Employed and hours worked in Labour Force Surveys and National Accounts

Background Facts
– Labour and Education Statistics 2016

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Foreword

The Labour Force Surveys (LFS) aims to describe the labour market for the entire population aged 15-74. The LFS is the only source that regularly gives a consistent picture of the labour market concerning employed persons, unemployed persons and persons outside the labour force. In addition, estimates from the LFS are also used as starting values for calculation of employed persons and hours worked in the National Accounts (NA).

The report describes the differences in definitions between the LFS and the NA, as well as the processing that the NA does of the LFS estimates to arrive at the estimates that are published by the NA.

The report has been written to fulfil the EU requirements for documentation of the differences between the NA and the LFS concerning the estimates of the number of employed persons and the number of hours worked. Our hope is that the report can be used to facilitate the interpretation of the statistics and help users to understand the reasons for the differences between the different sources.

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Summary

The Labour Force Surveys (LFS) are one of the main sources that the National Accounts (NA) use to estimate the number of employed persons and hours worked. This report provides a description of the differences in the international definitions as well as the national procedures that lead to the differences between the LFS and the NA.

The report describes the estimation procedures of the LFS, the adaptations that are made on the account of the NA and the separate calculations of the NA that are based on the estimates of the LFS. Finally, tables are presented that show the various adaptations, as well as their effects on the estimates. The report aims to help users of the statistics of the LFS and the NA to understand the reasons for the differences of the various estimates.

There are mainly four reasons for the differences between the estimates of employed persons and hours worked in the LFS and the NA:

The first reason is that the target population of the LFS consists of persons registered in Sweden, regardless of whether or not they work in the country or not. The definition of the population of the NA means that all work conducted within the country, regardless of whether it is conducted by people living in the country or not, is included. To handle this difference, the LFS delivers estimates to the NA on employed persons and hours worked by persons registered in Sweden working in Swedish enterprises and government agencies.

The second reason is that the NA makes a supplement for foreign labour working in Swedish enterprises and government agencies.

The third reason only concerns the estimates of hours worked and is that the NA makes a supplement for what is known as untaxed hours based on an assumption that these are not fully covered by the LFS.

Finally, the fourth reason is that the presentation of the NA follows the quarters and years of the calendar, while the LFS is based on reference weeks. As a result, the measurement periods of the LFS often differ somewhat from calendar periods. Consequently, the NA adjusts the LFS estimates of hours worked so that these follow the calendar period, known as VFAT estimation. However, a corresponding adjustment is not made for the number of employed persons.

To illustrate the effect of the differences, examples of estimates for both the LFS and the NA are presented concerning quarter 1 of 2013 and the annual estimation for 2013. Examples in the report show that the differences between the estimates that are published by the NA and the AKU concerning employed persons should be seen as being very small, or slightly more than 30 000 for both the quarterly and annual estimates. The difference for hours worked is somewhat larger: 47 million hours for the quarter and 163 million hours for the annual estimates. The difference in the hours worked is mainly due to the handling of untaxed hours. However, the supplement of hours that is made by the NA for untaxed hours mainly affects the level while the difference in the development of hours worked is not affected to any great extent.

1. Introduction LFS and NA

1.1. Labour Force Surveys (LFS)

The aim of the Labour Force Surveys is to describe the current employment conditions for the entire population aged 15-74 and to give information on labour market trends. The LFS is the only source that regularly gives a consistent picture of the labour market: employment, unemployment, hours worked etc. The LFS is a sample survey based on individuals conducted every month. The sample consists of 29 500 persons per month and the survey has a panel design where each person interviewed takes part eight times during a period of two years (every third month). The selected individuals answer questions about their situation on the labour market during a specific week of the reference month. The information is collected via telephone interviews. The results of the monthly surveys are published about 20 to 25 days after the end of the reference period. These results also form the basis for the estimates of quarterly and annual averages.

1.2. National Accounts (NA)

The European national and regional accounts system (*ESA 2010 or ESA*) is an internationally comparable accounting system for a systematic and detailed description of an entire economy (that is, a region, a country or a group of countries), of its components and of its connection to other entire economies. ESA 2010 is based on the global guidelines for the national accounts, *System of National Accounts* from 2008 (ESA 2008).

ESA consists of two main types of compilations, namely, the institutional sector accounts as well as the input – output accounts and the industry accounts. The sector accounts systematically describe the economic course of events for the various steps of each institutional sector - production, generation of income, income distribution, income redistribution, use of income, as well as financial and non-financial capital formation. The sector accounts also include balance sheets that describe stocks of assets, liabilities and net wealth at the beginning and the end of the accounting period. This part of the National Accounts is called the Financial Accounts.

The input – output accounts with their supply and usage tables describe in more detail the production process (cost structure, generation of income and employment) as well as the flow of goods and services (production, imports, exports, final consumption, intermediate consumption and capital formation for each product group). The following are two important aspects of expressions: The sum of the income that is generated in an industry is equal to the value added that is created by that industry; for each product or product group the selection is equal to the demand.

In addition, the ESA concepts of population and employment are defined. These concepts are relevant for the sector accounts, the industry accounts and the supply and usage tables.

Based on the National Accounts, key measurements such as Gross Domestic Product, Gross Domestic Income and Financial Savings are calculated.

There are certain differences in the definitions of number of employed persons, number of employees and hours worked between the Labour Force Surveys and

the National Accounts on the international level. At the same time there are considerable similarities because the definitions of the NA as well as the LFS are based on resolutions made by the international conference for labour market statisticians, ICLS.

The next chapter describes the international definitions, and the differences between the regulations for the Labour Force Surveys and the National Accounts are illustrated.

2. International regulations

2.1. Background

International cooperation on labour statistics began many years ago. The International Labour Organization (ILO), based in Geneva, was established in 1919 under the League of Nations and later became a UN body. The ILO has laid the foundation for broad labour statistics covering the labour force, work injuries and earnings alike. The ILO usually gathers the members of the ILO to join in a large statistics conference about every fifth year, and different parts of labour market statistics are handled. At the thirteenth international conference for labour market statisticians in 1982, the basic principles that are used in the Labour Force Surveys today were adopted. At the most recent conference in 2013, a number of adjustments were made that will be implemented in the future.

Through its Luxembourg-based statistics agency Eurostat, the EU has driven forth the development of statistics over a wide area within the entire EU, and labour statistics have been a key element of this development. All the time, the EU has kept rigidly to the ILO's guidelines on labour statistics. Even for a large union such as the EU, the requirement for international comparability not just between EU Member States but also over the whole world is an important issue. Today the LFS is regulated by a number of different EU regulations. As mentioned above, these regulations are produced to be in line with the recommendations of the ILO. Council Regulation 577/98 is the basic legal act that regulates the Labour Force Surveys in the EU today, and according to this regulation, labour market status is measured according to the criteria that were adopted at the 13th conference of the ICLS in 1982. A number of supplementary acts have been adopted as the work to develop the statistics and their quality has progressed. A complete list of these acts is available on Eurostat's website[1].

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[1] http://ec.europa.eu/eurostat/statistics-explained/index.php/EU_labour_force_survey_%E2%80%93_main_features_and_legal_basis

2.2. Definition of employed persons, employees and hours worked according to the ILO and the ICLS

Employment

(1) Employed persons include all persons over a certain age who, during a certain period, either a week or a day, belonged to one of the following categories:

(a) "*paid employment*":

> (a1) "At work": Persons who during the reference period conducted some type of paid work. Payment can occur via cash or payment in kind;
> (a2) "have employment but not at work": persons who previously have worked in their current occupation, but who were not at work during the reference period. However, the person must have a formal connection to their work.

This formal connection should be confirmed with consideration to national conditions, according to one or more of the following criteria:

> (i) continued payment of wages/salaries
> (ii) an assurance about returning to work after the end of the unexpected absence or upon a fixed date
> (iii) duration of absence - In certain cases this can correspond to the period for which the employee can receive compensation without a requirement to take other work;

(b) "*self-employed persons*":

> (b1) "at work": Persons who during the reference period conducted some type of work for profit or family income. Payment can occur via cash or payment in kind;
>
> (b2) "have an enterprise but were not at work": persons who conduct business activities, such as an enterprise or a farm, who during the reference period were not at work for some reason.

(2) In the operationalisation of the concept "at work", this can be interpreted as work for at least one hour during the reference period.

(3) Persons who temporarily are not at work due to sickness or injury, weekends or holidays, strikes or lockouts, time off for studies, maternity or parental leave, lack of work, temporary reduction of operations or temporary interruption of work due to for example bad weather, operational disturbances etc., or other temporary absence with or without compensation should be regarded as gainfully employed, providing that the person has formal attachment to their work.

(4) Self-employed persons with or without employees as well as persons who are a part of a production cooperative should be regarded as self-employed persons and classified as either "at work" or "having employment but not at work" based on the actual circumstances.

 (5) Unpaid family workers at work should be considered as in self-employment irrespective of the number of hours worked during the reference period. Countries that prefer for special reasons to set a minimum time criterion for the inclusion of unpaid family workers among the employed should identify and separately classify those who worked less than the prescribed time.

(6) Persons who work with production of goods and services for their own consumption and household consumption should be regarded as self-employed persons, providing that the production consists of an important contribution to the total consumption of the household.

(7) Apprentices who receive compensation, cash or in-kind, should be categorised as persons with paid employment and classified as "at work" or "having employment but not at work" according to the same criteria as other persons with paid employment.

(8) students, persons engaged in housework and other persons not engaged in occupational work during the reference period, but have employment or are self-employed persons according to the definition (1) above should be regarded as employees or self-employed persons according to the same criteria as other persons with paid employment, but are identified separately whenever possible.

(9) Members in the Armed Forces should be included among persons who are gainfully employed. The Armed Forces should include the regular and temporary participants according to the specification in the latest version of ISCO.

Hours worked

The ILO standards in the resolution concerning the measurement of working hours, which was adopted in December 2008 by the Eighteenth International Conference of Labour Statisticians, defines hours actually worked as the time persons spend on activities that contribute to the production of goods and services during a given reference period. The resolution specifies the hours worked in the following way:

1. Actual hours worked occur in all types of work with different forms of compensation (paid or unpaid), and can be carried out in different places.

2. Actual hours worked is not connected with administrative or legal concepts and thus includes all persons who work and can be conducted within normal or agreed working time or as overtime.

3. The statistics on actual hours worked should include the following:

a) Actual hours worked during normal working periods that directly contribute to production.

b) Paid time spent on training.

c) Hours worked beyond the hours of normal working periods, that is, overtime. Note that even unpaid overtime should be included.

d) Time spent on tasks such as preparation of the workplace, repairs and maintenance, preparation and cleaning of tools as well as handling of receipts, time reporting and reports.

e) Time spent waiting due to for example temporary lack of work, machinery breakdown or accidents, or time spent at the workplace when no work is conducted but is paid for according to an employment contract with a guarantee.

f) Time corresponding to short rest periods during the working day, including coffee breaks.

g) On-call duty. If the on-call duty takes place outside of the workplace, for example in the home, this time is included in actual hours worked to the extent that leisure time and mobility is limited.

h) Hours worked that are carried out by staff in the military service, even conscripts, should be included even if they are not included in the Labour Force Survey of the country.

4. The following **should not** be included in the statistics on actual hours worked:

A) Paid hours but not hours worked such as paid annual holiday, paid national holidays, paid sickness absence, paid parental leave, strikes, short time off for visits to the doctor etc. as well as closure due to weather conditions.

b) Breaks for meals.

c) Time spent on commuting to and from work; however, work performed during this time should be included.

d) Other training than further training.

2.3. European regulations

2.3.1 Labour Force Surveys (LFS)

The Labour Force Surveys are regulated by Eurostat via a number of regulations that aim to ensure international comparability of the surveys and are issued according to recommendations from the ILO.

The basic legal act is Council Regulation 577/98. According to this regulation, the Labour Force Surveys in the EU are to measure the labour force status according to the criteria adopted by the ICLS 13th Conference in 1982. The target variables are described in detail in the so-called Explanatory notes [2] that are supplied to member states by Eurostat. This forms the basis for Eurostat's confirmed operationalisation to produce labour force status according to recommendations from the ILO. A more detailed description is provided in Commission Regulation 1897/2000 of how unemployment should be measured, as well as general guidelines for questionnaire design. Work is now ongoing on the European level to also produce corresponding guidelines for the measurement of employed persons.

The number of employed persons and hours worked are affected by how the target population is defined. Eurostat's guidelines for the target population stipulate that the survey must be made for residents of the country at the time of the survey. According to the Commission Regulation (EC) 377/2008, questions on unemployment are to be asked of people in the sample age 15 or older. The guidelines further stipulate that the main population consist of persons living in private households in each country. If survey conditions in the country permit, this main population can be supplemented by persons living in collective households. If it is only possible to use private households, persons living in collective households who have a connection to a private household are included in the household. Military conscripts (including persons who do community service) are generally excluded in reporting the results, but are still generally included in the target population (at least when they are living in private households).

2.3.2 National Accounts (NA)

ESA consists of two main types of compilations, namely, the institutional sector accounts as well as the input – output accounts.

The classification of the NA in the sector accounts and the industry accounts means that the system has two types of units and two ways to sub-divide the economy that differ and serve different analysis goals. To present income, expenses and financial flows as well as for the balance sheets, the **institutional units** are divided into sectors based on their main functions, behaviours and targets.

To present the production processes for input-output analysis, **local business units** are divided into industries by type of operations. Operations are characterised by an input of products, a production process and production of products.

Borders of national territory

The units that comprise the economy of a country and its flows and stocks are presented in ESA 2010 and are domestic. An institutional unit is considered domestic in the economic territory where it has its economic domicile. Such types of units are considered to be domestic regardless of nationality and legal form, and independent of where they are situated in the economic territory when transactions are conducted.

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[2] http://ec.europa.eu/eurostat/documents/1978984/6037342/EU-LFS-explanatory-notes-from-2016-onwards.pdf

The economic territory consists of the following:

a) The area (geographic territory) that is actually administrated and governed economically by only one government.

b) All free zones, including bonded warehouses and factories under customs supervision.

c) The national airspace, territorial waters and the part of the continental shelf lying in international waters, and where the country enjoys exclusive rights.

d) Territorial enclaves, i.e. geographic territories situated in foreign countries according to international treaties or agreements between states that are used for the country's public administration (such as embassies, consulates, military bases, scientific bases, etc.).

e) Oil and natural gas deposits etc. in international waters outside the country's continental shelf, which are run by units that are domestic in the territory as defined according to a-d.

Fishing boats, other vessels, floating platforms and spacecraft are handled in the ESA as mobile equipment, whether they are owned and/or run by domestic units on land or are owned by foreign units but are maintained by domestic units. Transactions that deal with ownership (gross fixed capital formation) and use (rent, insurance etc.) of mobile equipment are entered in the finances of the country where each owner and/or user have their economic domicile. Financial leasing is regarded as a change in ownership.

The economic territory does not include extraterritorial enclaves.

The parts of the country's own geographic territory used by the following organisations are also not included:

a) Public administration of other countries.

b) The institutions and administration of the European Union.

c) International organisations according to international treaties between states.

The concept of main economic domicile means that there is a place within the economic territory where a unit is engaged in economic operations and transactions to a significant degree, either for an unlimited amount of time or for a longer limited period (one year or more).

Production boundary

Labour force input is classified on the basis of the same statistical units that are used for the analysis of production, namely the local operational unit and the institutional unit. The results of the producing unit's operations correspond to the labour force input if the latter includes both domestic and foreign employees who work for the domestic statistical units engaged in production. The ICLS resolution further defines the labour force as those persons engaged in operations that are included in the of production boundary in the national accounts.

Therefore the work contribution also includes the following categories:

a) Border workers who reside abroad, that is, persons who cross the border every day to work within the economic territory.

b) Seasonal workers residing abroad, that is, persons who move to the economic territory and stay there for less than one year to work in industries that periodically need extra labour.

c) Members of the country's armed forces stationed abroad

d) Citizens who are employed at national scientific bases situated outside the geographic territory of the country.

e) Citizens who are employed in diplomatic missions abroad.

f) Members of cruise on fishing boats, other vessels, aircraft and floating platforms that are run by domestic units.

g) Local employees at public administration units situated outside the economic territory.

Labour input does not include the following:

a) Inhabitants who are border workers or seasonal workers, that is, persons who work within another economic territory.

b) Citizens who are members of crews on fishing boats, other vessels, aircraft and floating platforms that are run by foreign units.

c) Local employees at foreign public administration units, situated within the geographic territory of the country.

d) Staff at the institutions of the European Union and in civil international organisations that are situated within the geographic territory of the country (including directly recruited local employees).

e) Members of the armed forces who work in international military organisations situated within the geographic territory of the country.

f) Citizens who work at foreign scientific bases situated within the economic territory of the country.

Population boundaries

The boundaries of the national territory and the production boundaries give the population boundary in the national accounts.

2.4. Difference in international definitions between the LFS and the NA

The definitions for the LFS and the NA are generally in agreement, but there are certain differences because the labour force surveys measure the number of employed persons and employees living in the country, while the national accounts are bound to the national territory and production of what are to be included in the measurement of the labour input.

Furthermore, operationalisation is made on the national level, based on the international regulations. This is described for Sweden's part in chapters 3 and 4 in this report. The report aims to illustrate the differences that occur because of and beyond the differences that are found in the international regulations.

To enable the transition to the concepts that are generally used in the labour market statistics (employment on the national level), that is, the LFS, the ESA stipulates in particular that the following items should be presented separately:

a) Conscripts (not included in the labour market statistics, but included in ESA under public administration services).

b) Residents who work for foreign producing units (included in the labour market statistics but not in the employment statistics as defined in ESA).

c) Persons residing abroad who work at domestic producing units (not included in the labour market statistics but included in the employment statistics as defined in ESA).

d) Residents who work and live permanently at an institution.

e) Residents who work but are too young to be included in the population boundaries of the labour market statistics.

3. Hours worked and number of employed persons - LFS

3.1. Definition of employed persons and hours worked in the LFS

Employed persons

Based on the resolution taken by the 13th international conference for labour market statisticians in 1982, national consideration are taken regarding how certain groups are defined. This above all refers to persons who were not at work during the reference week. Sweden has also made some clarifications of what should be considered as paid employment, with regard to the remuneration that may be paid to participants in labour market policy programmes.

To do so, the following definition of employed persons has been confirmed in the LFS to meet the intentions of the ILO and Eurostat:

- **persons who during a certain week (reference week) did some work** (at least one hour), either as a paid employee, a self-employed person (including freelancers) or unpaid helper in a business owned by one's husband/wife or another member of the same household (=employed, at work).

- **persons who did not do any work according to the above, but who were employed, had a position as a helper in a household or were self-employed (including freelancers) and were temporarily absent during the entire reference week.** Absence is included, regardless if it was paid for or not (=employed, absent from work). Reasons for absence include illness, holiday, leave of absence (such as care of children or studies), military duty, labour dispute or leave for other reasons.

- **persons who take part in certain labour market policy programmes where parts of the compensation come from an employer, or if the compensation goes to the start-up of business activities, are considered as employed persons.** This can include labour market programmes for disabled persons, programmes to start a business or employment with wage subsidies or employment support.

Data is delivered to Eurostat where conscripts are excluded from the population. In the Swedish publishing of the LFS, as in the deliveries to the NA, conscripts are included in the population and even among employed persons in those cases they live up to the above definition. However, conscripts only comprise an extremely marginal part of the Swedish population because Sweden has not had compulsory military service since 2010. Thus this group only comprises persons who do compulsory military service in another country.

Employees and self-employed persons

Employed persons can be broken down by professional status. Employees, who consist of persons with permanent or temporary employment, and self-employed persons including assisting family members. In the LFS, professional status is determined by the respondents who state if they work as an employee, if they are self-employed or if they work at a company that belongs to someone in their family and household.

Persons who run their own businesses as limited companies are classified as self-employed persons according to the LFS. This involves a contradiction from their

professional status in the legal sense where they are regarded as employees in their companies. However, the questionnaire includes questions about the legal form of the enterprise, which allow estimates of the number persons who are self-employed in the legal sense to be produced.

Permanent employees include persons with permanent employment. Temporarily employed persons covers people substituting for someone else, those employed using employee support, seasonal workers, trial employment or project employment as well as other forms of temporary employment.

The LFS measures both the main job and second jobs. In case a person has more than one job, the respondent needs to report what is considered to be main job and second jobs. This can in turn have an effect on whether the person will be classified as either self-employed or an employee.

Hours worked

The LFS measures hours worked in two ways. Hours actually worked are the number of hours a person works during the reference week. Hours usually worked are the hours that a person should work according to agreement with their employer (or average working time for self-employed persons).

Actual hours worked is measured for all employed persons and gives an immediate picture of the amount of work that is carried out in the economy. All weeks during the year are surveyed, and each respondent is asked about a specific week. Different respondents are thus linked to different reference weeks. All weeks are then used to calculate how much we work on average during different periods.

Usual hours worked is defined as the agreed working time for employees and as the average working time for persons who do not have an agreement with their employer or who are self-employed. Therefore this measurement refers to a longer time period.

This report only deals with actual hours worked since it is these hours that are delivered to the NA.

3.2. Target population and sampling frame

The target population in the Swedish LFS differs somewhat from Eurostat's recommendations. The LFS in Sweden cannot differentiate between private and collective households. Sweden's target population is based on the Total Population Register, TPR. Thus, the target population is the registered population and not those residing in Sweden. In Sweden, private as well as collective households are included because the survey is based on a sample of individuals that does not take into account the type of housing. However, all sample persons are coded as living in private households, which means that in its processing of data, Eurostat is unable to exclude the sample of persons living in collective households. The LFS also includes conscripts, which are very few in Sweden today.

Further, individuals aged 15-74 comprise the target population, and not persons aged 15 or older. The target population of the LFS consists of persons who are registered in Sweden and who have turned age 15 but not yet age 75.

The Total Population Register is updated daily through notices from the Swedish Tax Agency about births, deaths, moves within the country, immigration and emigration. The Total Population Register includes demographic variables (sex, age, place of residence) that affect the drawing of the sampling and these are used as starting values for the background variables.

Because persons registered in Sweden who are employed abroad are included in the sampling frame, these persons are included in the estimates of the LFS. However, based on the questions in the LFS questionnaire, it is possible to identify those persons who work abroad.

3.3.   The questionnaire

The questionnaire for the LFS includes a number of questions that are used to confirm the actual number of hours worked, employed persons and employees.

The questionnaire is designed to measure the labour market status according to the ILO. With a hierarchical approach, it begins with questions to determine if the person is employed or not. Questions are then asked to employed persons to determine if the person is an employee, a self-employed person or an assisting family member. Persons who have been at work during the reference week, that is, worked at least one hour, then receive a number of questions regarding how many hours they worked during the period. To minimise measurement error, questions on absence and overtime in relation to the agreed working time is asked first. Then the questions regarding how many hours the person has worked during the reference week are asked.

If the reference week spans two calendar months, further questions are asked to make it possible to divide up the hours worked between the calendar months.

Appendix 1 lists the questions that are used to determine employed persons, employees and the number of hours worked in the LFS questionnaire.

3.4.   Industry and sector in the LFS

Coding based on open answers is done for occupation and socioeconomic group, as well as industry and sector. Coding for industry is done according to the Swedish Standard Industrial Classification, a classification of economic activities. Sectors are coded in the LFS as of December 2014 according to INSEKT 2014 (Swedish standard classification of the institutional sector).

Coding of industry and sector uses information from the Statement of earnings register at the time of the interview; 50 percent of the coding occurs at this stage. No checking study has been done for this part.

Information gathered from open questions during the interview is used for the coding of the remaining cases. The coding for these cases is done manually with computer assistance based on the information from the interview together with information from the Business Register. The matching is done with the workplace, and the coding of industry is based on this. The results of the checking study for 2013 for this part showed that the share of correct codes for industry was 94.8 percent on the two digit level (the level used in publications of the LFS) and the share of correct codes for sector was 99.1 percent on the one digit level (the roughest level of presentation).

In general, coding errors give rise to incorrect classifications, which in turn give rise to errors in the statistics. The size of some groups may be slightly overestimated, e.g. with respect to the number of persons employed at the expense of other groups that will be underestimated.

3.5. Estimation of VFAT in the LFS (calendar month)

VFAT, or the volume of the actual hours worked, refers to the sum of the hours worked during a certain calendar month. This differs from the published estimates for the LFS which refer to an LFS month consisting of 4 or 5 measurement weeks, and are given in the form of an average number of hours worked for these weeks.

VFAT is an important variable for several important users. Among others, the national accounts and The National Institute of Economic Research require the VFAT per quarter. The variable is also a central part when calculating productivity.

As illustrated in the section about the questionnaire and the order of questions concerning actual hours worked, extra questions are asked when the measurement week spans two months. The purpose is to capture the number of actual hours worked for the part of the measurement week that occurs within a certain calendar month.

LFS and the measurement week system

The LFS is presented monthly, quarterly and yearly. These presentations are based on reference weeks and therefore differ slightly from the calendar's months, quarters and year. An "LFS - month" includes four weeks (every third month, five weeks), a "quarter" includes 13 weeks and a "year" consists of 52 weeks (53 as an exception). When the year consists of 52 reference weeks, the October LFS includes 4 weeks. When the year consists of 53 reference weeks, the October LFS includes 5 weeks.

Calculation of VFAT

The LFS present estimates of the total number of hours worked per week (actually, the average per week during the measurement month). These estimates are given by:

$\hat{t} = \sum_r w_k * t_k$

where

$\hat{t}$ = estimate of the total number of hours worked per week on average during the reference month

w_k = weighting factor for object k

t_k = number of hours worked during the reference week for object k

The estimate above takes advantage of the entire monthly sample, that is, the sample for all the reference weeks during the month.

To be able to estimate the volume of the hours worked during a calendar month, weekly estimates are needed, that is, for each week the upward adjustment up to the population level is done. A weekly weight is created for these calculations by counting the monthly weight as follows:

$$w_{ik} = \frac{\sum_r w_k}{\sum_{r_i} w_k} * w_k$$

i=1, 2, 3, 4 or 5

where

w_k = weighting factor concerning the month for object k

w_{ik} = weighting factor in reference week i for object k

An estimate of hours worked during a calendar month is thus given by:

$$\hat{T}_j = \sum_i w_{ik} * t_{ik}$$

where

$\hat{T}_j$ = estimate of the total number of hours worked during the calendar month **j**

i = the reference weeks that include days that belong to the calendar month

w_{ik} = weighting factor in reference week i for object k

t_{ik} = Number of hours worked belonging to the calendar month in the reference week i for object k

4.   Hours worked and number of employed persons - NA

4.1. **Definition of employed persons and hours worked in the NA**

Employed persons

Employment includes all persons who are engaged in some kind of productive activity that falls under the production definition in the main employment of the national accounts (see ESA Section 11.11-11.18). Employed persons are either employees or self-employed persons. Persons who have more than one job are classified as employed or self-employed persons, depending on their main job. Employees are defined as all persons who, according to agreement, work for a domestic institutional unit and receive compensation that is booked as compensation to employees. "Employees" correspond to the ILO's definition of paid employment. Self-employed persons are defined as persons who are the sole owner or co-owner of private enterprises in which they work, excluding private enterprises that are classified as quasi-enterprises. Persons who are both employed and self-employed are classified as employed if the employment is their main employment by income. The results of the producing unit's operations correspond to the labour force input if the latter includes both domestic and foreign employees who work for the domestic producing units.

Hours worked

The total number of hours worked corresponds to the combined number of actual hours worked that the employee or the self-employed person has carried out during the accounting period, on the condition that the production result lies within the production definition (see ESA sections 11.27-11.31). The definition of employees is broad and includes persons who are temporarily not at work but have a formal tie, such as part-time work. The total number of hours worked is used then.

In many surveys to enterprises, the paid hours are registered and not the hours worked. In such cases, the hours worked must be estimated for each group of working occasions with the use of all available information, such as paid absence.

Even if the number of employed persons and hours worked are defined according to international regulations, the NA must often use surveys with somewhat different definitions.

4.2.   **Industry and sector in the NA**

Breakdown of the economy into industry and sector

Industrial breakdown in the NA is based on operations on the local operations unit. The classification thus occurs on a more detailed level than industrial breakdown by workplace. For more information, see Appendix 6.3, Institutional units and their sub-components.

Industries can be divided into three categories in the national accounts:

a) Industries that produce goods and services for the market (market industries), and goods and services for their own final use. Services for their own final use are housing services in tenant-owned dwellings and household services produced by employees in the households. *The aggregate for this group is called the* **Business Sector**

in the Swedish national accounts. The Business Sector thus consists of market production from all institutional sectors, broken down by industry.

b) Industries within the public administration sector that are non-market producers of goods and services: non-market industries within public administration. *The aggregate for this group is called* **General government** *in the Swedish national accounts.*

c) Industries in the Non-profit institutions serving households sector that are non-market producers of goods and services: non-market industries in the Non-profit institutions serving households sector. *The aggregate for this group is called the* **Non-profit institutions serving households** *sector.*

The reporting of the labour input in the Swedish national accounts is done according to a, b and c. The employee is to be assigned to the local operational unit where they have their main employment. Then the employee can be assigned to industry and sector.

4.3. Quarterly estimates

Calculation of the entire economy

Even if there are descriptions and definitions about how to show the labour input in the NA, the calculations are dependent on the results from individual surveys and these methods and definitions. Various register-based sources and surveys are used for the different sectors, while estimates for the entire economy use the LFS as the main source.

The calculations of the NA are based on revised data from the LFS to follow the definition of self-employed persons (legal definition) of the NA. Employed persons in Sweden are presented separately to match the definition of the population in the NA. Regarding hours worked, adjustment has also been made of the measurement period so that data is based on calendar months instead of measurement months, known as the VFAT estimation. Because these estimates that are used in the calculations of the NA of the number of hours worked in the entire economy, there is thus a difference between the published data of the LFS and the data that is delivered to the NA already before any processing is done in the national accounts. Appendix 4 also gives a detailed presentation about how the different sub-sectors are calculated.

To calculate the hours worked and the number of employed persons on a quarterly basis, the *percentage wise development* from the LFS is used for the entire economy to write the *levels* in the national accounts. Development in terms of percent is based on the current calculation period compared with the corresponding period in the previous year, while the levels are produced upon the most recent annual calculation. Table 1 below provides an overall picture of how the calculations are done on a quarterly basis. In the quarterly calculations, no separate calculations are made of the untaxed hours and foreign individuals who work in the Swedish economical territory. It is assumed that the development of untaxed hours is the same for those who work within the Swedish tax system and that the number of employees and their hours follow the same development as the domestic population.

As illustrated in the table, it is only the entire economy that the LFS uses as the main source for the change in the number of employed persons and hours worked. Regarding self-employed persons, separate calculations are made, but the presentation is also on the total number of employed persons. That is, both the number of employed persons and self-employed persons together are presented.

Table 1 Overall picture of quarterly calculations in the NA

Item (p)	Employed persons	Hours worked
1. Central government and social insurance	$Syss_{NA,t} = \Delta\ Syss_{KLS+Bolag}$ $*\ Syss_{NA,t-1}$	$Tim_{NAt} =$ $\Delta Tim_{KLS+Bolag}\ *\ Tim_{NA,t-1}$ (Calibrated with total government agencies)
2. Municipality	$Syss_{NR,t} = \Delta\ Syss_{KLK}$ $*\ Syss_{NA,t-1}$	$Tim_{NR,t} = \Delta Tim_{KLK}\ *\ Tim_{NA,t-1}$ (Calibrated with total government agencies)
3. County councils	$Syss_{NA,t} = \Delta\ Syss_{KLL}$ $*\ Syss_{NA,t-1\ +} +Syss_{Bolag,t}$	$Tim_{NA,t} = \Delta Tim_{KLL}\ *\ Tim_{NA,t-1}$ (Calibrated with total government agencies)
4. Total general government	Sum of 1,2 and 3	$Tim_{NR,t} = \Delta\ Syss_{NA,t}\ *\ \Delta\ Tim_{LFS}\ /$ $\Delta\ Syss_{LFS}\ *\ Tim_{NA,t-1}$
5. Self-employed persons in industry	$Syss_{NR,t} = \Delta\ Syss_{Företagare\ LFS}\ *$ $Syss_{NA,t-1}$ Projected by branch of industry	$Tim_{NA,t} = \Delta\ Tim_{Företagare\ LFS}\ *\ Tim_{NA,t-1}$ Projected by branch of industry
6. Households' non-profit organisations	$Syss_{NA,t} = \Delta\ Syss_{KS}\ *\ Syss_{NA,\ t-1}$ Same development for all branches of industry	$Tim_{NA,t} = \Delta\ Förädlvärd_{FP}\ *\ Tim_{NA,t-1}$ Same development for all branches of industry
7. Market production in public sector	$Syss_{NA,t}\ =\ Syss_{NA,t-2}$	$Tim_{NA,t}\ = Tim_{NA,t-2}$
8. Employees in industry*	Total: Residual (p9- (p4 to p7)) Industries, $Syss_{NA,t}=$ $\Delta\ Syss_{KS}\ *\ Syss_{NA,t-1}$	Total: Residual (p9- (p4 to p7)) Industries, $Tim_{NA,t} =$ $\Delta\ Syss_{NA}\ *\ \Delta$ Average hours worked$_{KLP}\ *\ Tim_{NA,t-1}$
9. Entire economy LFS	$\mathbf{Syss_{NA,t}\ =\ \Delta\ Syss_{LFS}\ *\ Syss_{NR,t-1}}$	$\mathbf{Tim_{NA,t}\ =\ \Delta\ Tim_{LFS}\ *\ Tim_{NA,t-1}}$

KLS=Short-term statistics, salaries in central government sector, KLK = Short-term statistics, salaries in primary municipality, KLL = Short-term statistics, salaries in county council sector, KLP = Short-term statistics, salaries in private sector, KS=Short-term employment statistics

* Also includes untaxed hours and foreign labour in the quarterly calculations. For some branches of industry the development of the LFS or KLP is used to project the number of hours worked and the number of employed.

Δ denotes change, in percent, from the same quarter in the previous year

4.4. Annual estimates

Calculation of the entire economy

In contrast to the quarterly calculations, level estimates are used to a greater extent in the annual calculations. The levels of hours worked and number of employed persons for the entire economy are collected from the LFS. For this level in the LFS,

supplements are made for the part of the untaxed labour force that is not assumed to be captured in the LFS, and the labour force of foreign individuals who work in the Swedish economic territory. Table 2 below provides an overall picture of how the calculations are done. Appendix 5 also gives a detailed presentation about how the different sub-sectors are calculated.

Table 2 Overall picture of annual calculations in the NA

Item)	Employed persons	Hours worked
1. Government and social insurance	$Syss_{NA,t} = Syss_{KLS,,t} + Syss_{Högskola,,t} + Syss_{Bolag,t}$	$Tim_{NR,t} = = \Delta Tim_{KLS} * Tim_{NA,t-1}$
2. Municipality	$Syss_{NA,t} = Syss_{SLK,,t} + Syss_{Bolag,t}$	$Tim_{NA,t} = \Delta Tim_{KLK} * Tim_{NR,t-1}$
3. County councils	$Syss_{NA,t} = Syss_{SKL,,t} + Syss_{Sjukhus,,t}$	$Tim_{NA,t} = \Delta Tim_{KLL} * Tim_{NA,t-1}$
4. Total general government	Sum of 1,2,3	$Tim_{NA,t} = Syss_{NA,t} * Tim_{AKU} / Syss_{AKU}$
5. Self-employed persons in industry	Total: $Syss_{NA,t} = Syss_{Företagare\ LFS,t}$ Industries: RAMS	Total: $Tim_{NA,t} = Tim_{Företagare\ LFS,,t}$ Industries: $Tim_{NR,t} = Syss_{NR,t} * Tim_{Företagare\ AKU,\ t} / Syss_{Företagare\ AKU,t}$
6. Households' non-profit organisations	Total: $Syss_{NR,t} = \Delta Syss_{OrgEk} * Syss_{NR,t-1}$ Industries: $Syss_{NA,t} = \Delta LSUM_{NA} / (\Delta LSUM_{NA,\ NL} / \Delta Syss_{NA,\ NL}) * Syss_{NA,\ t-1}$	Total: $Tim_{NA,t} = \Delta Syss_{NA} * \Delta Tim_{Anställda\ LFS\ S94} / \Delta Syss_{Anställda\ LFS\ S94} * Tim_{NA,\ t-1}$ Industries: $Tim_{NA,t} = \Delta LSUM_{NA} / (\Delta LSUM_{NA,\ NL} / \Delta Tim_{NA,NL}) * Tim_{NA,\ t-1}$
7. Market production in public sector	$Syss_{NA,t} = \Delta LSUM_{NA} * Syss_{NA,t-1}$	$Tim_{NA,t} = Syss_{NA,t} * \Delta (Tim_{LFS,\ t} / Syss_{LFS,t}) * Tim_{NA,t-1}$
8. Employees in business sector	Total: Residual (p8=p9 - (p4 to p7)) Industries: $Syss_{NR,t} = \Delta Syss_{FEK,\ Heltidsekv} * Syss_{NR,t-1}$	Total: Residualt (p8=p9- (p4 till p7)) Industries: $Tim_{NR,t} = \Delta LSUM_{NR} / \Delta Timlön_{KLP} * Tim_{NR,\ t-1}$
9. Entire economy LFS	$\mathbf{Syss_{NA,t} = Syss_{LFS,,t}}$	$\mathbf{Tim_{NA,t} = Tim_{LFS,,t}}$
10. Untaxed work	No employed persons	$Tim_{NR,t} = LSUM_{NA} / Medellön_{KLP,\ NL}$
11. Foreign labour force who work in Swedish territory	$Syss_{NR,t} = Foreign\ income_{NR,t} / LSUM_{NA,NL,t} / Syss_{NA,\ NL,t}$	$Tim_{NA,t} = Syss_{NA,t} * Tim_{LFS,\ NL} / Syss_{LFS,\ NL}$
12. Conscripts	$Syss_{NA,t} = Syss_{LFS,t}$	$Tim_{NA,t} = Syss_{NA,t} * Tim_{LFS} / Syss_{LFS}$
12. The entire economy NA	**Total 9 to 12**	**Total 9 to 12**

KLS - Short-term statistics central government, SLK - Short-term statistics municipalities, SkL - Sweden's municipalities and county councils, RAMS - Register-based labour market statistics, FEK - Structural Business Statistics, LSUM$_{NR}$ = Calculated sum of wages NA, NL = Business Sector. OrgEk = Organisationers ekonomi, S94 = Branch of industry 94 according to SNI2007.

*For some branches of industry the development from LFS is used to project the number of hours worked and the number of employed.

** Four percent of untaxed hours are assumed to be worked by self-employed.

Δ denotes change, in percent, compared to the same quarter the previous year

Calculating untaxed hours and foreign individuals in business sector

Special calculations are made for untaxed working hours in the annual calculations. The untaxed labour input only includes hours worked and no employed persons. Employed persons are assumed to be included in the taxed labour input.

The calculation of untaxed hours is based on the total amount of untaxed labour. This is divided by the hourly wage of the National Mediation Office per industry with regards to taxed labour. Then it is assumed that 96 percent of the hours worked is from employees while 4 percent is from self-employed persons. The breakdown of the untaxed hours on employees ad self-employed persons is based on data from the report of the National Tax Agency: *"Svartköp och Svartjobb i Sverige rapport 2006:4"*. Then only 50 percent of the hours worked are included, because the NA have made the assumption that the remaining hours are captured by the LFS.

The labour force consists of all persons who offer or can offer labour for productive operations that are within the definition off production in the national accounts. An institutional unit is considered domestic in the economic territory where it has its economic domicile. Because of this, foreign individuals who work within the territory of Sweden must be added to the calculations of hours worked and the number of employed persons, because these persons are not included in the LFS. The calculations of hours and employed persons is based on data on income from abroad. First, the number of employed persons is calculated by dividing the total wages by their wages per employed person according to the NA for persons employed in the business sector in the Swedish economic territory. Then, the number of employed persons is multiplied by the average working time according to the LFS to obtain the number of hours worked.

5. Differences and consequences

5.1. Differences in definitions

Target population/definition

The target population in the NA and the LFS differs since in the LFS, it is based on the total population register. This means that the sample frame includes all persons registered in Sweden, regardless if they work within or outside of the country.

According to the NA's definition of the population with the definition of production and economic domicile, the persons who work for domestically producing units are instead referred to, regardless if the employees are domestic or foreign. Production means operations that are conducted under management and responsibility of an institutional unit that uses input of labour, capital and goods and services to produce goods and services. Employment includes all persons who are engaged in some kind of productive activity that falls under the production definition in the national accounts (see ESA Section 11.11-11.18). The results of the producing units' operations correspond to employment, according to the NA.

In the delivery to the NA, the estimates from the LFS are adapted so that the numbers of hours worked within Sweden and abroad are presented separately. However, the difference remains that employees who work in Sweden but who are not in the registered population are not included in the LFS.

Main job and second job

In the LFS the respondents themselves report what is their main job and second job, in case they have several jobs. In the NA, it is instead income or the number of hours worked that serve as guidelines to identify which job should be regarded as the main job. In those cases where the person is an employee as well as self-employed, or works as an employee in different sectors, differences in estimates may occur because the person belongs to different groups.

Self-employed persons

In the published figures from the LFS, persons who have a limited company are classified as working as self-employed persons. On the other hand, persons in this group are classified as employees in the NA, which is also the case in Sweden from a legal perspective. However, the LFS questionnaire has a question about the legal form that the company operates under, which makes it possible for the NA to exclude persons who have a limited company from the group of self-employed persons and treat these persons as employees instead.

Reference period

In the LFS the reference period is the measurement week for which the respondents receive questions about their labour market situation. In turn, the measurement weeks are included in a measurement month, which consists of either four or five measurement weeks. These measurement months correspond to the calendar month to varying degrees. Because the NA are based on calendar periods, the data on hours worked that is delivered from the LFS to the NA is adapted, the VFAT estimation. Because it is these VFAT estimates that are used in the calculations of the NA of the number of hours worked in the entire economy, there is thus a difference between the published data of the LFS and the data that is delivered to the NA even before any processing is done in the national accounts.

In the estimates of NA of employed persons in the entire economy, rates of change from the LFS are also used. These rates are based on the measurement month and not on the calendar month. Thus, another reference period is used than what would be ideal for the national accounts as a starting point for the development of the economy regarding the number of employed persons.

This means that the NA's estimates that are based on the LFS sometimes refer to the measurement month and sometimes to the calendar month.

Untaxed work

Both the LFS and the NA are to report the untaxed time worked. The NA makes an assumption that all untaxed hours are not captured in the LFS, and a supplement is made for untaxed hours worked based on other information.

Differences in statistical units

To present the production processes for input-output analysis, **local business units** in the NA are divided into industries by type of operations. Operations are characterised by an input of products, a production process and production of products. Therefore, persons in the NA are classified to local business units based on the main occupations that the persons have. The sector breakdown in the NA is based on the operational unit and industrial classification based on the local business unit. The LFS codes persons according to **workplace units** and the person receives the industrial classification and sector breakdown via the workplace unit. Coding of the person in the LFS is partly done via the Statement of earnings register, but is also based on information from the Business Register.

The statistics are presented by institutional sector in both the LFS and the NA. However, limited companies that are classified in the Business Register in the public sector are transferred to the private sector in the LFS, according to an agreement at Statistics Sweden from 2000. The presentation in the NA of labour input is done completely according to the functional classification. In the NA, the economy can be divided up on an aggregated level into the business sector, government agencies and households' non-profit organisations. Because the presentation of the LFS is by institutional sector while the presentation of the NA is by functional unit, the statistics are not completely comparable.

5.2.   Summary of the differences

The National Accounts only use the LFS for selected parts that are described in chapter 4 of this report. The LFS is mainly used for calculations of the entire economy. In the quarterly calculations, the development for the entire economy in the LFS is used to project the level of hours worked and the number of employed persons in the NA. The annual calculations use the level to estimate the development for the entire economy excluding untaxed input and labour input for foreign employees who work at domestic institutional units. This can be described in the following table:

Table 3a Employed persons

Published estimates LFS
(-) Employed working in another country
Estimate delivered from LFS to NA
(+) Foreign labour force who work in Swedish territory
Published estimate NA

Table 3b Hours worked

Published estimates LFS
(-) Employed working in another country
(±) Reference period adjustment
Estimate delivered from LFS to NA
(+) Untaxed work
(+) Foreign labour force who work in Swedish territory
(±) Conscripts
Published estimate NA

For detailed sectors and calculations of industries, the LFS is usually used with other sources, which is best described as mixed models. As a result, there are differences between the LFS and NA for estimates of industries and sectors.

5.3.   Example

To illustrate how estimates are changed in relation to the above reconciliation tables, the tables below are presented concerning the first quarter of 2013 and the annual estimate for 2013 for the LFS and the NA.

Quarter 1 2013

The tables below illustrate how the LFS adapts estimates of the number of employed persons and the number of hours worked to better harmonise with the definitions of the NA. The NA uses the development from the corresponding quarter of the previous year to estimate the number of employed persons and the hours worked for the current period, based on previous estimates.

Table 3c Employed persons according to the LFS and the NA, thousands

	Quarter 1 2013	Quarter 1 2012	Development, percent
Published estimates LFS	4608.5	4570.5	
Employed working in another country	49.8	45.9	
Estimate delivered from LFS to NA	4558.7	4524.6	0.8
Published estimate NA	4639.6	4604.8	0.8

Table 3d Hours worked according to the LFS and the NA, millions

	Quarter 1 2013	Quarter 1 2012	Development, percent
Published estimate LFS - average per week	**142.9**	**147.3**	
Published estimate LFS * number of weeks	1857.7	1914.9	
VFAT total	1876.0	1935.6	
Hours worked abroad VFAT	19.6	20.6	
VFAT to NA	**1856.3**	**1914.9**	**-3.1**
Published estimate NA	**1904.4**	**1964.6**	**-3.1**

Annual estimate 2013

Regarding the annual estimate in the NA for the entire economy, the LFS estimate is used to a greater extent than for the quarterly estimate. In the tables below you can see the adjustments the LFS does to the estimates so that they follow the NA definitions to a greater extent, as well as the adjustments the NA itself makes using assumptions etc.

Table 3e Employed persons according to the LFS and the NA, thousands

	2013
Published estimates LFS	**4704.4**
Employed working in another country	51.4
Estimate delivered from LFS to NA	**4653.3**
Foreign labour force who work in Swedish territory	18.9
Rounding	0.2
Published estimate NA	**4672.0**

Table 3f Hours worked according to the LFS and the NA, millions

	2013
Published estimate LFS - average per week	**141.4**
Published estimate LFS * number of weeks	7352.8
VFAT total	7444.7
Hours worked abroad VFAT	83.0
VFAT to NA	**7361.7**
Untaxed work	124.1
Foreign labour force who work in Swedish territory	30.5
Rounding	0.2
Published estimate NA	**7515.6**

Appendices

1. The LFS questionnaire

Only the questions that are used for the deduction of variables are presented here. Reference to questions that are not needed for deduction is therefore not presented here. The symbol "➔" without reference to a specific question thus means that the respondent is forwarded to another part of the questionnaire with this answer alternative. The complete questionnaire is available on Statistics Sweden's website: http://www.scb.se/Statistik/AM/AM0401/_dokument/Nyklassblankett.pdf.

Employed persons

The classification of employed persons are based on questions Ak1-Ak5.

Ak1 Did you work at all during that week? We are interested in all work, even if the work was only for a few hours.
1 Yes ➔
2 No

AK2 Did you have any employment that you were absent from??
1 Yes ➔
2 No

AK3 Did you work without pay at any company or farm?
1 Yes ➔Ak5
2 No

AK4 Were you absent from any such job?
1 Yes
2 No ➔

Ak 5 Is that company/farm run by someone in your household?
1 Yes ➔
2 No ➔

Employed persons consist of persons at work and employed persons who are absent for the entire reference week. To be classified as being at work, a person must answer yes to question Ak1, or answered yes to both questions Ak3 and Ak5. To be an employed person absent the entire reference week, the person must answer yes to question Ak2 or answer yes to both questions Ak4 and Ak5.

Employees

Employed persons can be broken down into permanent employees, temporary employees, self-employed persons and family workers. Permanent and temporary employees together make up the total number of employees. Question Hu 4a determines whether a person is an employee.

Hu4a Are you employed, self-employed or an unpaid family worker ?
1 Employee ➔Hu7
2 Self-employed, freelancer

3 Unpaid family worker

Questions Hu7 and Hu9 determine the type of employment.

Hu7 Is your employment temporary or permanent?
1 Temporary
2 Permanent employment➔

Hu9 Is your employment on a permanent basis ?
1 Yes
2 No

Persons with permanent employment at their current employment as well as persons with temporary employment who are on temporary leave from a permanent contract are included. Persons who reply that they have permanent employment for question Hu 7 and persons who reply 1 for question Hu7 and then answer 1 for question Hu9 are permanently employed.

Persons who reply that they have temporary employment for question Hu7 and then answer no to question Hu9 are considered as temporarily employed.

Actual number of hours worked

The approach used in the LFS questionnaire concerning hours worked has looked the same since in 2005. The approach has the advantage that actual hours worked is better captured since questions about absenteeism and overtime precede the question regarding how many hours the respondent works during the reference week. The following questions are used to answer how many hours a person actually works during the reference week. Only employees answer these questions while self-employed persons and assisting family members receive other questions.

To estimate the number of hours employees are absent, the following question is used. Only persons who were absent during a part of the week receive this question. For those who were absent all week, the numbers of hours absent is the same as the number of hours usually worked.

1.   Main employment

At3 How many hours were you absent?
……… hours

Questions At 6-10 are asked employees at work during the reference week to study if the respondent had any paid or unpaid overtime.

>   *Full-time*
At6a During <<week number>>, that is <<dates>>, did you work any overtime for which you are entitled compensation in time or money?
>   *Part-time*
At6aa During <<week number>>, that is <<dates>>, did you work any overtime or additional time for which you are entitled compensation in time or money?
>   *Irregular working time*
At6aaa You have no agreed working hours, but did you still have some overtime during <<week number>>, that is <<dates>> for which you are entitled compensation?
>   *Standard compensation that is not calculated by the hour should be*
>   *included here. Hours within a flexitime system should not be included*

1 Yes
2 No

AT7 How many hours?
…….. hours

Full-time
At9a During the week, did you have any overtime that you did not receive any compensation for?
Part-time
At9aa During the week, did you have any additional time or overtime that you did not receive any compensation for?
If the person has standard compensation for overtime work, e.g. executive compensation, it should not be included. Hours within a flexitime system should not be included either.

1 Yes
2 No

AT10 How many hours ?
……… hours

Question At13 is used to estimate the number of hours actually worked in the main job during the reference week. The answers to the previous questions are used to assess the plausibility of the answer to this question.

At13a How many hours did you work during that particular week?
If the respondent was studying during working time during the reference week

At13aa How many hours did you work during that particular week? Hours for training should also be included.
…….. hours

If the reference week extends over the turn of the month, another two questions are added to find out how many hours were worked during each month.

At14 That week is at the turn of the month. Did any of your working hours take place on "days of week and date"?
1 Yes
2 No

At15 How many hours did you work on that day/those days (in your main job)?
…….. hours

Fewer questions are used for self-employed persons and assisting family members. However, they are used in the corresponding way.

Fat3a How many hours did you work in that particular week?
If the respondent was studying during working time during the reference week

Fat3aa How many hours did you work during that particular week? Hours for training should also be included.
……… hours

If the reference week is at the turn of the month, questions Fat 4 and Fat 5 are asked to find out how many hours were worked during each calendar month.

FAt4 That week is at the turn of the month. Did any of your working hours take place on "days of week and date"?
1 Yes ➔FAt5
2 No

FAt5 How many hours did you work on that day/those days (in your main job)?
……... hours

2.   Second job

Questions Bi 12 and Bi 13 are used to obtain the number of hours actually worked in the second job(s).

Bi 12 How many hours did you work during the week of <<ref. week>> in your second job (total hours of your other job(s))?
……… hours
In the same way for questions about actually worked time in the main job, another two questions are asked about the reference week that is at the turn of the month.

At the turn of the month

Bi 13 That week is at the turn of the month. Did any of your working hours take place on "days of week and date"?
1 Yes
2 No

Bi 14 How many hours did you work on that day/those days?
……… hours

Self-employed persons

Hu4a Are you employed, self-employed or an unpaid family worker?
     1   Employee
     2   Self-employed
     3   Unpaid family worker
     (No partial non-response allowed)

Sample persons who answer that they are self-employed persons also receive question Hu6.

Hu6 Is your company/enterprise a limited company, trading partnership, limited partnership?
     Corporate form = limited company or trading partnership

     1   Yes
     2   No
     8 Do not know

     9 Do not want to answer

2. Calculations of quarterly and annual estimates in the LFS

Estimation procedure

Data collection is normally completed 14 days after the end of the reference period of the month. Publishing occurs another one to two days afterwards for monthly and, if applicable, quarterly statistics. In connection with the publishing of tables that refer to the month of December as well as the final quarter, annual tables are also published.

Since 1999 the estimation procedure has been based on the GREG estimation[3] (General Regression Estimator). The system was developed with the restriction that there would be no breaks in time series for estimates on the national level. The system was therefore based on two GREG estimators instead of one. From April 2005 onwards, one GREG estimator has been used and estimation was expanded to include the age group 15-74. Beginning January 2010 the supplementary sample has been included [4] in the published results.

Since 1993, auxiliary information from the Total Population Register, the Employment Register and the job-seeker register of the Swedish Public Employment Service have been used in the estimation procedure. Compensation for non-response is done by straight upward adjustment according to the stratification used in the regular LFS sample, this is the case for both the regular and the supplementary sample.

The starting point for the estimation process in the LFS is to estimate totals for a certain time period, a month. Quarterly and annual estimates are based on these monthly totals.

The sample for a given survey month originates from two or three different, independent annual samples. The monthly estimates are obtained by calculating every sub-set of the monthly sample upwards to the known population totals, taking consideration to each inclusion probability of the sample persons.

The estimates from the different yearly samples are then weighted together and the monthly estimates are received. This can be formulated as follows:

Estimates of for example the total number of employees t_y in the month is given by

$$\hat{t}_y = \sum_j c_j \hat{t}_{y_j} \tag{1.1}$$

The variance for $\hat{t}_y$ is estimated with

$$\hat{V}(\hat{t}_y) = \sum_j c_j^2 * \hat{V}(\hat{t}_{y_j}) \tag{1.2}$$

where

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[3] Videll, Frida (2011). Urvals- och estimationsförfarandet i de svenska arbets-kraftsundersökningarna (AKU) 2005- "Bakgrundsfakta till arbetsmarknads- och utbildningsstatistiken 2011:6" http://www.scb.se/statistik/_publikationer/AM0401_2011A01_BR_AM76BR1106.pdf

[4] Videll, Frida (2014) Metod för estimation vid sammanslagning av urval med olika design i arbetskraftsundersökningarna -"Bakgrundsfakta till arbetsmarknads- och utbildningsstatistiken 2014:1": http://www.scb.se/Statistik/_Publikationer/AM0401_2014M01_BR_AM76BR1401.pdf

c_j is a constant of which the appearance was changed due to the supplementary sample that was added in January 2010. From April 2005 up to December 2009, c_j was a constant that gave the share of the entire monthly sample that came from the annual sample j, that is (number from the annual sample j in the monthly sample) / (the number in the entire monthly sample).

From January 2010, c_j is a constant that weighs together the annual samples as well as the regular sample and the supplementary sample.

$\hat{t}_{y_j}$ = Estimate of a total based on the part of a monthly sample that is from the yearly sample j.[5]

Calculations of weights and variance regarding level estimates (month), are done with the CLAN program package.

The auxiliary vector $\mathbf{x}_k$ corresponds to the variable value for *aux_ald, aux_lan, aux_fodland, aux_sni och aux_ams* for the individual *k*. These variables are categorical and indicate the group affiliation of the individual. This means that $\mathbf{x}_k=(x_1, x_2,\ldots, x_{26}; x_{27}, x_{28},\ldots, x_{52}; x_{53}, x_{54},\ldots, x_{56}; x_{57}, x_{58},\ldots, x_{64}; x_{65}, x_{66})'$ is a vector with 26+26+4+8+2=66 elements, where the first 26 elements, x_1- x_{26}, give the individual's group affiliation according to the grouping from *aux_ald* while the last 2 elements, x_{65}- x_{66} give the individual's group affiliation according to *aux_ams*. The $\mathbf{x}_k$ vector thus consists of 61 elements with the value 0 and five elements with the value 1. The first number 1 gives the group affiliation of the indivdual in *aux_ald* while the second number 1 gives the group affiliation in *aux_lan*.

The $\mathbf{t}_x$ variable includes population totals for the categories that are defined by *aux_ald, aux_lan, aux_fodland, aux_sni* and *aux_ams*.

$\mathbf{t}_x=(N_1, N_2,\ldots, N_{26}; N_{27}, N_{28},\ldots, N_{52}; N_{53}, N_{54},\ldots, N_{56}; N_{57}, N_{58},\ldots, N_{64}; N_{65}, N_{66})'$.

Quarterly and annual estimates
Quarterly estimates are based on the incoming months (estimates) in the quarter. The level estimates for a certain year ($\hat{t}_y$) are correspondingly based on the incoming monthly estimates of the year. The calculations are based on the number of measurement weeks in each of the incoming months during the period. The months with five measurement weeks are given a higher weight than the months with four measurement weeks.

For example, January and February always have four measurement weeks while March consists of five measurement weeks. The contribution to the quarterly

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[5] I Mirza, Hassan & Hörngren, Jan (2001). Urvals- och estimationsförfarandet i de svenska arbetskraftsundersökningarna. "Bakgrundsfakta till arbetsmarknads- och utbildningsstatistiken 2001:5" gives a detailed description of among other things how estimation is done for the period 1999 - March 2005.

I Videll, Frida (2011). Urvals- och estimationsförfarandet i de svenska arbets-kraftsundersökningarna (AKU) 2005- "Bakgrundsfakta till arbetsmarknads- och utbildningsstatistiken 2011:6" gives a detailed description of the sample and estimation processes from 2005 onwards.

estimates will thus be 4/13 for January and February, while the contribution for March will be 5/13. The calculation is based on estimates of the population adjusted upwards for each month. The calculations are described in more detail below.

Quarterly level estimates

Since January 1993 the LFS surveys all weeks of the year. Each survey month includes four or five measurement weeks. This implicates that the monthly sample is normally[6] broken down into four measurement weeks during the first two months of each quarter and into five weeks during the third month.

The system for measuring the weeks means that the quarterly estimates are calculated so that the months are proportionately weighted with the number of measurement weeks in each month. The estimates for quarter ($\hat{t}_q$) in a normal year are calculated [7] as follows:

$$\hat{t}_q = \frac{4}{13}\left(\hat{t}_j + \hat{t}_{j+1}\right) + \frac{5}{13}\hat{t}_{j+2},$$ (1.3)

$$q = 1, 2, 3, 4 \quad och \quad j = 1, 4, 7, 10$$

The quarterly estimates include three independent monthly samples and an estimate for the variance can be written:

$$\hat{V}(\hat{t}_q) = \hat{V}\left[\frac{4}{13}\left(\hat{t}_j + \hat{t}_{j+1}\right) + \frac{5}{13}\hat{t}_{j+2}\right]$$ (1.4)

By using the approximation that the approximate variance estimation for a level estimate regarding months is set at an equal level for all months, [8] variance estimation is calculated as follows:

$$\hat{V}(\hat{t}_q) = \frac{16}{169}\left[2\hat{V}(\hat{t}_j)\right] + \frac{25}{169}\hat{V}(\hat{t}_j) \approx 0.337\hat{V}(\hat{t}_j) \approx \frac{\hat{V}(\hat{t}_j)}{3}$$ (1.5)

Yearly level estimates

The level estimates for a certain year ($\hat{t}_y$) are correspondingly based on the incoming monthly estimates of the year. The 12 monthly estimates are weighed together proportionally with the number of measurement weeks in each monthly estimate and ($\hat{t}_y$) is obtained. Level estimates for a normal year, with 52 weeks, is thus given as:

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[6] During certain years an extra measurement year is added to compensate for the years that consist of 53 weeks.

[7] See Mirza (1995) for a detailed description.

[8] $\hat{V}(\hat{t}_j) = \hat{V}(\hat{t}_{j-1}) = \hat{V}(\hat{t}_{j-2}) = \hat{V}(\hat{t}_{j-3}) = \hat{V}(\hat{t}_{j-4}) = \hat{V}(\hat{t}_{j-5}) = \hat{V}(\hat{t}_{j-6}) = \hat{V}(\hat{t}_{j-7}) = \hat{V}(\hat{t}_{j-8}) = \hat{V}(\hat{t}_{j-9}) = \hat{V}(\hat{t}_{j-10}) = \hat{V}(\hat{t}_{j-11}) = \hat{V}(\hat{t}_{j-12})$

$$\hat{t}_y = \frac{4}{52}\left(\hat{t}_j + \hat{t}_{j+1} + \hat{t}_{j+3} + \hat{t}_{j+4} + \hat{t}_{j+6} + \hat{t}_{j+7} + \hat{t}_{j+9} + \hat{t}_{j+10}\right)$$
$$+ \frac{5}{52}\left(\hat{t}_{j+2} + \hat{t}_{j+5} + \hat{t}_{j+8} + \hat{t}_{j+11}\right)$$
(1.6)

$$\hat{V}(\hat{t}_y) = \hat{V}\left[\begin{array}{l} \frac{4}{52}\left(\hat{t}_j + \hat{t}_{j+1} + \hat{t}_{j+3} + \hat{t}_{j+4} + \hat{t}_{j+6} + \hat{t}_{j+7} + \hat{t}_{j+9} + \hat{t}_{j+10}\right) \\ + \frac{5}{52}\left(\hat{t}_{j+2} + \hat{t}_{j+5} + \hat{t}_{j+8} + \hat{t}_{j+11}\right) \end{array}\right]$$
(1.7)

Can be approximated as

$$\hat{V}(\hat{t}_y) = \hat{V}\left(\frac{\hat{t}_j + \hat{t}_{j+1} + \hat{t}_{j+2} + \ldots\ldots + \hat{t}_{j+11}}{12}\right)$$
(1.8)

Three different types of correlations occur for level estimates for the year:

- *common individuals in a three month perspective.*

- *common individuals in a six month perspective.*

- *common individuals in a nine month perspective.*

According to the approximation concerning λ[9] and $\hat{\rho}$[10] that these are "constants" that only vary with the distance between two survey rounds, an estimation for variance can be written as:

$$\hat{V}(\hat{t}_y) = \hat{V}\left(\frac{\hat{t}_j + \hat{t}_{j+1} + \hat{t}_{j+2} + \ldots\ldots + \hat{t}_{j+11}}{12}\right) =$$
$$\frac{12 \cdot \hat{V}(\hat{t}_j) + 2 \cdot \left[9 \cdot \hat{C}(\hat{t}_j, \hat{t}_{j+3}) + 6 \cdot \hat{C}(\hat{t}_j, \hat{t}_{j+6}) + 3 \cdot \hat{C}(\hat{t}_j, \hat{t}_{j+9})\right]}{144} =$$
$$\frac{\hat{V}(\hat{t}_j) \cdot \left(6 + 9 \cdot \lambda_{j,j+3} \cdot \rho_{j,j+3} + 6 \cdot \lambda_{j,j+6} \cdot \rho_{j,j+6} + 3 \cdot \lambda_{j,j+9} \cdot \rho_{j,j+9}\right)}{72}$$
(1.9)

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[9] The number of common individuals who answered the survey at two points in time

[10] An estimation of the correlation for *t* between two points in time.

3. Institutional units and their sub-components

Institutional units are economic units that can own goods and assets, put themselves into debt and run economic operations and make transactions with other units on their own account. In the system, institutional units are divided into five mutually exclusive domestic institutional sectors, namely, non-financial corporations, financial corporations, public administration, households and households' non-profit organisations. Together, these five sectors form the total domestic economy. Foreign units can cooperate with these five domestic sectors, and this cooperation is shown between the domestic sectors and a sixth sector - other countries.

When institutional units have more than one activity, they are broken down to type of operations. This breakdown is done in so-called "local operational units". A local operational unit includes all parts of an institutional unit, in the form of a producer, that is situated in only one **place** or **at** several neighbouring places and that contribute to operations according to the five-digit level (detail groups) in the NACE industrial nomenclature. All operational units that conduct the same type of activities or similar activities form an industry. An institutional unit includes one or several local operational units, while a local operational unit belongs to only one institutional unit. For each local operational unit, the information system of the institutional unit must be able to give or at least calculate the production value, intermediate consumption, compensation to employees, operational surplus, employment (for hours worked) and gross fixed capital formation.

An industry consists of a group of local operational units that conduct the same or similar types of operations. Industries consist of both local operational units that produce goods and services for the market and local operational units that produce goods and services that are not intended for the market.

4. Quarterly estimates of the NA, detailed sector

Calculation of the general goverment

Number of employed persons

The number of employed persons for **the general government** is calculated by using information about employment development from the short-term wage statistics. Employment development is used to project employment levels of previous years. Projection is made on the lowest calculation level (central government, municipality and county council). The totals for the general government is obtained by adding the subsectors together.

Hours worked

The method that is used today for calculating hours worked in the National Accounts is called the *mixed method.* As the name implies, the mixed method uses data from different sources to calculate hours worked. The employment development from the short-term wage statistics is multiplied by the development of the average working time from the LFS that is based on the number of hours worked according to VFAT (calendar month) and the number of employed persons in Sweden from the LFS (measurement month). The assumption is made that the difference in the reference period in the numerator and the denominator does not have any particular significance for the number of employed persons. By using this calculation, the development of hours worked is obtained, which is then multiplied by the level of the previous year and the hours worked for the corresponding quarter. In terms of a formula, this can be described in the following way:

(i) $ArbTim_{NA, T} = \Delta Syss_{KL} * (\Delta ArbTim_{LFS} / \Delta Syss_{LFS}) * ArbTim_{NA, T-1}$

Up until and including 2014, this calculation was made at the lowest calculation level (central government, municipality and county council municipalities) within government agencies. It was also used to obtain the total of the sub-sectors of the government agencies. As of 2015, the mixed method was used to calculate the total number of government agencies first and then calculate the sub-sectors separately. To calculate hours worked for the sub-sectors, the development of hours worked from the short-term wage statistics is used to project the level of hours worked for previous years. Then the projected levels are calibrated so that they are added up to the total number of government agencies. This is done by calibration of the levels.

Calculation of the business sector and other parts of the economy

Number of employees

Introduction

The calculation of the other parts of the economy can be broken down into four areas: employees in the business sector, self-employed persons in the business sector, market producers in government administration and households' non-profit organisations. The calculation for these four parts is made using 68 industrial groups. The 68 industrial groups are on the level that is conducted in the national accounts.

Step 1 Uncalibrated calculation

The first step is to calculate uncalibrated information about employment for employees in the business sector, self-employed persons in the business sector, households' non-profit organisations and market production in the public sector.

For **employees in the business sector**, *development* of the number of employees per industry from the short-term wage statistics [11] is used to project the previous year's *level* of the number of employed persons in the national accounts. For agriculture, forestry and fishing (NACE 01-03) development from the number of employed persons in private service plus self-employed persons in limited companies from the LFS are used. For SNI 49-51, 62-63, 69-70 and 78-82 the development of number of employees according to KLP is used. For gainful employment and production in households (NACE 97-98) the development of value added in constant prices is used as a proxy for employment development.

Self-employed persons are not defined in the same way in the LFS as in the NA. In the national accounts, self-employed persons in limited companies are counted as employees. Self-employed persons in limited companies receive part of their economic compensation in the form of wages and not only dividends, and are thus classified as employed persons. Therefore the LFS first makes an adjustment of the published information of the LFS about self-employed persons and helpers to create an estimation of the definition of the NA for self-employed persons. Then, *development* of self-employed persons is used according to the NA's definition per industry to project the *level* of the previous year of employed persons in the national accounts.

For **Households' non-profit organisations,** employment development is calculated by using information from KS concering HIO. Currently all branches of industry are projected using the same development.

For **public market production,** the number of employed persons is used from the most recent annual calculation.

<u>Step 2 Calibration</u>

The calculated values according to step 1 above are added together with the calculated values of the number of employed persons for government agencies. This is the uncalibrated estimate of the number of employed persons for the entire economy. This estimate will differ from the estimate calculated for the entire economy in section 4.3. This difference in the number of employed persons is broken down by industry in the uncalibrated calculation of the number of employed persons in the business sector. On the aggregated level, we can thus say that the number of employed persons in the business sector is calculated residually.

Hours worked

<u>Step 1 </u>Uncalibrated calculation

The first step was to calculate uncalibrated information about employment for employees in the business sector, self-employed persons in the business sector, households' non-profit organisations and market production in the public sector.

For **employees in the business sector,** the *development* of employees per industry from national accounts is multiplied by the development of the average working

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[11] scb.se; Short-term employment statistics; Production of the statistics;

time from the short-term wage statistics [12] project the previous year's *level* of hours worked in the national accounts. Agriculture, forestry and fishing (NACE 01-03) uses the development of hours worked from the employees in individual service plus limited companies for self-employed persons. For gainful employment and production in households (NACE 97-98) the development of value added in constant prices is used as a proxy for employment development.

For **self-employed persons**, the LFS estimates for the *development* of hours worked of self-employed persons, according to the NA's definition of self-employed persons per industry to project the *level* of previous years of hours worked in the national accounts. As previously mentioned, the definition of self-employed persons in the NA differs with the definition that is used in the LFS.

For **households' non-profit organisations**, development of hours worked is calculated by using the development of value added in HIO. Currently all branches of industry are projected using the same development.

For **public market production**, hours worked for the current quarter is used from the most recent annual calculations. A separate calculation is only made in the annual calculations.

Step 2 Calibration

The calculated values according to step 1 above are added together with the calculated values of the number of hours worked for government agencies. This estimate will differ from the estimate calculated for the entire economy in section 4.3. This difference is broken down proportionally (by hours worked) in the uncalibrated calculation of the hours worked of employed persons in the business sector.

No special calculation of untaxed working hours is done on a quarterly basis. These hours are assumed to develop in the same way as "taxed" hours. Because untaxed working hours are included in the level for annual calculations, they are projected together with the development of taxed hours.

Reconciliation and automatic stabilisers

The development of the number of self-employed by branch of industry according to the LFS are uncertain. Therefore, in the calculations of the number of employed persons and hours worked the NA uses automatic stabilisers. The cut-off values for these stabilisers are a development of +/- 20 percent for the number of employed persons and +/- 35 percent for hours worked. For industries where the development will exceed these values, the value will be set at the cut-off value.

For employees there is a stabiliser that regulates the number of employed and the number of hours worked by only allowing the key figures of salary per employee and salary per hour vary between 0 and 10 percent. This is due to the fact that the information on salaries can be assumed to be very certain and that large changes in salary per employee and salary per hour are assumed to be unreasonable in the short term.

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[12] scb.se; Short-term statistics, salaries in the private sector; Production of the statistics;

In addition, the editing work can also lead to corrections of individual results on
the industry level.

5.　Annual estimates of the NA, detailed sector

Calculation of government agencies

Number of employed persons

The calculation of the number of employed persons in the NA for government agencies differs somewhat between years and quarters. The difference is that the source for the development of employment is changed from being the short-term wage statistics to being the short-term wage statistics for municipalities and county councils. However, the short-term wage statistics in the central government are still used because they have been assessed to be of better quality than the structural statistics. Furthermore, the levels for the number of employed persons in the annual calculations, which is not the case for the quarterly calculations. Table 2 gives a simple overview on how the sources are exchanged.

Table 2 Source for development of employment

Sector	Quarter	Year
Central government	Statistics on wages and salaries, central government(KLS). Plus a number of companies such as Chalmers University of Technology, the Royal Opera.	Statistics on wages and salaries, central government (KLS). Plus a number of companies such as Chalmers University of Technology, the Royal Opera as well as higher education institutes.
Primary municipality	Statistics on wages and salaries, municipality (KLK)	Short-term statistics Municipality (SLK). Plus a number of companies
County councils	Statistics on wages and salaries, county council (KLL) Plus hospital companies.	Swedish Association of Local Authorities and Regions (SKL). Plus hospital companies.

The level of employment is calculated by sub-sector (central government, municipality and county council) with sources according to table 2. The totals for government agencies are obtained by adding the subsectors together.

Hours worked

The yearly and quarterly calculation of hours worked differs on two points. In the annual calculations levels are used instead of the development. Furthermore the source for the number of employed for primary municipalities and county councils is changed according to table 2 above. In both the yearly and quarterly calculations hours worked are based on KL (since the structural statistics do not contain this information).

As of 2015, the mixed method has been used to calculate the total number of government agencies first and then calculate the sub-sectors separately. To calculate hours worked for the sub-sectors, the development of hours worked from the short-term wage statistics is used to project the level of hours worked for previous years. Then the projected levels are calibrated so that they are added up to the total number of government agencies.

Calculation of the business sector and other parts of the economy

Number of employees

The level of the number of employed **self-employed persons** in the business sector is taken from the LFS. As previously mentioned, **self-employed persons** are not defined in the same way in the LFS as in the NA. The national accounts consider self-employed persons in limited companies as employees. These are therefore subtracted in the first step. The number of self-employed persons by industry is taken from the register-based labour market statistics (RAMS)[13]. The structure from Rams is calibrated with the level value from the LFS.

For **households' non-profit organisations**, employment development is calculated by multiplying the employment development according to NA by the average working time from the LFS for industry NACE 94.

Employment for the **public market production** is calculated by using the total wages. Currently, public market production is only from the municipalities. The level of the number of employed persons from previously is projected by using the development of total wages for the public market production in municipalities, adjusted for wage development for municipalities in the current year.

On an aggregated level, the number of **employees in the business sector** is calculated residually by subtracting all the sub-calculations (self-employed persons, government agencies, households' non-profit organisations and public market production) from the total number of employed persons for the entire economy. To calculate the sub-sectors of industries, the development of the average number of employees (full-time equivalents) is used from the Structural Business Statistics[14] to project the NA's levels of employment from previous years. The calculations of the sub-sectors are then calibrated so that the total is the same as the total that was residually calculated. For Financial and insurance activities (NACE 64-66), the development of employees in individual services plus self-employed persons in limited companies from the LFS is used instead of information from Structural Business Statistics.

Hours worked

Information about hours worked for the level for **self-employed persons** is taken from the LFS. Hours worked for **self-employed persons** on the industrial level is calculated by multiplying the number of self-employed persons per industry according to 2.3.3.1 with the average working time for self-employed persons by industry, according to the LFS. Then the industrial estimates are calibrated with the level from the LFS.

Hours worked for **Households' non-profit organisations** are calculated by multiplying the employment development according to NA by the average working time from the LFS for industry NACE 94.

Hours worked for **public market production** is calculated by multiplying the number of employed persons by the average working time for municipalities, according to the NA for the current reference year.

The number of hours worked for **employees in the business sector** on an aggregated level is calculated residually by subtracting all the sub-calculations

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[13] scb.se; Labour statistics based on administrative registers (RAMS); Production of the statistics;

[14] scb.se; Structural Business Statistics; Production of the statistics;

(self-employed persons, government agencies, households' non-profit organisations and public market production) by the total number of hours worked for the entire economy. The hours worked for the sub-sectors is calculated by dividing the total wages according to the NA (calculated by the Statement of Earnings Register LSUM[15]) with the hourly wage according to the short-term wage statistics[16]. By using the annual value of the previous year, a development figure is used to project the level of the previous year's hours worked of the NA. The final step is to calculate the hours worked with the residually calculated aggregate.

[15] scb.se; Wagesum statictics (LSUM); Production of the statistics;

[16] scb.se; Short-term statistics, salaries in the private sector; Production of the statistics;