

Eurostat/OECD 2018 questionnaire on the methodology underlying labour input data in national accounts

Country: Denmark

Date: April 2018

Part I: Methods

1. Employment in persons

Question 1.1: Please describe the architecture of your estimation method for employment in persons. Please include details of differences in methods and data sources that may exist at different points in the time series (e.g. a break in the series) or due to the timing of the estimate (e.g. flash estimate, regular estimate or annual data). Please also provide links to articles that may be relevant.

Derived from administrative data (monthly tax data) on reported income. For more information, please look at the documentation of employment, compensation of employees and hours worked through the following link.

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/employment--compensation-of-employees-and-hours-worked>

From 2008 we are using monthly tax data as source data. The new source data is a substantial improvement of quality. Besides minor adjustments for informal economy the source data covers the total population of employees.

Question 1.2: What is the main original source for employment in the national accounts (e.g. administrative source, labour force survey, business survey, other)? Briefly describe this source, its coverage (including over time, range of businesses/households covered, etc.), its availability and whether it is in terms of jobs and/or persons.

Working times accounts (administrative data). For more information, please look at the documentation of the annual and quarterly working time accounts through the following links.

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/the-annual-and-quarterly-working-time-accounts>

Please also look at the analysis made about Danish working time. [Concepts in the WTA](#)

<https://www.dst.dk/en/Statistik/emner/arbejde-indkomst-og-formue/beskaeftigelse/arbejdstidsregnskab>

Working times accounts is the main source data for employment, compensation of employees and hours worked for national accounts.

Please specify the sources used for different parts of employment (in particular if sources differ between employees and self-employed, and/or between industries, firms of different size, etc.). If sources differ, please provide a clear distinction when answering the questions that follow.

Adjustments are made between industries to create consistency with the rest of the national accounts.

Question 1.3: Please describe how estimates of annual figures based on higher frequency data (e.g. weekly, monthly, quarterly) are derived. Please also specify, if relevant, how annual figures are derived if survey information is less periodic (e.g. every 5 years)?

The national accounts are consistent, i.e. the quarters sum the annual. The compilation of the final annual employment and wages (2014) is a full benchmark compilation in level. Previous releases is generally projected with the WTA data.

In the WTA: The starting point for the calculation of the average employment and the average number of jobs is status information on persons employed and the number of jobs each day of the month, according to the Labour Market Accounts (LMA). When the average number of employees, respectively the average number of jobs, in the quarter (year) is calculated, this is done as an average of the 3 months of the quarter (12 months of the year). Actual hours worked and compensation of employees in the quarter (year) is calculated as the sum of hours worked and compensation of employees in the three months of the quarter (12 months of the year).

Question 1.4: Please describe the adjustments made to pass from jobs to the concept of persons (if the original source is in terms of jobs).

Please look at the documentation for WTA

<https://www.dst.dk/ext/arbe/WTAtransitionIS--pdf>

Question 1.5: Please describe the adjustments made to correct for coverage of the economic territory (see ESA §11.17-11.19)? This refers specifically to residents working for non-resident units abroad non-residents working in resident units. If relevant, please also describe adjustments for military (including conscripts, where applicable) and other collective households not covered by your main source.

As described in the Bridge tables.

Our source data includes all employed in Danish institutional units.

WTA: Employed employees, self-employed and assisting spouses of Danish registered enterprises. The population covers persons working in Danish enterprises or on Danish ships. The population of the Danish working time accounts (WTA) are persons affiliated to Danish registered companies, which is consistent

with European system of (national) accounts (ESA2010) boundaries. ESA2010 includes working in resident companies (see ESA 2010 paragraphs 2.04 to 2.11).

The Danish Working Time Account covers, as in the Danish national accounts, the economic territory of the Kingdom of Denmark excluding the Faroe Islands and Greenland, which is in accordance with Commission Regulation (EC) No 109/2005.

Question 1.6: Which adjustments are made for the unobserved economy (e.g. producers that deliberately do not register, individuals providing their labour that are not required to register, illegal workers, etc.)?

In the supply-use table unobserved economy is estimated with a variety of methods both directly and indirectly. Based on those values consistent estimates for employment, hours worked and wages are made to the extent it is economically meaningful to calculate it.

Question 1.7: Which, if any, other adjustments are made (e.g. inclusion of resident workers below the age threshold, prisoners, adjustments made to account for statistical deficiencies in the source data, etc.)?

All age groups are included from the WTA. Regarding prisoners: Only employment outside prison is considered employment in accordance with the definition of labor market statistics. These employment relationships with employers are in all essential respects in accordance with job on a regular basis and are voluntarily concluded by both parties. The reports are already received by Statistics Denmark, similar to other employment conditions.

The so-called employment (/ activation) of prisoners in prison is not considered employment in the sense that labor statistics will define employment:

- It is not a formal connection to an employer in the form of an employment contract,
- it is not a normal employer / employee relationship because the inmates must be employed (and as such not a voluntary agreement), - although much is done to accommodate the wishes of the employees (this latter is an official requirement).
- it is not possible to separate work at a production workshop from therapeutic courses and education,
- no start and finish are reported on the individual working conditions at the production workshops or working hours.

Question 1.8: In cases where Labour Force Survey data have not been used as the main source (even if only for some activities or groups of workers), please explain why. Are LFS data used for adjustments or cross-checking? Are differences monitored?

LFS is considered less precise especially at the detailed level used for example, in the national accounts. In Denmark the administrative registers are very detailed and comprehensive. Also the focus in the LFS is the person. There is less information related to sidelines (and in the LFS only the largest sideline job in the reference week are reported) and the sampling error related to these is greater. Furthermore, industry and sector information is not as precise in LFS as in administrative sources.

The registry-based working hours are based on the administrative payroll systems that are also reported to the Danish Customs and Tax Administration. Because the information is thus linked to both income and

tax payments, they are considered to be relatively high quality. It also means that hours worked are limited to not including illegal activities and unpaid hours of work, which are information that, for natural reasons, is not available in administrative sources. Illegal activities and unpaid hours are information that can only be provided by surveys asking the employed themselves. Thus, this information is subject to both the memory and the willingness of the employed to respond. Also due to sampling errors the information will only be available at a relatively aggregated level.

We use LFS for supplementary information that does not exist in the administrative sources, e.g. information on selfemployed, unpaid overtime and moonlighting. However, when LFS information is used, they are used as ratios as to how much to adjust for – not absolute values.

In relation to the boundaries of jobs for self-employed and assisting spouses problem lies primarily in ensuring that there is enough activity to define a job. The problem here is that there is no comprehensive data on volume measures for self-employed and assisting spouses. To calculate payroll for self-employed and assisting spouses is not possible (since there is no direct link between the vesting period and payment period and the wage concept at all for this group is very difficult to define). The only statistic that provides information on working volume for these groups is the labour force survey (LFS), which is a sample survey where you ask the employed themselves about how many hours they have worked during the reference week. We suspect that there is a tendency, when you ask the employed themselves, that they overstate the number of hours worked. This is especially true for self-employed and assisting spouses. We suspect that this over-reporting is greatest in cases where the work of the self-employed (and the assisting spouse) is the residence of the self-employed since this is to be assumed that the relationship between work and leisure is blurred. It is mainly the case for employment in agriculture etc. and small businesses in the retail trade and hotel business.

Although the calculation of hours worked is based on register-based information on working hours for employees, we cannot correct for the excess reporting of hours worked by self-employed and assisting spouses compared to reports by employees in the LFS. When the Labour Force Surveys (LFS) are used in the Labour Market Accounts (LMA) to adjust for how much more self-employed and assisting spouses work than employees, it is not possible for us to take into account that the self-employed has a tendency to overestimate their hourly information to a greater extent than employees in the LFS. This means that hours worked for this group in the WTA is probably overvalued. However, it is not possible to quantify how much more the self-employed and assisting spouses overestimate their hours worked compared to employees in the LFS.

2. Hours worked

***Question 2.1:* Please describe the architecture of your estimation method for hours worked. Please include details of differences in methods and data sources that may exist at different points in the time series (e.g. a break in the series). Please also provide links to articles that may be relevant.**

Derived from administrative data (monthly tax data) on reported income refined in various integrated statistics [employment for employees, labour marked accounts (LMA), working time accounts (WTA)]. For more information, please look at the documentation of employment, compensation of employees and hours worked through the following link.

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/employment--compensation-of-employees-and-hours-worked>

From 2008 we are using monthly tax data as source data, see documentation:

<https://www.dst.dk/en/Statistik/emner/arbejde-indkomst-og-formue/beskaeftigelse/arbejdstidsregnskab>

The new source data is a substantial improvement of quality.

Besides minor adjustments for informal economy the source data covers the total population of employees.

Question 2.2: What is the main original source for hours worked in the national accounts (e.g. administrative source, Labour Force Survey, Business survey)? Briefly describe this source, its coverage and its ability to reflect the definition of hours worked (see ESA §11.27-11.31). In particular, does it capture a ‘usual’ hours, ‘actual’ hours, or some other concept?

Working times accounts (administrative data). For more information, please look at the documentation of the annual and quarterly working time accounts through the following link.

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/the-annual-and-quarterly-working-time-accounts>

Working times accounts is the main source data for employment, compensation of employees and hours worked for the Danish national accounts.

Please specify the sources used for different parts of the employed population (in particular if sources differ between employees and self-employed, and/or between industries, firms of different size, etc.). If sources differ, please provide a clear distinction when answering the questions that follow.

See: <https://www.dst.dk/ext/arbe/WTAconcepts--pdf>

The Structural Earnings Statistics (SES) are used in the WTA to convert paid hours from the LMA to annual hours worked in the WTA.

In addition, data from the SES are used as auxiliary information to describe the distribution of hours worked over the months of the year in the WTA. Wage statistics are used to identify jobs for hourly wages, which are characterized by not getting paid during absence. Therefore, hourly wage distribution of paid hours throughout the year can for this group of hourly wages represent the distribution of hours worked over the year's months. In addition, studies based on the Labor Force Survey (LFS) show that self-employed and co-operating spouses do not have a significantly different distribution of hours worked throughout the year than employees. On the basis of this information, it is therefore possible to calculate the relative distribution of hours worked compared to paid hours over the year's months for all employees in the WTA. So, even though there is only information about paid hours in the month from e-income (that form the basis for paid hours in the LMA and employment for employees), the WTA can calculate how much this corresponds to in hours worked per. month, based on the knowledge of how the hours worked are distributed in relation to paid hours over the year's months. Paid hours generally have a different distribution over the year's months than the hours worked, because absence is not evenly distributed over the year's months.

Question 2.3: Please describe the adjustments made to transform the original source to adapt it to the concept of working hours as defined in national accounts? Please, describe each adjustment separately. These adjustments might include:

- Accounting for holidays and annual leave
See above
- Accounting for sickness leave
From the LMA only hours from part time leave are included.
- Accounting for strikes and temporary lay-offs
Are accounted for when conversion from paid hours to hours worked (see above description) are carried out broken down by 19 industrial groupings.
- Accounting for paid but unreported overtime
Not accounted for
- Accounting for unpaid overtime
Estimated with information from LFS.

Question 2.4: Is a specific adjustment made to account for under- or over-reporting in the source data? Please specify if these adjustments are made for employees and/or self-employed workers.

See Q1.8.

Question 2.5: If an adjustment is made for the number of persons employed in relation to the unobserved economy, what assumption is made regarding the hours worked by these persons?

See Q1.6. Generally economic estimates used to calculate concurrent hours worked. Based on evaluation hours worked are in some cases used to calculate employment. In most cases it is assumed that informal hours worked are done by people with other primary jobs.

Question 2.6: Which other adjustments, if any, are made?

No other adjustments are not made.

Question 2.7: If necessary, please describe any additional calculations needed to derive total hours worked and average hours worked from the sources and adjustments specified above. This includes, but is not limited to, adjustments made to align the coverage of hours worked with that of employment in persons (i.e. the coverage produced by the process followed in section 1).

Apart from specific adjustments (like Q2.5) hours worked and employment are calculated in an integrated system.

Part II: Other work in this area

3. Differences between national accounts and Labour Force Survey estimates

Question 3.1: To what extent do you consider your Labour Force Survey an accurate tool for the measurement of employment and hours worked? Please describe any issues or shortcomings of which you may be aware.

See Q1.8. and Q3.2.1.

Question 3.2: If the Labour Force Survey is not the primary source of data used to derive your estimates of employment in persons hours worked: Are you able to quantify, even approximately, what the difference would be between your current national accounts estimates and those you would obtain if you did use the Labour Force Survey data as your primary source?

Total employment: Overall level higher in NA. Higher level of employees in NA, but lower level on self-employed in NA. Quite large differences between sectors.

Number of hours worked: Higher level of hours worked in the LFS - approximately 4 percent than WTA.

The following are tables and show the employment and hours worked for different sources, namely WTA, NA and LFS.

Calculation of total hours worked on the basis of LFS.

	Av. Employment (Av. No. Job1)	Av. No. Job2.	ACT_Week_Hour_job1	ACT_Week_ Hour_job2	Total Hours
LFS					
Employees	2.436.198	150.494	29,30	7,40	3.769.103.663
Self-employed ¹	236.025	54.552	39,51	9,97	513.151.819
Total	2.672.223	205.046			4.282.255.482

Anm.:LFS age 15-74. Deviates from <http://www.statistikbanken.dk/aku203>. Also LFS only publish average actual hours worked (age 15-64) in main job (0-97 hours), see <http://www.statbank.dk/AKU502>.

¹ Including assisting spouses

Difference between NA, WTA and LFS. 2014.

	Av. Employment		Actual hours worked	
	No.	Pct. diff. to NA..	No.	Pct. diff. to NA....
National Accounts				
Employees	2.610.662		3.631.759.000	
Self-employed	179.850		313.487.000	
Total	2.790.512		3.945.246.000	
Working Time Accounts				
Employees	2.556.876	0,0	3.399.790.000	0,1
Self-employed	198.064	-0,1	347.591.000	-0,1
Total	2.754.940	0,0	3.747.381.000	0,1

Labour Force**Survey**

Employees	2.436.198	6,7	3.769.103.663	-3,8
Self-employed	236.025	-31,2	513.151.819	-63,7
Total	2.672.223	4,2	4.282.255.482	-8,5

Anm.: Actual hours worked in the WTA (and therefore the NA) are carried out administrative sources. Here the data are job-level information on paid hours of work, that are transformed to actual hours of work at a more aggregated level (reference year, 8 industrial levels, Sex, 6 sector groups and a breakdown on top manager/manager but not top/not manager). Individual job level information include start and end of job information. Therefore average actual hours of work per job or per week is not possible. Also, in administrative sources, there is a difference between the number of persons and jobs and the published average number of persons and average number of jobs. The difference is greater the more jobmobility there is in a given group.

Question 3.2.1: Where differences between these estimates exist, can you provide a brief assessment of the source of these differences?

NA makes some corrections for unobserved economy in selected industries. In the LFS the extent to which moonlighting is included are up to the individual respondent. LFS has a few ad hoc modules designed to illuminate the extent of moonlighting with specific questions.

NA makes some adjustments between industries regarding information on wage and employment to harmonize the National Accounts with the accounting and production statistics.

LFS covers employed living in Denmark ("night population"). National Accounts covers people working in the economic territory of Denmark ("day population").

We suspect overreporting of hours worked by the employed respondents in the LFS. Also, in survey-based statements, where they ask the employed themselves how many hours they work, the result is subject to memory, willingness to answer and random sampling.

LFS include only integer numbers (not decimals) when answering weekly hours worked.

Not all sideline jobs are included in the LFS.

The influence from job mobility (change of job during the reference week) are not clear, and likely subject to differences between respondents.

4. Flash estimates of employment in persons

Question 4.1: Are you currently producing flash estimates of employment (t+30 or t+45)? If so, please describe briefly the methodology, coverage and sources. If you are not producing a flash estimate, do you have plans to start doing so in the future?

Yes we are currently developing flash estimates for employment (t+30 and t+45). Results are reported to an Eurostat Task Force, but we are not publishing the data. We use administrative monthly data and forecast the last month in the quarter using an ARIMA model.

Question 4.2: Please provide information on the quality of the estimates (e.g. revision analysis).

Not done yet. Will be part of developing process.

5. Other data produced (Optional)

Question 5.1: Do you have plans in the near future to improve or expand the content of national accounts labour input data (e.g. improved alignment with national accounts concepts, extension of the time series, increased industry detail, etc.)?

Question 5.2: Do you produce labour input data other than that already discussed, for example quality adjusted labour input or labour input in terms of full-time equivalents? If so, please provide details and/or links to these data. See Q5.3

Question 5.3: Do you produce productivity statistics (e.g. labour productivity for the total economy, further breakdowns of labour productivity, capital productivity, multi-factor productivity, etc.)? If so, please provide details and/or links with regards to these data.

Yes we produce productivity statistics. Please look at the documentation for more information.

<https://www.dst.dk/en/Statistik/dokumentation/documentationofstatistics/productivity>

Question 5.4: If there is any other work that you produce currently, or are looking to produce in the future, in the areas of labour input or productivity, please use the space below to inform us about this work.