EU labour force survey - correction for breaks in time series

Statistics Explained

Article update: 13 September 2024.

This Eurostat article describes how breaks in the time-series of the European Union Labour Force Survey (EU-LFS) resulting from updated labour status definitions in 2021 are corrected. The updated definitions of the labour status are part of the new Integrated European Social Statistics Framework Regulation (Regulation (EU) 2019/1700) and its Implementing Regulation (EU) 2019/2240 for the labour market domain entering into force in 2021. For reasons of simplicity, the remainder of this text refers to this legislation as IESS regulation. Definitions of the EU-LFS methodology before 2021 are based on the previous regulation of the Labour Force Survey . The aim of this correction exercise is to provide users with break-free time-series for the most important indicators related to the labour market .

This article is part of a **set of online articles** on the EU-LFS.

Comparability over time - correction of breaks in time series

The changes in the derivation of the labour status can cause breaks in the time series of the quarterly and annual LFS main indicators as they derive from EU-LFS microdata. The LFS main indicators section comprises the main statistics on the labour market , and encompasses various breakdowns of labour market participation, employed and unemployed . In order to provide stakeholders with the most relevant labour market policy indicators, Member States and Eurostat produce and disseminate break-free series, thus ensuring data comparability over time. The following sections address the methodology used to derive quarterly and annual indicators. The break-free data for monthly unemployment statistics is sent to Eurostat either directly by countries, or derived from the corrected quarterly data series once those are available.

Background

The IESS regulation explicitly states that participating countries shall send either break-corrected series or methodological correction input for a limited set of indicators to Eurostat by 31st of December 2021. The time span covered by this correction exercise is 2009 Q1 to 2020 Q4. The mandatory set of indicators to be covered includes employed persons (lfsi_emp_q) broken down by sex and age groups 15-24, 25-64, 20-64, 65+, and unemployed persons (une_rt_q) broken down by sex and age groups 15-24, 25-64, 65+. However, participating countries can send an optional set of correction input that includes further age groups for employment (25-54, 55-64, 55-74) and unemployment (20-64, 25-54, 55-64, 55-74), as well as additional indicators. These indicators include:

- employment by educational attainment (lfsi_educ_q)
- unemployment by educational attainment (une_educ_q)
- employees
- (underemployed) part-time employment and temporary contracts (lfsi_pt_q)
- long-term unemployment (une_ltu_q)

- supplementary indicators to unemployment (lfsi_sup_q)
- young people neither in employment nor in education and training (NEET), (lfsi_neet_q)

Eurostat disseminates break-free series as received from countries. If, however, longer time series are sent by countries (i.e., data before 2009), Eurostat also publishes that part of the series as received. If countries provide correction factors instead, Eurostat applies factors to data series before 2021. If Eurostat does not receive the optional age groups for employment and unemployment, Eurostat derives them as shares from the mandatory age groups sent from countries. Further, if Eurostat does not receive any correction input for the optional indicators, Eurostat produces break-free time-series for these optional indicators by using past and current correlations of these indicators with employment and unemployment. More information on Eurostat's methodology is described in detail below.

Input for break correction

Participating countries have the option to provide either complete break-free series to Eurostat or correction factors that are applied to the series from 2009 to 2020. For the production of the correction input, countries follow various methodologies including pilot surveys and modelling approaches using past EU-LFS data or other data as auxiliary information.

The table below lists the correction methodologies used by each country and is filled once this information is available.

For the correction of the remaining time series of optional indicators published in the LFS main indicators section, Eurostat uses various methodologies to correct the remaining time series published in the LFS Main Indicators section on the basis of the mandatory correction information provided by countries. Depending on the type of correction input received, Eurostat derives missing estimates as shares from corrected employment and unemployment estimates. The
figure below gives an overview of the different methodologies used by Eurostat to correct LFS Main Indicators series.

Country	Correction input provided	Start of series	Indicators corrected by country	Link to methodology
Belgium	Series	2009	all	BE
Bulgaria	Series	2009	employment and unemployment	BG
Czechia	No existing breaks	2009	no breaks in time series	CZ
Denmark	No existing breaks	2009	no breaks in time series	DK
Germany	Series	2009	employment and unemployment	DE
Estonia	Series	2009	all	EE
Ireland	Series	2009	employment, unemployment, employment and unemployment by education available from 2009Q2, part-time employment, temporary contracts, long-term unemployment, underemployed part-time workers, self-employed, employees. No breaks were identified in the indicators NEET and persons available to work but not seeking.	IE
Greece	Series	2009	employment and unemployment	EL
Spain	No existing breaks	2009	no breaks in time series	ES
France	Series	2003	all but employment and unemployment broken down by education. Population estimates were also revised.	FR
Croatia	No existing breaks	2009	no breaks in time series	HR
Italy	Series	2009	employment and unemployment, temporary contracts, self-employed and employees. Population estimates were also revised.	IT
Cyprus	No existing breaks	2009	no breaks in time series	CY
Latvia	Series	2009	employment and unemployment	LV
Lithuania	No existing breaks	2009	no breaks in time series	LT
Luxembourg	No existing breaks	2009	no breaks in time series	LU
Hungary	Series	2009	all	HU
Malta	No existing breaks	2009	no breaks in time series	MT
Netherlands	Additive Factors	2009	all	NL
Austria	Series	2009	employment and unemployment	AT
Poland	Series	2009	all	PL
Portugal	Series	2009	all but employment and unemployment broken down by education start in 2011Q1	PT a PT b
Romania	Series	2009	all	RO
Slovenia	Series	2009	employment and unemployment	SI
Slovakia	Multiplicative Factors	2009	employment and unemployment	SK
Finland	Series	2009	employment and unemployment, employment and unemployment broken down by education	FI
Sweden	Series	2009	employment and unemployment, temporary contracts and employees. Population estimates were also revised.	SE a SE b

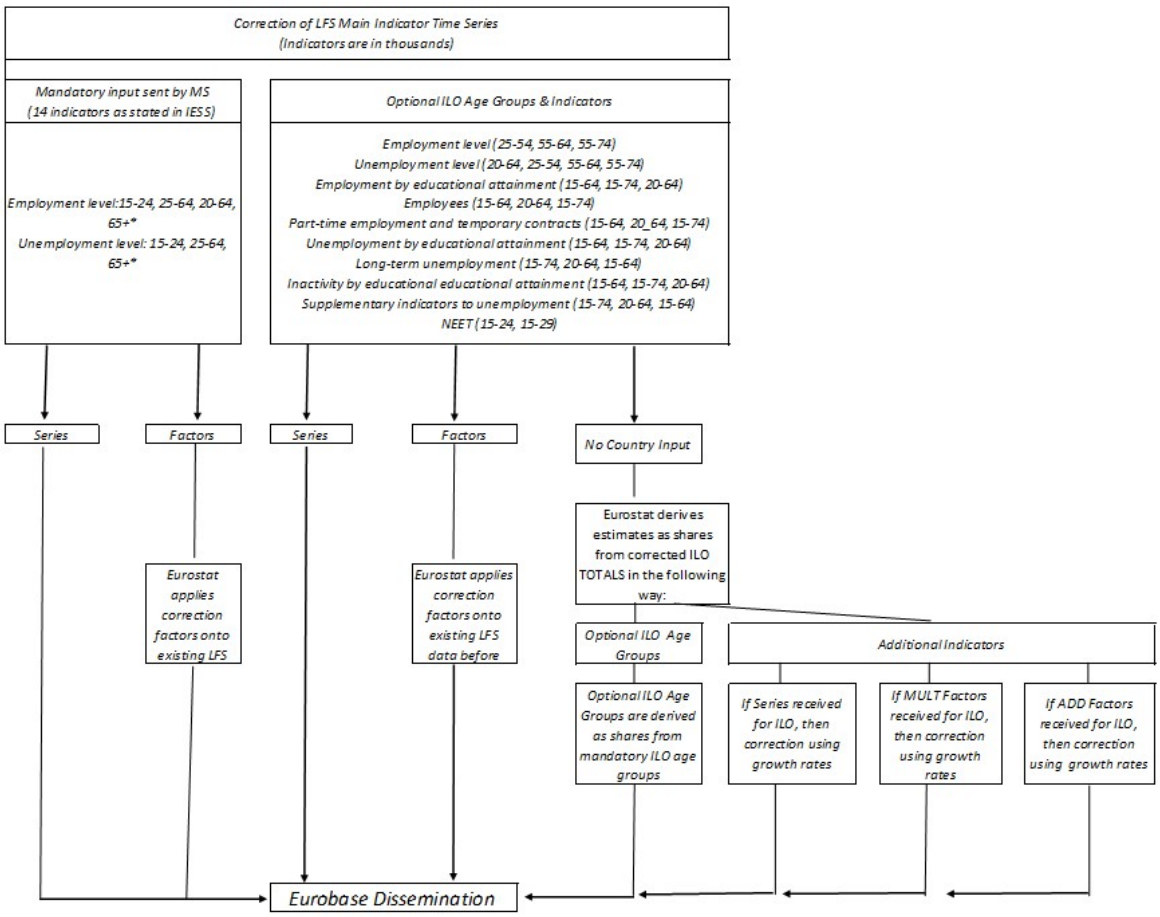

Figure 1: Derivation of break-free series

Series: Countries have the option to send complete break-free time series to Eurostat. These series will include 2009Q1-2020Q4 data, and are directly usable and published on Eurobase as received. If countries send series for years before 2009, these are published as received.

Factors: Factors can be either of multiplicative or additive nature. A maximum of eight factors in total is accepted, up to two factors per quarter for a maximum of four quarters. These factors are applied to all the years 2009-2020. This means that the same factors for each quarter are applied throughout the years 2009-2020.

No country input: If Eurostat receives no correction input for the additional ILO age groups or optional indicators, back data needs to be derived. More specifically, if Eurostat receives no input for the **optional ILO age groups** for employment (25-54, 55-64, 55-74) and unemployment (20-64, 25-54, 55-64, 55-74), age groups are derived as shares from the corrected ILO age groups sent by countries. For this, the level of employment/unemployment as a share is calculated in original data before 2021. This share is then applied to the corrected employment/unemployment totals, which derive from age groups that countries sent. The result of this calculation are corrected levels of employment/unemployment that are comparable with data after 2020. Further, if Eurostat receives no correction input for the **optional indicators** , back data needs to be derived on the basis of corrected employment and unemployment data using the methodologies as described below.

- *Shares* : Eurostat first estimates the share of each series (i.e., the specific optional indicator as a share of employment/unemployment) for each quarter of the data prior to 2021 (2009Q1-2020Q4). Subsequently, the same statistic is calculated for 2021 data that is available at the time of correction (e.g., data for 2021Q1, 2021Q2 etc. depending data availability for each country).
- *Growth rates* : Following the calculation of shares, the method of growth rates can be applied to calculate the corrected estimates for each indicator. Eurostat calculates the growth rates of the share estimates between the quarters (2009Q1-2020Q4), and applies them backwards to the new share estimates (2021 average). These corrected shares are then applied to the corrected employment (or unemployment) series, to derive corrected levels for each indicator.

Data dissemination

Monthly unemployment is a data set that is also updated with LFS data collected under the new IESS regulation. This data is published in the existing table (une_rt_m). For monthly unemployment data, past series are overwritten. As no duplication of the data table is available, results before the break-correction are available upon request. The date of publication of complete break-corrected monthly unemployment series differs by country, and may not be in line with the publication of break-corrected quarterly data. The table below lists the existing breaks in monthly series per country.

*Hungary also introduced a new methodology (direct monthly extractions from the quarterly LFS) with reference month 01/2021.

Country	2021 (IESS) derivation labour status used since	pre-2021 derivation labour status used	break flag
France, Netherlands	reference month 01/2003	up until and incl. ref. month 12/2002	yes - 01/2003
Italy, Austria	reference month 01/2004	up until and incl. ref. month 12/2003	yes - 01/2004
Sweden	reference month 04/2005	up until and incl. ref. month 03/2005	yes - 04/2005
Norway	reference month 01/2006	up until and incl. ref. month 12/2005	yes - 01/2006
Belgium, Bulgaria, Germany, Greece, Estonia, Finland, Hungary*, Poland, Romania, Slovakia and Slovenia	reference month 01/2009	up until and incl. ref. month 12/2008	yes - 01/2009
Portugal	reference month 02/2011	up until and incl ref. month 12/2010	yes - 01/2011

LFS main indicators - data from 2021 on and break-corrected data before 2021: Data from 2021Q1 on, as well as the break-free back-series from 2009Q1 on, are published in the current tables. The break-free data before 2021 are based on the correction input that is received from countries. Back-series became available between May 2021 and February 2022. The EU and EA aggregates published during this year were based on the available information at each point in time. Fully break-free EU and EA aggregates were published for the first time in February 2022.

LFS main indicators - data before 2021: Eurobase provides tables with EU-LFS data that is derived directly from LFS microdata as collected under the regulation before 2021. This data remains accessible without changes (last regular update was with 2020 annual results). Tables are only be updated in case of revisions. Reasons for revisions are census revisions or weight revisions due to revised weighting routines. Table codes for these existing tables were changed and the letter 'h' for historical series was added (e.g., the table lfsi_emp_a changed to lfsi_emp_a_h with publication of 2021Q1 data). Table names were updated accordingly.

Detailed quarterly survey results and detailed annual survey results offer a higher number of tables, with more detailed breakdowns on a quarterly and annual basis. The data in these tables is not break-corrected, and therefore differs from the data published in the LFS Main Indicators before 2021.

Data interpretation

In order to understand and interpret the difference in the pre-IESS and the back-calculated IESS data, the following paragraphs discuss first a number of general changes deriving from the IESS Regulation that can and likely will affect the results, and then changes in the variables used to determine labour market status in detail. Their impact varies among the countries depending on the extent to which previous national situations deviate from the IESS criteria stated in the new legislation. In addition, most countries have used the introduction of IESS to further improve their national LFS methodology independently of the legislative changes. Therefore, it is not possible to make clear statements of the overall impact that all cumulative improvements will have on the data. Instead, this

document discusses the theoretical impact of each change separately, assuming that all else remains equal. In several cases, specific country situations are pointed out. Please note that these references are not exhaustive with respect to the list of countries being affected.

General changes

- Target population: is now defined as all persons usually residing in private households in the territory of the Member State. The concept of residency has for this purpose been defined as being resident in a Member State for at least six months of a year. Age limits to be eligible for an interview (which differs depending on the module) are now the same for all countries. Conscripts are excluded. In the previous situation, the target population had different national definitions. For example, some countries were adopting the criterion of being registered as resident while other countries adopted a prevalence criterion more similar to the new one.
- Temporal references: the fixed reference week and the equal distribution of the sample over the reference weeks of each quarter are now the rule for all countries, including countries with a monthly sample design. Fixed reference week means that a statistical unit is assigned to a fixed week and the answers should refer to that particular period, independent from the interview date. All statistical units are uniformly distributed over all the weeks of the quarter in order to have equal representativity for each week and to avoid temporal biases. Before the IESS, some countries did not assign a fixed reference week and/or did not distribute them evenly over the quarter. The results were affected by temporal bias since some weeks were overrepresented with respect to the others.
- Data collection modes: CAPI, CATI and CAWI (all computer assisted) modes are the recommended data collection modes, limiting paper assisted interviews to exceptional cases (e.g. when participation in the LFS is required by law, and therefore all modes need to be offered). Paper assisted data collection is subject to several kinds of error (data entry or typos or filtering) and automated filters are by definition not available. Some countries were relying on paper-assisted interviews for a significant share of their sample. Mode effects are well known and to some extent unavoidable, but it is now easier to keep them under control. Use of administrative data is allowed except for the core variables determining the labour status, and the new clear rule on their use increases harmonisation. Moreover, the introduction of the variable MODE, stating the data-collection mode of each separate record in the microdata, will allow for a better analysis of mode effects on the estimates.
- Editing standards: imputation of missing information (from administrative sources, results of previous interviews and from interviews of other persons) is allowed with the exclusion of the core variables. This particular aspect was not regulated before, resulting in different national standards. The new standards ensure that editing for core variables does not affect the main results of the survey.
- Precision requirements: Precision requirements have been clarified and standardised in comparison with the previous situation. Also, they now refer exclusively to quarterly data. They are now defined for 1. the estimate of quarterly ratio unemployment-to-population for the age group 15-74 at national level; 2. the estimate of quarterly ratio employment-to-population for the age group 15-74 at national level; 3. the estimate of quarterly ratio unemployment-to-population for the age group 15-74 in each NUTS II region.

The new precision requirements are expected to improve the accuracy of quarterly regional estimates.

- Quality monitoring: The provision of quality reports for both quarterly and annual data is now regulated, and precise and timely deadlines are fixed. This will allow for a stricter quality monitoring of the survey and an earlier detection of any arising problems.

Changes in the derivation of labour market status The changes between the two regulations discussed below explain the hypothetical and expected effects each separate change might have on the estimation of labour market status, all else equal. It does not allow judgement on the overall effect. Overall, the general definitions based on internationally agreed criteria to determine whether a person is considered employed, unemployed or outside the labour force have not changed; what has changed is that the way the criteria are tested is more harmonised, starting with the sequence of questions. An important innovation of the IESS is the adoption of the information flow chart: the new legal base provides a flow chart determining the order of questions and their filters. All questions on the core variables must be asked after the demographic information and before any other subject. Effects of these changes depend on the PRE-IESS order of questions in each country. As the order of the question is known to have an effect on results, the information flow-chart is expected to have a strong harmonisation impact.

Employment Under IESS, employed persons comprise those aged 15 to 89 (in completed years at the end of the reference week) who, during the reference week, were in one of the following categories:

(a) persons who during the reference week worked for at least 1 hour for pay or profit, including contributing family workers;

(b) persons with a job or business who were temporarily not at work during the reference week but had an attachment to their job

(c) persons that produce agricultural goods whose main part is intended for sale or barter.

Persons in own-use production work, voluntary workers, unpaid trainees and individuals involved in other forms of work are not included in employment on the basis of those activities.

To interpret changes in employment, relevant factors might be:

- age group: cut-off for a person to be counted as employed is now at 89 for all countries. Before, the situation differed between countries; it ranged from an early cut–off from the age of 65, to 70, 75, 77, 90 or no cut-off at all. Each country had also different rules for respondents over this threshold: for example, they were interviewed only for the first wave, or answers where imputed from registers or directly classified as outside the labour force. The impact of the new cut-off depends on the situation in each country.
- reference week: the reference week must be clearly stated and the answer does not refer to the “present” or “last week” situation.
- at least 1 hour: the 1 hour principle must be clearly stated in the questionnaire to better catch persons employed in small or casual jobs, this concept is expected to increase the employment.
- for pay or profit: changes in the approach to improve coverage of this concept are twofold; on the one hand, it should help to capture all those in paid employment, even in very small and informal jobs, increasing employment in countries where such jobs were not well captured; on the other hand, it should exclude all voluntary unpaid work, reducing the employment in those countries for which the concept was not clear enough.
- unpaid family workers: the definition of family workers is now very precise and covers persons in unpaid employment in a business owned by relative even if owner does not live in the same household as the respondent. The effect will vary according to the PRE-IESS adopted definition.
- the sub-module “Small and casual jobs”: in addition to the precise implementation of the definition of employment, some countries introduced an additional sub-module on “Small and casual jobs” that further investigates marginal jobs, using lists of examples and focusing the attention on jobs that could be considered not relevant by the respondent. This should increase employment. Countries that can show that in their national situation this approach does not result in different estimates are not obliged to ask this sub-module.
- persons with a job or business who were temporarily not at work during the reference week but had an attachment to their job. With IESS, clearer guidelines and definitions of what constitutes attachment to the job were introduced for those persons with a job or business who were temporarily absent from it during the entire reference week.

In some cases, the duration of the absence is relevant to determine job attachment. Under IESS, the duration of the absence is now clearly defined as the total expected duration of the absence, and may refer only to the duration of the absence in the reference week in case the total expected duration is not known. All else equal, this change by itself should lead to a decrease in the number of employed persons. Specific situations of absences from work and the changes in their definitions, where applicable, are discussed below:

- no changes in the recording of absences of persons not at work due to holidays, working time arrangements, sick leave, maternity or paternity leave, for which the status of employed is warranted;
- persons in job-related training, for which the status of employed is warranted;

IESS: the respondent is in a job related training if one of the three following statements is true: the participation of the employee is required by the employer, the training takes place inside normal paid working hours (not during any kind of leave), the training is directly connected to the current job, paid by the employer or the employee continues receiving a remuneration from the employer.

PRE-IESS reasons for absences were broader, referring to all kinds of school, education or training, inside or outside the workplace. This might lead to a marginal decrease in employment in some countries.

- persons on parental leave

With IESS, all persons who take up parental leave, and are either receiving and/or being entitled to job-related income or benefits, or whose parental leave is expected to last 3 months or less, are counted as employed. This holds independently of their legal status: in order to improve harmonisation, the choice has been to find an easy, general rule. PRE-IESS, the situation of persons on parental leave was less clearly defined, and consequently, very much dependent on national legislations. Therefore, the impact of this clarification on how to treat persons on parental leave may lead to a decrease in employment for countries that used to check only the legal status PRE-IESS (and if the legal status was granting an unpaid leave longer than three months, among others: AT, DE), no change, or an increase in employment (among others HU). For most countries, this affects the employment of women more than that of men.

- seasonal workers during the off-season

IESS: they are classified as employed if they continue to regularly perform tasks and duties during the off-season for the job or business, excluding fulfilment of legal or administrative obligations, the concept of performing work is the relevant one; PRE-IESS: they are classified as employed if: they have an assurance to come back to work with the same employer at the beginning of the next season, AND the employer continues to pay at least 50 % of their wage or salary during the off-season. For this change, it is impossible to evaluate the effect, as the criteria have changed: performing work vs. continuous receipt of a salary.

- persons temporarily not at work for any other reasons

IESS: they are classified as employed if the expected duration of the absence is 3 months or less; this now holds also for persons on temporary lay-off. PRE-IESS: they were classified as employed. For the treatment of lay-offs, which were a complicated special case, please see the next section.

Special case: absences due to temporary lay-off Pre-IESS, lay–offs were classified as employed if they had an assurance of return to work within a period of 3 months or received 50 % of their wage or salary from their employer. Not employed lay–offs were classified as unemployed if they were “available to start work in 2 weeks” and had “actively searched for a job in the last 4 weeks”. Otherwise, they were considered as out of the labour force. Overall, cases of lay-offs, classified as employed, unemployed or outside the labour force were low. Only in the context of the COVID-19 pandemic, persons absent from work due to lay-off were becoming a relevant category of employed persons. The problems in correctly classifying persons on lay-off due to differences in national legislation were exacerbated due to the addition of specific schemes introduced in the context of the pandemic. In addition to the existing explanatory notes , which were not sufficiently clear in all national contexts in this situation, Eurostat extended these guidelines to enable NSIs to correctly encode person on lay-off. With the introduction of IESS, the category of lay-off is included in “other” reasons for absences. The decision to categorise a person on lay-off as employed or not is now based exclusively on the expected duration of the absence. No other factors are considered. The decisions on these changes were taken at a time when the current importance of this particular type of absence from work could not be anticipated. The national need for data that is consistent over time has led some countries to postpone implementation of this particular change for the time being (France, Spain). Full harmonisation, and thus, full comparability of employment data will become available once these changes have been fully implemented in all countries. For those countries that have already implemented the full IESS definition, this difference between the regulations will clearly have an impact on the level of employment in countries where a large number of persons fall in the category employed based on the Pre-IESS definition, but not in the IESS definition, all else equal. For the break-corrected series, this difference can lead to large decreases of employment in some quarters in 2020, in some countries, all else equal. In the context of the pandemic, with large uncertainty about the future and limited job search options and decreased availability of workers, this will lead more likely to increases in the category outside the labour force rather than to unemployment.

- persons that produce agricultural goods whose main part is intended for sale or barter.

Pre-IESS, persons raising agricultural products could be considered employed if the agricultural output was intended exclusively for own-consumption and was an important contribution to the total consumption of the household. With IESS, this category is excluded from employment, including only agricultural producers if the main part of the product is intended for sale or barter. This can lead to a decrease in employment, all else equal, for countries with large own-consumption agriculture. Some countries implemented an optional “Agricultural Employment Recovery” sub-module to collect information on these specific categories.

Unemployment Persons aged 15 to 74 (in completed years at the end of the reference week) are counted as unemployed if they were:

a) during the reference week, not employed according to the definition of employment described above; and

b) currently available for work, i.e. were available for paid employment or self-employment before the end of the 2 weeks following the reference week; and

c) actively seeking work, i.e. had either carried out activities in the four-week period ending with the reference week to seek paid employment or self-employment or found a job to start within a period of at most 3 months from the end of the reference week.

PRE-IESS, active job search could include “other” activities in addition to those described above. This is no longer possible under IESS, leading potentially to a marginal decrease in unemployment, and an increase in the number of persons outside the labour force. Seasonal workers not at work during the reference week (off-season) but who expect to return to their seasonal job are to be considered as having ’found a job’ and then are directly tested for availability. Pre-IESS off-season seasonal workers not in employment are classified as unemployed only if they are ’currently available for work’ and ’seeking work’.

See also

- All articles on labour market
- European Union Labour Force Survey (EU-LFS)

Dedicated section

- Labour market (including Labour Force Survey)