify the workplace where people have worked using what are known as local unit numbers. All local unit numbers for enterprises are registered in the Statistical Business Register. Special local unit numbers common to all employers can be used when a person cannot be linked to a specific workplace. Starting from 2023, enterprises must provide the designated workplace address for employees in the PAYE returns. This address is used in BAS to link individuals to a workplace in cases where the local unit number is missing or unknown, the specified address is found among the enterprises' workplaces in the in Statistics Sweden's Business Register, and the address is in the same municipality where the person is registered. Statistics Sweden sends out a questionnaire to enterprises with more than one workplace that have submitted PAYE returns to the Swedish Tax Agency where the local unit number for at least 19 persons is missing or unknown. This form asks for the local unit numbers of the individuals for whom the enterprise has provided incorrect information. Enterprises with a high proportion of employees living a long way from the workplace are reviewed. This applies to enterprises with more than one workplace.

### **2.4.2 Measurement**

Basic data for the statistics are obtained from the Swedish Public Employment Service, the Swedish Companies Registration Office, the Swedish Board of Student Finance, the Swedish Social Insurance Agency, the Swedish Pensions Agency, the Swedish Tax Agency and the National Board of Health and Welfare. The primary responsibility for collecting and recording the data lies with the respective authorities. The quality of statistics is mainly determined by the quality of the registers and administrative systems of these authorities. The data are processed and compiled in the BAS register.

### **2.4.3 Follow-up of non-response**

BAS is based on administrative data sourced from administrative systems, all of which are primarily created for administrative purposes. There is no non-response follow-up in the context of BAS.

The same is also true for the authorities from which the administrative data are taken, since the data have mainly been collected for purposes other than the production of statistics.

## 2.5 Processing

The main variable of BAS is labour market status, which shows whether a person is employed, unemployed, studying, retired, sick or other. These statuses can be aggregated into the categories labour force or non-labour force. A person belonging to the labour force has one of the statuses 'employed' or 'unemployed', while anyone in the 'non-labour force' belongs to one of the categories 'student', 'retiree', 'sick' or 'other'.

Labour market status is defined on the basis of the period month, which means, for example, that a person who has been employed at some point during the month is described as employed. The definition of labour market status is hierarchical, which means that a person can only have one labour market status. For example, the labour market status 'unemployed' is obtained if the person has been unemployed at some point during the month without being employed. Similarly, subsequent labour market statuses are defined hierarchically, which means, for example, that a person has the labour market status 'student' when he or she has been a student but not employed or unemployed.

Processing includes the co-processing of the administrative data on which the statistics are based. The classification of labour market status is done in two stages, which together constitute the definition of the observation variable 'labour market status'. The second stage of this classification only concerns those persons classified as 'other' under the first stage.

The first stage in the classification consists of:

### employed

A person classified as 'employed' fulfils at least one of the following criteria:

- has during the month received earned income that is the basis for employer contributions according to the Swedish Tax Agency's monthly pay as you earn income tax return at the individual level (the PAYE return).
- has received, during at least one of the eleven months preceding the reference month, earned income that is the basis for employer contributions according to the PAYE return. In addition, they have received benefits from the Social Insurance Agency referring to an activity that occurred at least one day per month in all subsequent months up to and including the reference month. The

benefit from the Social Insurance Agency must be of the type parental allowance, temporary parental allowance, prenatal allowance, sickness benefit, rehabilitation allowance, work or occupational injury benefit, benefit for care of closely related persons, disease carrier allowance or compensation for a risk group.

- is assumed to operate an enterprise during the month as a sole trader, trading partnership or limited partnership, and the enterprise is included in Statistics Sweden's Business Register. Assumptions are based on preliminary income tax returns and monthly F-tax payments reported by the individual to the Swedish Tax Agency as well as the current status of VAT accounting. This means that the person has appeared in the register and is considered active, or that the enterprise has paid earned income that is the basis for employer contributions according to the PAYE return to at least one person who is not responsible for the enterprise.
- has declared a business in an income tax return and appendix NE (sole trader) or N3A (trading partnership or limited partnership) to the Swedish Tax Agency for the reference year to which the reference month belongs. The enterprise must also have a positive turnover in the reference year and a known start date. Alternatively, the enterprise has zero turnover and a start date no earlier than one year before the reference month.

#### unemployed

A person classified as 'unemployed' has, at some point during the month, been registered as unemployed with the Swedish Public Employment Service as openly unemployed, or as an applicant in a programme with an activity grant. 'Openly unemployed' and 'applicant in a programme with an activity grant' are defined according to the Swedish Public Employment Service's definitions for the current reference month.

In addition, the labour market status 'unemployed' is only obtained if the person is aged 16-65 on the last day of the month and has not been classified as employed.

#### students

A person classified as a student fulfils one of the following:

- has received payment from the Swedish Board of Student Finance of study grants, study allowance, student finance for transition and retraining or education entry grants, which refers to an activity that took place during at least part of a week included in the reference month.

- has received activity benefit from the Social Insurance Agency for extended schooling, which refers to an activity that took place for at least one day of the month.
- has been enrolled in basic higher education or in municipal adult education (Komvux) at some point during the month.
- is 15 years old or, in most cases, 16 years old on the last day of the month.<sup>2</sup>

In addition, the labour market status 'student' is only obtained when the person has not been classified as employed or unemployed.

#### retiree

A person classified as 'retiree' has, according to information from the Swedish Pensions Agency, received payment of an income pension, supplementary pension, guarantee pension, premium pension, or housing supplement and maintenance support for the elderly if the person is at least 65 years old, which refers to an activity that took place on at least one day in the reference month.

In addition, the labour market status 'retiree' is only obtained if the person is not classified as being employed, unemployed or a student.

#### sick

A person classified as 'sick' has received payments from the Social Insurance Agency of sickness allowance, activity compensation (not for extended schooling), sickness benefit, rehabilitation allowance, work or occupational injury sickness benefit, disease carrier allowance or compensation for a risk group, which refers to an activity that took place on at least one day in the reference month.

In addition, the labour market status 'sick' is only obtained if the person is not classified as being employed, unemployed, a student or a retiree.

#### other

A person classified as 'other' has not been classified into any of the labour market statuses of employed, unemployed, student, retiree or sick.

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<sup>2</sup> This does not apply to the reference months of July and August. Whether a 16-year-old is affected is determined based on the regulations for when payment of the Social Insurance Agency's child allowance is replaced by payment of student finance by the Board of Student Finance.



The second stage of the classification only concerns those persons classified 'other' under the first stage of the classification. The second stage of classification consists of:

employed

A person classified as 'employed' fulfils at least one of the following criteria:

- has, at some point during the reference year, received payments from employers in Denmark, Finland, Iceland or Norway constituting earned income for work that is the basis for employer contributions according to the PAYE return. This is according to information that the Swedish Tax Agency has received from the tax authorities in those countries.
- has during the reference year received earned income for work that is the basis for employer contributions and which has been reported to the Swedish Tax Agency in a statement of earnings and tax deductions filed by the employer.
- Has declared qualified holdings in a closely-held company (form K10) to the Swedish Tax Agency during the reference year to which the month refers, or was registered as beneficial owner of an enterprise in the Swedish Companies Registration Office's register of beneficial owners during the month. The person must also be a board member, managing director or chairman of the enterprise during the month according to the Swedish Companies Registration Office's register of representatives, and the enterprise must also have a turnover during the reference year as well as being active in Statistics Sweden's Business Register during the reference month.

In addition, the labour market status 'employed' in the second classification stage, is only obtained if the person has been classified as 'other' according to the first stage of the classification.

retiree

A person classified 'retiree' is aged 55 or over and, according to information from the Swedish Tax Agency, has received a payment of occupational pension, private pension or foreign-taxed pension during the year.

In addition, the labour market status 'retiree' in the second classification stage, is only obtained if the person has been classified 'other' in the first stage of classification and has not been classified 'employed' according to the second stage of the classification.

sick

A person classified 'sick' has, according to information from the Swedish Tax Agency, received compensation from sick pay and disability insurance for workers and disability pension due to a pension insurance during the year.

In addition, the labour market status 'sick' in the second classification stage, is only obtained if the person has been classified 'other' in the first stage of classification and has not been classified 'employed' or 'retiree' according to the second stage of the classification.

Employed persons include persons who are employed and persons who are self-employed. The statistics disseminate data on employed persons by status in employment, with the categories 'employees', 'self-employed persons' and 'self-employed persons in a joint-stock company'. It is common for a person to have several jobs, to work on a self-employed basis for different companies or to combine work as both an employee and a self-employed person. In such cases, a main occupation, in terms of both status in employment and workplace, is selected for that person.

The choice of main occupation is based on where the person received their highest remuneration. Status in employment is selected first. If a person had their highest earned income from one or more jobs, they are classified as an employee. If the earned income is highest among the jobs that can be linked to self-employed persons in a joint-stock company, that person is classified as a self-employed person in a joint-stock company, and if the business profits from self-employment is the highest, the person is classified as self-employed. The comparison of earned income from employment, earned income from self-employment and business profits from self-employment is made after adjusting the amounts for comparability<sup>3</sup>.

The main workplace is selected after a person has been classified as an employee, self-employed or self-employed person in a joint-stock company. Among the employees and self-employed persons in a joint-stock company, the workplace is selected according to the job that has generated the highest earned income. If, instead, the person has 'self-employed' as their status in employment and runs several enterprises, the choice of workplace is essentially based on a hierarchical decision-making arrangement. The decisive factors in the decision-making arrangement are the number of employees and the

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<sup>3</sup> Earned income is adjusted by reducing it by an expected income tax. The expected business profit is derived using the preliminary tax. The amount is adjusted partly to reflect expected earned income, and partly to reflect expected underreporting.

registers in which each enterprise has appeared, the number of employees and the turnover of the enterprise.

Data referring to an employed person's main workplace are generated using the corporate identity number and local unit number in the PAYE return, together with data from Statistics Sweden's Statistical Business Register. The local unit number is a variable in the PAYE system which employers with business activity at more than one addresses are expected to provide. Non-response in local unit numbers is compensated for using imputation. Missing data or data that are invalid according to the Statistical Business Register are imputed. In terms of size, local unit numbers for around 100,000 persons are imputed per month. This is information on legal entities which, according to the Statistical Business Register, have more than one workplace but where there is either no information on the local unit number in the PAYE return or where the legal entity has provided a local unit number which, according to the Statistical Business Register, is invalid.

Local unit numbers are corrected automatically in cases where a workplace has a large proportion of employees who have a registered domicile address a long way from the workplace address. The aim is to find a workplace that is close to the domicile for the same enterprise in the first instance. Secondly, the person is assumed to start from home, rather than being present at one of the employer's workplaces in order to start work. In these cases, the municipality in which the person is entered in the population register is used as the workplace municipality. The latter applies to activities where it is deemed common for staff not to carry out work at an actual workplace. A further 70,000 people are handled at this stage. In total, this means that around 170,000 people have updated information on their workplace.

To add further nuance to the description of labour supply, labour market status is presented in combination with two classification criteria: 'Main source of income' and 'Work-related income level'.

Main source of income aims to show which earned income and transfers are the largest, using the following categories: earned income, unemployment benefit, student finance, pension, benefit for long-term reduced work capacity, sickness benefit, parental benefit/care of close relative, financial aid and without income.<sup>4</sup> For a

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<sup>4</sup> Certain income is exempt from tax. To make all income comparable, an adjustment is made by reducing the income that is not tax-exempt by an expected income tax. An adjustment is also made for an expected underreporting of business profit.

given month, the breakdown is made on the basis of earned income and transfers relating to the month in question.

Work-related income level is a categorical variable, where each person is assigned to a category by relating their income from employment and business and work-related benefits to the income base amount<sup>5</sup> for the reference period. The categories disseminated are: SEK 0, SEK 1 - < 1 income base amount, 1 - <2 income base amounts, 2 - <3 income base amounts, 3+ income base amounts. The types of earned income used in the definition of the labour market status 'employed' together with the work-related transfers that a person receives as compensation for being temporarily absent from work provide the starting point.

The work-related income level is disseminated on the basis of the income from employment and business and work-related benefits that the person has had in the last twelve months. The variable is derived for those persons who have had the labour market status 'employed' at some point in the last twelve months. For other persons, the variable is set to SEK 0.

For more information on the variables 'Main source of income' and 'Work-related income level', see the document ['Main source of income' and 'Work-related income level'](#). This includes a description of the data underlying the two variables.

## **2.6 Review**

The supplying authorities do not perform a content review, but they do check that the delivery formats correspond to Statistics Sweden's order. Regular checks are carried out during production of the final register. The statistical values published are reconciled with other sources, the previous period and the same period of the previous year.

### **2.6.1 Review during direct collection**

The completion of workplace dissemination is the only data collection performed for the sole purpose of producing BAS. Review of data received in the context of that data collection is continuous in instances where errors are suspected.

### **2.6.2 Review of microdata and collected statistical values**

Various delivery checks are performed when data is delivered to Statistics Sweden. Checks are performed against the previous

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<sup>5</sup> For more information on income base amounts, see [Inkomstbasbelopp och inkomstindex för år 2023 fastställt - Regeringen.se](#) retrieved 18/11/2024. The income base amount for 2023 is set at SEK 74,300.

month's input data and the corresponding month of the previous year. Checks are also performed against the supplier's own published statistics, where available. If any shortcomings are detected, the supplier is notified to prevent a recurrence of the situation.

Data relating to amounts and numbers are checked regularly during register production.

### **2.6.3 Review of macrodata**

Statistics on the number of people employed and unemployed are compared with statistics from the Labour Force Surveys (LFS) and the Swedish Public Employment Service. The statistics disseminated are also compared with the previous period and the corresponding period of the previous year. Comparisons are also made between preliminary and final statistics.

### **2.6.4 Review of dissemination**

The statistical values loaded in Statistics Sweden's web publishing tool and statistical database are reviewed prior to dissemination. This includes checks for consistency where the same statistical value or text appears in several places.

## **2.7 Estimation procedure**

### **2.7.1 Principles and assumptions**

BAS is based on administrative data which have been retrieved from the administrative systems of authorities and therefore have been collected for purposes other than the presentation of statistics. This is a model-dependent approach, as models are used to translate administrative variables into statistical target variables. Frame coverage and model assumptions are the sources of uncertainty deemed to have the greatest impact on accuracy.

Persons incorrectly excluded from the register cause undercoverage, while those incorrectly included in the register cause overcoverage. Coverage gaps mainly arise from shortcomings in the reporting of deaths, immigration and emigration. The source of uncertainty in the model assumption arises because data on the timing of payments are what mainly form the basis for the derivation of the main variable 'labour market status'; in contrast to the target variable, which is instead defined in terms of when the activity described by the labour market status has occurred. Insofar as data on when the activity occurred are available, these data are used in final statistics, which is one reason why reliability is assumed to be better in the final statistics than in the preliminary statistics. However, one important source for BAS, the PAYE return, does not include any information on when the work was carried out.

### 2.7.2 Estimation procedure for statistical target characteristics

There are two target characteristic types for a given reference period: number and proportion. The number of persons employed and the proportion of the population employed are examples of these two types. The summary measure 'number' is a special case of sum (total), while 'proportion' is a special case of ratio.

The estimate of a total for a characteristic  $y$  for month  $m$  is denoted  $\hat{t}_{y,m}$  and is the summed number of persons in the frame population who have the characteristic in question according to the observation variable. The corresponding estimate of a ratio between two totals, where the total in the numerator is a total for a characteristic  $y$  and the total in the denominator is a total for a characteristic  $y'$  is denoted  $\hat{r}_{yy',m}$ .

Three target characteristics are expressed as ratios. For month  $m$ , estimates of these as a percentage are denoted and expressed as

- employment rate:  $\hat{r}_{yy',m} = \frac{\hat{t}_{y,m}}{\hat{t}_{y',m}} \cdot 100$ , where  $\hat{t}_{y,m}$  denotes the estimated number of persons employed in month  $m$  among the persons entered in the population register on the last day of month  $m$ , and  $\hat{t}_{y',m}$  denotes the number of persons entered in the population register on the last day of month  $m$ .
- percentage of population in the labour force:  $\hat{r}_{yy',m} = \frac{\hat{t}_{y,m}}{\hat{t}_{y',m}} \cdot 100$ , where  $\hat{t}_{y,m}$  denotes the estimated number of persons in the labour force (employed or unemployed) in month  $m$  among the persons entered in the population register on the last day of month  $m$ , and  $\hat{t}_{y',m}$  denotes the number of persons entered in the population register on the last day of month  $m$ .
- relative unemployment rate:  $\hat{r}_{yy',m} = \frac{\hat{t}_{y,m}}{\hat{t}_{y',m}} \cdot 100$ , where  $\hat{t}_{y,m}$  denotes the estimated number of unemployed persons in month  $m$  among the persons entered in the population register on the last day of month  $m$  and  $\hat{t}_{y',m}$  the estimated number of persons in the labour force (employed or unemployed) in month  $m$  among the persons entered in the population register on the last day of month  $m$ .

The target characteristics for the reference periods 'quarter' and 'year' are expressed as a function of the target characteristics for the constituent months. Totals for the reference period 'quarter' are the average of the totals for the constituent months of the quarter, and a similar approach is applied for the reference period 'year'. Ratios are defined in terms of the average of the totals of the months included in the reference period in the numerator and denominator. The estimates are constructed in a similar manner.

The number estimate for a characteristic  $y$  for quarter  $k$  is defined as

$$\hat{t}_{y,k} = \frac{1}{3}(\hat{t}_{y,3(k-1)+1} + \hat{t}_{y,3(k-1)+2} + \hat{t}_{y,3(k-1)+3})$$

where  $\hat{t}_{y,3(k-1)+i}$  denotes an estimate of the number of persons with a characteristic  $y$  for the  $i$ th month of quarter  $k$ , where  $i=1, 2, 3$ .

Similarly, a number estimate for a characteristic  $y$  for year  $\hat{a}$  is defined as

$$\hat{t}_{y,\hat{a}} = \frac{1}{12}(\hat{t}_{y,1} + \hat{t}_{y,2} + \hat{t}_{y,3} + \dots + \hat{t}_{y,12})$$

A ratio estimate for quarter  $k$ ,  $\hat{r}_{yy',k}$ , expressed as a percentage, is defined as

$$\hat{r}_{yy',k} = \frac{\hat{t}_{y,k}}{\hat{t}_{y',k}} \cdot 100 = \frac{\hat{t}_{y,3(k-1)+1} + \hat{t}_{y,3(k-1)+2} + \hat{t}_{y,3(k-1)+3}}{\hat{t}_{y',3(k-1)+1} + \hat{t}_{y',3(k-1)+2} + \hat{t}_{y',3(k-1)+3}} \cdot 100$$

The corresponding estimate of ratio for year  $\hat{a}$ ,  $\hat{r}_{yy',\hat{a}}$ , expressed as a percentage, is defined as

$$\hat{r}_{yy',\hat{a}} = \frac{\hat{t}_{y,\hat{a}}}{\hat{t}_{y',\hat{a}}} \cdot 100 = \frac{\hat{t}_{y,1} + \hat{t}_{y,2} + \hat{t}_{y,3} + \dots + \hat{t}_{y,12}}{\hat{t}_{y',1} + \hat{t}_{y',2} + \hat{t}_{y',3} + \dots + \hat{t}_{y',12}} \cdot 100$$

### 2.7.3 Estimation procedure for accuracy

No reliability estimates are performed.

### 2.7.4 Disclosure control

Statistics Sweden is obliged to prevent individuals' data from being disclosed in the disseminated statistics. BAS uses a methodology that allows detailed statistics to be disseminated without the need to hide statistical values, or to make parts of the report less detailed. This method involves introducing random uncertainty into the statistics in a controlled manner, without introducing systematic bias into the statistics.

All statistical values, including totals, greater than zero, are adjusted by a small negative or positive integer. Some statistical values are left unchanged. A consequence of this method is that the totals disseminated do not always equal the sum of their disseminated components. For example, the disseminated total for women and men does not necessarily equal the sum of the disseminated statistical values for women and men.

The added uncertainty is small, but its impact is greater for low frequencies than for high ones. This also has implications for proportions, which should always be interpreted with caution when based on low frequencies.

If the disseminated statistical values are added to create a new total, the uncertainty is also added. There is therefore a risk that the new total contains more uncertainty than would have been assigned to an individual statistical value under the method.

### **3 Implementation**

#### **3.1 Quantitative information**

The population in the 15 to 74 age bracket 7,616,000 in January 2023.

In the additional collection of workplaces, the non-response rate was just over 10%, 170 out of 1,600 enterprises included, in the survey. The workplace was imputed for these individuals, who numbered just over 13,000. This corresponds to 0.25% of the employed.

#### **3.2 Deviations from the survey design**

There have been no deviations.