

**Documentation of statistics for  
The Annual and Quarterly Working Time Accounts 2017  
Quarter 2**

## 1 Introduction

The primary purpose of the Danish working time accounts (WTA) is to compile time series on hours worked and calculate wage and employment data for the national accounts. The current time series goes back to 2008. Earlier versions of the WTA include data back to 1995, but since both populations, sources, methods and systems are different, the previous series are not comparable to the current series.

## 2 Statistical presentation

The statistics include data on employment, number of jobs, hours worked and compensation of employees broken down by sex, industry, sectors and socioeconomic status (self-employed, assisting spouses or employees). The data basis is made up by a number of existing statistical data, which are adapted and adjusted to achieve coherence of the concepts and definitions used in the Danish working time accounts system, the primary data source being the Labour Market Accounts.

### 2.1 Data description

The Danish Working Time Accounts (WTA) produce integrated statistics with consistent time series on employment, jobs, number of hours worked and compensation of employees on an annual and quarterly basis.

The WTA transmit quarterly data to the Eurostat short term business statistics (STS). The variables transmitted to STS are: - Number of Persons Employed (Variable 210) - Hours Worked (Variable 220): Paid hours worked in the jobs. - Gross Wages and Salaries (Variable 230)

An employed person can have one or more jobs. A job is defined as a person connected to a workplace (establishment). In each job the person performs a number of hours worked and receives as compensation a salary measured in DKK.

The WTA is not calculated at the level of individual jobs. Data in WTA are aggregated, where the number of hours worked, compensation of employees, the average number of jobs and the average employment are summed to industry level (6 digit DB), sector, socioeconomic status (3 groups), sex (2 groups), and scope of work (5 groups). From this level data are summarized for publication level (including various types of industrial aggregates).

### 2.2 Classification system

[Danish Industrial Classification \(DB07\)](#) (compatible to NACE) is used for classifying workplaces according to their main activity. NACE aggregates are used in international reports. Also, the WTA are broken down on [national accounts industry groupings](#).

The workplace sector is determined using the national account sectors (ESA 2010 sectors) to make a 2 group sector breakdown: *general government* versus *Corporations and organizations*. A detailed description of the transformation to ESA 2010 sectors is given in the paper [Ny sektorkode i beskæftigelsesstatistikkerne](#) (New sector code in the employment statistics - in Danish only).

Socioeconomic status is a breakdown on three groups: employee, self-employed or assisting spouse.

Full-time work is defined as at least 32 paid hours of work in the job per week for employment over the entire week, or at least 139 paid hours of work in the job for employment over the entire month.

## 2.3 Sector coverage

The statistics covers all the [national accounts \(ESA 2010\) sectors](#) that Danish registered companies can be assigned (i.e. all sectors excluding rest of the world and foreign-controlled entities). However, sectors are aggregated to a division into 2 groups, respectively *Corporations and organizations* and *General government*.

*General government* include central government, regional government, municipal government, and social security funds.

*Corporations and organizations* includes private corporations, public corporations, private non-profit organizations and sector not stated.

## 2.4 Statistical concepts and definitions (S.3.4)

**Employment:** Employed is, if one has an attachment to a workplace in the form of a job where you at least have one hour of paid work in the reference week. However, there is no requirement for the number of paid working hours for employees who are temporarily absent. Persons who up to a period of 45 days have not received salary, but subsequently returned to the same employer, are included in the period without pay. Employment is an assessment of how many people (headcount) are employed at any given time. See detailed [description of concepts](#).

**Job:** A job is defined as a person connected to a workplace. The same person can have several jobs at the same time. Jobs shows the number of jobs that are active (excluding temporary absences in the form of e.g. maternity or other leave) at any given time. The labour market statistics are a job actively, if there is a minimum of 1 paid hour per week. Persons who up to a period of 45 days have not received salary, but subsequently returned to the same employer, are included in the period without pay. See detailed [description of concepts](#).

**Hours Worked:** Hours worked are defined as hours paid by employers, including paid overtime and excluding paid hours of absence. Unpaid overtime hours and criminal (incl. black) work are excluded from the calculation of hours worked in the Danish Working Time Accounts (WTA). See detailed [description of concepts](#).

**Wage:** Compensation for hours worked or for hours paid but not worked. Compensation of employees in the Danish Working Time Accounts (WTA) includes compensation of employees in cash or in kind which the employer pays to an employee for work performed in an accounting period. See detailed [description of concepts](#).

## 2.5 Statistical unit

The statistical unit in the Danish Working Time Accounts (WTA) is the job that the person has at the individual workplace (establishment).

## **2.6 Statistical population (S.3.6)**

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 WTA do not include employees, self-employed or assisting spouses of foreign business enterprises hired out for work in Denmark according to the rules governing hiring-out of labour (see [Register of Foreign Service Providers \(RUT\)](#)).

Regarding data transmitted to the Eurostat short term business statistics (STS), only data in *market sector* are transmitted (i.e. ESA2010 sectors Non-financial corporations (S.11), Financial corporations (S.12), Households (S.14) and Sector not stated).

## **2.7 Reference area**

Denmark.

## **2.8 Time coverage**

Q1 2008 - (for all indicators in all breakdowns).

## **2.9 Base period**

Not applicable to these statistics.

## **2.10 Unit of measure**

Employment is calculated as number of persons.

Job is calculated as the number of jobs.

Hours worked are calculated as the number of hours. In STATBANK these are calculated in 1000 hours.

Compensation of employees is measured in DKK. In STATBANK compensation of employees measured in millions DKK.

## **2.11 Reference period**

The reference period of the figures in the annual Working Time Accounts (WTA) is the calendar year whereas the reference period of the quarterly working time accounts are the quarters.

## 2.12 Frequency of dissemination

Annual and quarterly statistics are published. Two annual statements (in September with preliminary data for the last year, and in February with final data), and four quarterly statements are released.

## 2.13 Legal acts and other agreements

The statistics provides labour market data to EUROSTAT business short-term regulation (STS) and the national accounts (ESA / ESA).

STS: Council Regulation (EC) concerning short-term statistics:

- Council Regulation (EC) No 1165/98 of 19 May 1998 concerning short-term statistics, 1165/98, OJ L 165, p.1, 05-06-1998.
- European Parliament and Council Regulation (EC) No 1158/2005 of 6 July 2005 amending Council Regulation (EC) No 1165 / 98 concerning short time statistics. 1158/2005, OJ L 191, p.1, 22-07-2005.
- Commission Regulation (EC) No 586/2001 of 26 March 2001 implementing Council Regulation (EC) No 1165/98 concerning short-term statistics as regards the definition of Main Industrial Groupings. 586/2001, OJ L 86, p 11, 27-03-2001.
- Commission Regulation (EC) No 1503/2006 of 28 September 2006 implementing and amending Council Regulation (EC) No 1165/98 concerning short-term statistics as regards definitions of variables, list of variables and frequency of data compilation. 1503/2006, OJ L 281, p 15, 12-10-2006.
- Commission Regulation (EC) No 656/2007 of 14 June 2007 amending Regulation (EC) No 586/2001 implementing Council Regulation (EC) No 1165/98 concerning short-term statistics as regards the definition of industry groups. 656/2007, OJ L 155, p 3, 15/06/2007.
- COMMISSION REGULATION (EC) No 1178/2008 of 28 November 2008 amending Council Regulation (EC) No 1165/98 concerning short-term statistics and Regulation (EC) No 1503/2006 and (EC) No 657/2007 as regards adaptations following the revision of statistical classifications NACE and CPA. 1178/2008, OJ L 319, p 16, 29-11-2008.

ESA / ESA: Council Regulation (EC) on the European system of national accounts:

- Council Regulation (EC) No 2223/96 of 25 June 1996 on the European system of national and regional accounts in the European Community. 2223/96 OJ L 310, p.1, 30-11-1996.
- European Parliament and Council Regulation (EC) No 1392/2007 of 13 November 2007 amending Council Regulation (EC) No 2223 / 96 with respect to the transmission of national accounts data. 1392/2007, OJ L 324, p.1, 10-12-2007.
- Commission Regulation (EU) No 715/2010 of 10 August 2010 amending Council Regulation (EC) No 2223/96 as regards changes in the national accounts as a result of the revision of the statistical classification of economic activities NACE rev. 2 and the statistical products by activity (CPA). 715/2010, OJ 210, p.1, 11/08/2010.

## 2.14 Cost and burden

No response burden is calculated as the statistics build on existing statistical products.

## 2.15 Comment

The system for the Working Time Accounts (WTA) is the result of a three-year project established in Statistics Denmark in 1995 with grants by The European Social Fund. The purpose of the project was to improve the current statistical description of the Danish labour market. The background to the WTA is that there has been a considerable expansion in the number of statistics covering the labour market and the fact that the figures from different statistics are not immediately comparable. The project work has been concentrated on developing statistical systems integrating already existing labour market statistics. In December 1998 the project ended with the publication of a report (in Danish only): "Integrated Labour Market Statistics - the Labour Market Accounts and the Working Time Accounts 1995-97" ("Integreret arbejdsmarkedsstatistik - Arbejdsmarkedsregnskab og Arbejdstidsregnskab 1995-97") in which two new statistical systems were presented. In 1999 the WTA were presented by Statistics Denmark with the inclusion of annual as well as quarterly statistics.

Differences in concepts and statistics on employment and number of hours worked are described in the following paper [differences in concepts between employment statistics](#).

Additional documentation of differences between the employment statistics can be found at [employment](#).

Documentation relating exclusively to the working time accounts can be found at [the Working Time Accounts](#).

We work in Statistics Denmark on exploiting information from Register of foreign services in Denmark (Register over Udenlandske Tjenesteydelser i Danmark, RUT) to create a better illumination of border work. RUT included hiring out labour, corporate transferees and sole proprietorships that provide services in Denmark, but not taxable in Denmark. RUT-employment is not a part of the night-time population (typically used for population delineation of social statistics, including labour market statistics), since workers do not reside in Denmark. The national accounts is about to disentangle, whether RUT employment relationships should be included in national accounts employment (in terms of the activities are conducted in Denmark and thus should be included in the day-time population) or whether they should be categorized as "import of foreign services" (as they are engaged are employed by - and receives salary, from - the foreign company). The part of the RUT employment to be included in the national accounts daytime population, will also be included also in the Working Time Accounts employment.

## 3 Statistical processing (S.18)

The population and concepts as well as levels of the variables are defined by annual structural data sources. Short-term data sources are applied in projections to periods for which structural data are not available. Summation of the data is conducted before they are projected. Data are seasonally adjusted both for use in Denmark as well as for use in Eurostat's business short term statistics (STS).

### 3.1 Source data (S.18.1)

The Danish Working time accounts (WTA) are based on a combination of census and survey data. The WTA are compiled on the basis of four primary data sources:

1. Labour Market Accounts [see Documentations of statistics LMA](#)
2. Structure of Earnings [see Documentations of statistics SES](#)
3. A-Income Statistics [see Documentations of statistics AINCOME](#)
4. Employment Statistics for Employees [see Documentations of statistics BfL](#).

(1) With the Labour Market Accounts (LMA) monthly statements are available on employment, jobs, temporary absences and paid hours of work and for employees also compensation of employees throughout the calendar year for all the years covered by LMA data.

LMA form the basis of WTA on paid hours of work for self-employed and assisting spouses. In LMA these are calculated on the basis of hours paid for employees, but enumerated with how much more self-employed and assisting spouses are working according to labour force survey (LFS). Furthermore, WTA uses the latest developments in LMA to project jobs, employment and paid hours of work for self-employed and assisting spouses.

With LMA longitudinal data, it has become significantly easier to establish, whether leave has its origin in employment or unemployment. WTA uses information on leave from LMA covering all months of the year. Furthermore, continuing recent trends from LMA, WTA projects information on leave from employment (sickness and maternity) to months where no structural data exist.

Another huge quality improvement is that LMA can produce preliminary structural data for the reference year 2015 to be available already in August 2016.

(2) Structural Earning Statistics (SES) are used to convert paid hours of work from LMA to actual hours worked during the year in WTA.

Furthermore, data from the SES are used as help information to describe the distribution of hours worked over the months of the year in the WTA. Earning statistics are used for identifying jobs for workers paid by the hour, who are characterized by not being paid during absence. Therefore, the distribution of paid hours of work by hourly workers can represent the distribution of actual hours worked over the months of the year.

Furthermore, studies based on the labour force survey (LFS) shows that self-employed and assisting spouses do not have a significantly different distribution of hours worked over the year than employees. This information is in the WTA used for calculating the relative distribution of hours worked compared to hours paid for over the months of the year for all employed.

So although from eIncome (LMA and employment statistics for employees) only information on paid hours of work in the month are available, the WTA can thereby calculated how much this represents in hours worked per. month, based on the knowledge of how actual hours of work are distributed relative to paid hours of work over the months. Paid hours of work generally have a different distribution over the months of the year than actual hours worked due to the fact that absence is not evenly spread over the months of the year.

(3) Income statistics data (AINCOME) based on reports from the Danish Central Pension System (CPS) are used for adjusting compensation of employees in the WTA to include earnings of funded labour market pension.

(4) The Employment Statistics of Employees (BFL) contains monthly data on jobs, hours paid and compensation of employees throughout the year for employees. The information is used in the WTA to project compensation of employees, hours paid for, employment, primary and sideline (secondary, third etc.) jobs for employees during periods when there is no AMR data. Given that LMA include preliminary structural data, then the projection period is reduced so that the maximum length of projection is 15 months. The 15-month projection occurs in the calculation of the first quarter in June, while for example the calculation of second quarter figures in September will only be projected for six months. This increases the quality of the WTA statistics considerably.

In deciding which data sources to apply in compiling the WTA, attention is centred on the major advantages provided by each individual statistics. For example, LMA are used to ensure complete coverage in the calculation of employment, number of jobs, aggregate payroll costs and paid hours



of work. This includes personal interviews used for obtaining information on groups that are not covered by the administrative registers. Information from the wage and salary system of the enterprises is used to convert paid hours of work into hours worked during the year.

The Working Time Accounts are exclusively based on existing data sources, which are subsequently converted to the concepts used in the WTA. The WTA is flexible in its choice of primary sources, which can be replaced by other sources, if these have proved to be more accurate. The choice of primary source decides the amount of data editing necessary. When it comes to integrating all the sources, however, all the concepts are consistent in conforming to international standards and every variable fulfils the requirement of the system for the WTA.

Data in WTA are summarized (aggregated) prior to integration and projected so that the output data alone are broken down by socioeconomic status (whether you are an employee, self-employed or assisting spouse), industries, sectors, gender and amount of work.

### **3.2 Frequency of data collection (S.18.2)**

The Danish Working Time Accounts (WTA) makes use of information retrieved from existing sources in Statistics Denmark when new data are available. Typically, WTA retrieves data from the structure of earnings statistics (LON) once a year (end of August), from the Labour Market Accounts (LMA) and Income Statistics (AINDK) twice a year (in August and January) and from Employment Statistics for Employees (BfL) twice the month.

### **3.3 Data collection (S.18.3)**

The information is retrieved from these existing sources in Statistics Denmark when new data are available.

### **3.4 Data validation (S.18.4)**

Data are already checked for errors in the primary statistics. In the Danish Working Time Accounts (WTA) further checks, troubleshooting and debugging are carried out. This is partly based on the information from the producers of the input sources, partly systematic (mostly figurative) controls the internal consistency between variables and over time, and by comparisons with other published statistics. Finally developments are systematically being discussed with stakeholders from other statistics in Statistics Denmark.



### **3.5 Data compilation (S.18.5)**

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).

The Danish Working Time Accounts (WTA) is a statistical product that is based on several input data sources. The statistics has ongoing revisions due to new data input sources, data breaks in existing input sources, revisions in line of industry codes, new sector codes, new or changing needs of users (national and international) etc.

The series are seasonally adjusted. In accordance with the international guidelines, employment and jobs are seasonally adjusted, but these series are not trading day adjusted. Hours worked and compensation of employees are both seasonally adjusted and trading day adjusted.

### **3.6 Adjustment (S.18.6)**

The data are seasonally adjusted, but otherwise no corrections of the data are carried out beyond what has already been described during data validation and data processing.

## **4 Relevance**

The statistics is relevant for users interested in social and economic statistics.

### **4.1 User Needs**

Among users are politicians, ministries, interest groups, businessmen, researchers, major private companies and others interested in the development of the Danish labour market. The areas of application are mainly the National Accounts, economic models, economic government departments and labour market organizations.

When major revisions are released, the changes are described in Documentation of statistics and in potential more comprehensive notes available at the website. In addition users are oriented about the background for the changes, when the changes are put into force, and the reference period the changes are related to, as early as possible in the process via user committees (user committee for labour market statistics and user committee for economic statistics), in the forum of short term statistics and on interest group meetings. In addition, revisions of the Working Time Accounts are discussed and coordinated with the national accounts.

## 4.2 User Satisfaction

Users interested in the social and economic statistics have expressed satisfaction with the quality of the statistics. However, they also expressed frustration over large data breaches, especially in the transition to e-Income-based sources.

User Committee for Labour Market Statistics includes the areas employment, unemployment, wage subsidies jobs, earning statistics and statistics on absence. The user committee hold meetings once or twice a year to ensure running contact and dialog on the scope of statistics, developments, quality and communication. The members of the committees are important users of the products of Statistics Denmark within the subject areas of the user committee.

The User Committee for Economic Statistics covers the topics national accounts, public finances, short term statistics, external economy, globalization, employment, prices, consumption and financial statistics. The committee normally holds meetings in June and December. At these meetings the revisions of the Working Time Accounts (WTA) have generally been embraced, as no users have doubted that the quality of the WTA has been improved significantly. However, data fractures been difficult for users to handle. Especially for the national accounts and its users and for the Productivity Commission has the restructuring to using the eIncome statistics - especially with the very significant drop in the levels of hours worked - has given rise to much frustration and additional work load.

## 4.3 Data completeness rate

In the reports to the European business short term statistics (STS) the population has previously been larger than the market sector of the economy, which is covered by the Regulation, as sector code 89: Non-profit institutions serving households (NPISH) were not excluded from the data deliveries.

In the period from the statistics was revised to be based on eIndkomst (in December 2012) and until the revision, where WTA was revised to be based on the labour market accounts (LMA) in September 2016, the delimitation of deliveries to the STS has been the sector group *Corporations and organizations*, ie. excluding *General government*.

With the revised statistics in September 2016, this reservation is no longer necessary, since data to the STS now (with data revised back to 2008) cover the market sector of the economy only, as recommended by the regulation. This has been possible because data in the revised system is available in more detailed sectoral codes.

## 5 Accuracy and reliability

The statistics is mainly based on the Labour Market Accounts (LMA). LMA integrates and harmonizes a wide range of data sources in a statistical system. This means that LMA can illustrate the labour market better than individual statistics can. LMA is at the same time based on a total census of the population, so there is not the same uncertainty as with statistics based on sampling. The quality of the statistics has also been significantly improved by the fact that the projection period has been reduced compared to previous versions.

## 5.1 Overall accuracy

The margins of statistical uncertainty are related to the statistical uncertainty of the individual primary statistical data that are used.

The statistics is mainly based on the Labour Market Accounts (LMA), which is a longitudinal register based on integration and harmonization of a large number of registers in Statistics Denmark. This means that LMA can illustrate the labour market better than individual statistics can. LMA is at the same time a total census of the population, so there is not the same uncertainty as with statistics based on sampling. Data is available at a very detailed level, which makes the delimitation of the population and concepts very accurate. Against this background, quality is judged to dump other labour market statistics at home and abroad.

The quality of paid hours is not as high as other concepts in the LMA, but relatively high compared with survey-based statements. In contrast to survey-based statements, where they ask the employed themselves how many hours they work, and as a result, among other things, is subject to memory and random sampling, 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.

Information on pay hours of work is from the Employment Statistics for Employees (BfL), where paid hours of work are sometimes imputed and therefore there is uncertainty related to this information. However, the proportion of imputed pay hours for employees has fallen from 2008, where the share was more than 14 per cent to less than 4 per cent by 2015. There is greater uncertainty about the paid hours of work for self-employed and assisting spouses. This is due to the fact that hourly information for self-employed and co-spouses is imputed on the basis of paid hours for employees from BfL adjusted by how much more self-employed and assisting spouses say they work compared to employees in the labour force survey (LFS). The Working Time Accounts (WTA) converts paid hours from the LMA at job level to hours worked using factors calculated using the annual Structure of Earnings at a more aggregated level. The hourly information is considered to fit an overall level, but at the detailed level they should be interpreted with caution.

Since data includes provisional structural data from the Labour Market Accounts (LMA), the projection period in the WTA has been reduced compared to earlier versions of the WTA so that the maximum length of projection is 15 months. The 15-month projection occurs in the calculation of Q1 in June, while for example the calculation of Q2 in September only will be projected for six months. This increases the quality of the statistics considerably compared to previous versions of the WTA. By combining structural and short term statistics, both high-quality data from structural statistics and statements of recent periods using faster short term statistics is obtained. In addition, it contributes to the consistency of the WTA both over time and between variables, that the main source used for projection is employment for employees (BfL), which is also the main source of employees in the LMA.

## 5.2 Sampling error

Not applicable to this statistic.

### 5.3 Non-sampling error

Adjusting to the non-response and lack of information on paid hours of work are carried out in the sources that the Danish Working Time Accounts (WTA) uses. For a description of the statistical uncertainty of the primary sources, see the respective Documentation of statistics.

In general, the quality of data has improved significantly with the use of the new eIncome source and has become even better with the transition to use LMA data.

Previously, the WTA was calculated by combining a lot of different sources. After the reorganization in 2012 the WTA is based primarily on eIncome sources. This is the same basic data for most of the sources included in the WTA, which ensures a high degree of internal consistency.

In the transition to LMA precision was changed once again, because in LMA integrated and harmonized in a very wide range of data sources in one statistic system. This means that LMA may highlight labor significantly better than the current individual statistics can be, especially compared to the timing of the transition from one labour market state to another. At the same time, LMA is a census of the population, and thus there is not the same uncertainty as statistically based sampling. Read more on [precision in LMA](#).

Not only has there been a significant quality improvement related to the transition to eIncome. Over time, the eIncome register have also been improved. Thus, a quality measure for the calculation of hours worked is the proportion of hours paid in eIncome that have been imputed because they have either not been reported or because they have proved to be invalid:

Year Total Corporations and organizations General government 2008 14.6 percent 17.7 percent 7.8 percent 2009 11.6 percent 13.5 percent 7.7 percent 2010 10.6 percent 11.9 percent 8.1 percent 2011 8.3 percent 9.6 percent 5.7 percent 2012 5.8 percent 7.1 percent 3.1 percent 2013 4.2 percent 4.8 percent 2.9 percent 2014 3.6 percent 3.7 percent 3.2 percent 2015 3.3 percent 3.6 percent 2.9 percent 2016 3.2 percent 3.3 percent 2.8 percent

In general, there is a tendency that more and more report information on hours paid to eIncome, which guarantees a better quality over time. Furthermore, the guidelines from the tax authorities on the reporting of hours paid to eIncome have become more clear, and the precision and knowledge of concepts are increased in the reporting over time so that, for example, the reporters become aware that unpaid absences are not to be included in the reported hours paid.

### 5.4 Quality management

Statistics Denmark follows the recommendations on organisation and management of quality given in the Code of Practice for European Statistics (CoP) and the implementation guidelines given in the Quality Assurance Framework of the European Statistical System (QAF). A Working Group on Quality and a central quality assurance function have been established to continuously carry through control of products and processes.

### 5.5 Quality assurance

Statistics Denmark follows the principles in the Code of Practice for European Statistics (CoP) and uses the Quality Assurance Framework of the European Statistical System (QAF) for the implementation of the principles. This involves continuous decentralized and central control of products and processes based on documentation following international standards. The central quality assurance function reports to the Working Group on Quality. Reports include suggestions for improvement that are assessed, decided and subsequently implemented.

## 5.6 Quality assessment

The margins of statistical uncertainty are related to the statistical uncertainty of the individual primary statistical data that are used. The source used absolutely fundamental to describe the level and developments, is the Labour Market Accounts (LMA). The conceptual consistency and the uniform adaptation of sources over time contribute to a reduction of the margins of statistical uncertainty in the Working Time Accounts. Especially, the juxtaposition of information from the primary sources in a joint system implies that the results will automatically be compared and thereby reveal any errors and inherent problems of consistency in the basic concepts and data. These errors and inconsistencies are reported back to the primary sources. The work on integrating statistical systems will thus be instrumental in enhancing the general data quality of the primary statistical data.

For a description of the statistical uncertainty of the primary sources, see the respective Documentation of statistics:

1. Labour Market Accounts [see Documentations of statistics LMA](#)
2. Structure of Earnings [see Documentations of statistics SES](#)
3. A-Income Statistics [see Documentations of statistics AINCOME](#)
4. Employment Statistics for Employees [see Documentations of statistics BfL](#).

Self-employed and assisting spouses make up the group for whom the lowest quality of data is available on number of jobs (with activity over 1 weekly working hour), length of job (duration of each individual job) and number of hours worked in each individual job in the data sources. The consequence is that the information on employment, jobs and hours for self-employed and assisting spouses are subject to a relatively greater degree of uncertainty than it is for employees.

When the Labour Force Survey (LFS) is applied in the Labour Market Accounts (LMA) in adjusting how many more hours are worked by self-employed and assisting spouses compared to hours worked by employees, it is impossible for us to take into account that there is a tendency for self-employed to overstate, to a greater extent, than is the case for employees. It would be extremely subjective, if we were to introduce a factor for the extent of this overstatement made by the self-employed compared to the employees. However, we have an assumption that this overstatement is greatest in cases where the workplace for the self-employed (and the assisting spouse) is the residence of the self-employed, as it must be assumed that the relation between working time and leisure time becomes more blurred. This applies, especially, to employment in agriculture, etc. and small businesses in retailing and hotels and restaurants.

In eIncome information is reported with regard to paid hours in the jobs in the individual reference month. This information is the primary source on paid hours of work in the LMA. The quality of this information naturally reflects the quality of the data reports. Generally, we think that the information has a high quality. However, particularly related to the data on unpaid hours of absence and overtime hours there may be quality problems in the primary data of the eIncome register. Some problems have been revealed with respect to data reports of paid hours for employees paid by the month who are not paid for in periods of absence. Lack of impairment of hours paid for as a result of unpaid absence leads to an overestimation of paid hours. Lack of registration of paid overtime will result in an underestimation of hours paid. Typically, the registration problem worse related to hours of unpaid absence. There can be, especially for salaried who have not paid absences be a problem in that the hours are not always written down sufficiently during periods of absence.

There associated uncertainty in relation to developments in hours worked over the year. In the Danish Working Time Accounts (WTA) the development is identified by paid hours for hourly workers, who have not paid absence. The development in paid hours of work during the year is calculated divided into 19 industry groups. The assumption here is that the time distributions over the months in 2016 for hourly workers in each of the 19 industry groups represents the hour distribution for all the employed in the same industry groups. This information is used to convert

reports of paid hours from eIncome over the year to monthly information on hours worked over the year in the WTA. Because of compensated absences as holidays and sickness etc., the distribution on paid hours and hours worked is not the same throughout the year.

Particular uncertainty is attached to data on the distribution of hours worked during 2016, especially within the industry group *education* (NACE1='P'). The reason is that there are no structural data for 2016 yet, so we do not have information on the distribution of hours worked over the months of the year compared to hours paid. In the absence of structural data on hourly distributions over the months in 2016, ratios between hours worked and hours paid for each month in the year from a previous year are used, where Easter falls at about the same time within the year. Normally the Easter holidays falls in April. But in 2016 Easter fell in March. 2008 and 2013 are the only two years when Easter fell in March in the period where eIncome data is available. In 2008, however, partly due to strikes within the social and health industries, and partly due to a structural reform in the general public sector not entirely completed, and partly due to 2008 being the first year of eIncome data, the data from 2008 are not very representative regarding hourly distributions. As 2013 is the latest data of the two years, 2013 hours distributions are instead being used. However, due to the lockout in 2013, the hourly distribution from 2013 is not used for the industry grouping *education*. Instead, hourly workers are identified using raw 2016 report to the structure of earnings statistics, and the hourly information is gathered from hourly workers in the industry grouping *education* in the employment statistics for employees. Unfortunately it is not possible to use raw wage statistics reports for 2016 for all industries, because reports to the private wage statistics are not available yet.

In September 2017, the working time account publish hours worked, the structure data (including structural statistics on earnings) for the year 2016 is incorporated so that the distribution of hours worked for hourly workers in all 19 industry groups can be identified. It is only in the projection period (as from Q1 2016), there is uncertainty on the distribution of hours worked over the year. This uncertainty is in general greatest in the years when Easter falls in March. The longer time series, the greater the probability of the existence of structural data for a year when Easter is the same as the projection period, and data not being marked by specific events such as strikes, lockouts or the like. However, only when the structure data for the reference year are available, the distribution of hours worked over the year is final, as it is not possible to take into account all calendar effects based on previous years.

## **5.7 Data revision - policy**

Statistics Denmark revises published figures in accordance with the [Revision Policy for Statistics Denmark](#). The common procedures and principles of the Revision Policy are for some statistics supplemented by a specific revision practice.



## **5.8 Data revision practice**

The Quarterly Working Time Accounts (WTA) will be published in accordance with Statistics Denmark's specialized goals of timeliness, which with respect to the quarterly statistics implies not later than by the end of the subsequent quarter.

Data on employment for employees is available both in a provisional version as well as a final version, so the two most recent quarters will be subject to revision in conjunction with the compilation of each quarterly statistic.

When new structural data are incorporated (the Labour Market Accounts and Structural Statistics on Earnings) in connection with the compilation of the Annual Working Time Accounts, the levels as from this year will be revised, i.e. also during the entire period of projection. When final structural data are incorporated, the data in the Working Time Accounts are considered to be final.

However, data in the Working Time Accounts can be subject to revision as a result of updated values in the primary sources, in the case of methodological changes or use of new information and sources.

## **6 Timeliness and punctuality**

The annual Working Time Accounts (WTA) are published 6 months after the reference year. The quarterly WTA are published two months and 15 days after the reference quarter.

The statistics are usually published without delay in relation to the scheduled date.

### **6.1 Timeliness and time lag - final results**

The Danish Working Time Accounts (WTA) are published with provisional quarterly figures 4 times a year (1st Quarter mid-June, 2nd Quarter mid-September, 3rd Quarter mid-December and 4th Quarter mid-March). Provisional annual statements are published in September and final annual statements are published in February.

As from September 2016 (with the transition to be based on the Labour Market Accounts, LMA) the annual Working Time Accounts are thus published twice a year (in September with the last annual figures as preliminary data, and again in February, where the preliminary annual data is replaced with final data from the LMA).

There is consistency between the annual and quarterly WTA so that quarterly data is also final for periods where final annual statements are available.

WTA will continuously be published in accordance with Statistics Denmark benchmark goals. For quarterly statistics concerned, this means published data by the end of the following quarter. On account of requirements from business short-term regulation (STS), provisional data from the WTA are transferred to Eurostat plus 2 months and 15 days. For the annual statistics the guiding target is by the end of the following year.



## **6.2 Punctuality**

95 percent (19 out of 20 publications) of the Quarterly statements have been published exactly as planned or ahead of schedule since the transition to eIncome basis December 2012.

The annual statistics has since December 2012 been released four times, all at pre-announced time (100 percent.).

Data to Eurostat short term business statistics (STS) are evaluated based on requirements for interim STS quarterly (within 2 months after the reference quarter) and here meets 84.2 percent the requirements (16 out of 19 deliveries since the system was revised to eIncome basis in December 2012).

For the final STS quarterly data 90.0 per cent (18 out of 20 of the releases) were transmitted according to the required deadline (within 2.5 months after the reference quarter).

## **7 Comparability**

The Working Time Accounts (WTA) deliver labour market data to the business short-term regulation (STS) and the national accounts (SNA / ESA). Therefore, changes in these regulations typically result in changes in the WTA. A description of the transitional tables between the WTA and the National Accounts (NA) can be found in the publications on the NA. Transitional tables between the WTA and the Register-based Labour Force Statistics and the Establishment-related Employment Statistics are published in Statistical Reports (Statistiske Efterretninger - in Danish only) for the annual WTA.

### **7.1 Comparability - geographical**

The statistics are worked out according to international guidelines, European System of Accounts (ESA 2010) and International Labour Organisation (ILO 1988: Current International Recommendations on Labour Statistics), the latest of which is reviewed in 2013 (Resolution concerning statistics of work, employment and labour underutilization, 19th International Conference of Labour Statisticians).

The population are persons affiliated to Danish registered companies, which is consistent with ESA2010 boundaries. ESA2010 includes working in resident companies (see ESA 2010 paragraphs 2.04 to 2.11) (colloquially called 'the day-time population'). ILO guidelines include the resident population (colloquially called 'the night-time population').

### **7.2 Comparability over time**

In the current Working Time Account (WTA) time series there is no data breach. But compared to historical versions / releases of WTA, there have been the following data breach:

As from the publication in September 2016 of the WTA for the second quarter of 2016 and the annual WTA for 2008-2015 the working time accounts system surpasses to use longitudinal data from the new Labour Market Accounts (LMA). WTA thus builds on structural data covering all months of the year. Further, the period of projection using short term statistics has been significantly reduced, since the working time accounts in September 2016 make use of a preliminary version of LMA for the year 2015 and the structure on earning statistics for 2015 has been included as well. In February 2017, the preliminary data from LMA for 2015 is replaced with final data for 2015. There is therefore a significant improvement in quality of the WTA. The revision of the WTA

on transition to the LMA has given rise to minor revisions in the levels of employment, jobs, hours worked and compensation of employees:

Size of the WTA revision upon transition to LMA (pct.):

Year	Employment	Number of jobs	Hours worked	Compensation of employees
2008	1.3	1.4	-0.2	1.0
2009	1.2	1.1	-1.0	1.2
2010	1.1	1.2	0.1	0.6
2011	1.2	1.4	-0.3	0.8
2012	1.1	1.3	-0.1	0.8
2013	1.0	1.1	-1.4	0.7
2014*	1.3	1.0	-2.1	0.6
2015*	1.5	2.3	-1.6	0.3

Note: \* Recent structural data in the previous WTA was for the reference year 2013. This means that 2014 and 2015 alone were calculated by projections based on short-term statistics.

In December 2012 the Working Time Accounts (WTA) were adjusted, implying that new data sources (primarily based on eIncome) are used for the compilation. Subsequently, the WTA were compiled on the basis of a new system. As changes have been made to the population, concepts, sources as well as methods, this has resulted in revised levels and revised developments throughout the year. See [Break in WTA on transition to eIncome](#).

With eIncome the target population was expanded to include people who work in Danish companies but live abroad:

Year	No. employed	No. jobs	No. hours worked
2008	63,654	65,069	87,619,000
2009	56,017	56,639	75,339,000
2010	54,495	54,990	73,123,000
2011	55,578	56,017	74,467,000
2012	54,311	54,776	73,571,000
2013	54,045	54,604	73,619,000
2014	55,542	56,065	75,595,000
2015	57,181	57,841	78,393,000
2016*	58,418	59,079	80,719,000

Furthermore, there were breaks in the WTA as a result of revisions to the classifications of sectors and industries, see [Break in WTA due to changed classifications since 2008] <http://www.dst.dk/ext/arbe/WTAbreak>.

Earlier versions of the Working Time Accounts (WTA) have been used to write-back the current series to 1995. However, these back-written series are not used for separate disclosure, as the quality is not good enough at the detailed level published in the WTA.

But the series are used to write-back the National accounts employment data series, see for example:

- [Quarterly national accounts, industries: NKBB10](#): Employment (10a3-grouping) by socioeconomic status, industry and seasonal adjustment.
- [Annual national accounts, industries: NABB69](#): Employment (69-grouping) by socioeconomic status and industry.

In addition, the back-written series are used in deliveries to the Eurostat Short Term business Statistics (STS), but on the condition that they may not be published separately but solely together with series from other countries.

### 7.3 Coherence - cross domain

A fundamental principle of the Working Time Accounts (WTA) is to document the coherence between statistics utilized in the WTA and to document coherence between the primary statistical data and the WTA.

The WTA are worked out according to international guidelines.

However, since the WTA is primarily a register-based statistic, it does not include information on unpaid overtime and illegal (including undeclared) hours of work. In the Labor Force Surveys (LFS) and in the National Accounts, the hourly concept includes unpaid overtime and illegal (including

black) work, as explained by respondents in LFS.

Transitional tables between the WTA and the RAS: Register-based Labour Force Statistics (employment) and the ERE: Establishment-related Employment Statistics (jobs and compensation of employees) is published in Statistical Reports (Statistiske Efterretninger in Danish only) for the annual WTA. A description of the transitional tables between the WTA and the National Accounts (employment, hours and compensation of employees) can be found in the publications on the National Accounts.

The basis of the number of jobs in the Working Time Account is end of November statements of the number of jobs in the Establishment-related Employment Statistics (ERE statistics). Unlike in the ERE statistics WTA number of jobs also include jobs in business statistics below the activity limit used in business statistics and also include jobs for people in eIncome not resident in Denmark.

Employment includes persons who are temporarily absent due to leave, but who have an affiliation to a workplace in the form of a job to return to. The transformation from job to employment include deduction of the persons' sideline (secondary, third etc.) jobs at the end of November and addition of the number of people who are either on sick leave, maternity leave or childcare leave from employment. Employment in The Register of Employment Statistics end of November (representing average employment per day in November in the WTA) includes, in addition to RAS employment also employment for persons not resident in Denmark. The Working Time Accounts employment for self-employed and assisting spouses is defined in the same manner as in the register-based labour force statistics (RAS), where self-employed consists of the following three groups: employers, VAT payers and other self-employed.

To get the average number of employees in Q4 an average of employment in October, November and December is used. The average employment during the year is calculated as the average number of employees in the 12 months of the year, or an average of employment in the four quarters of the calendar year. Similarly, the number of jobs in the year is calculated as the average number of jobs in each of the 12 months, where the number of jobs end of November in the Register of Employment Statistics represents the average number of jobs in the month of November in the WTA.

The concept of earnings in the WTA is the same as that used in the ERE statistics, but the population is slightly different because the ERE statistics operates with an activity limit (in accordance with international guidelines for business statistics), which is not used in labour market statistics (or economic statistics).

The revision in December 2012 implied a change in the division of labour between national accounts and work accounts so that the working time account adjusts what can be adjusted on job level, while national accounts make further adjustments on a more aggregate level. This change of labour division leads to greater differences between the working time accounts and national accounts figures. On the other hand, it implies that adjustments are made to the extent possible where the greatest expertise is. Finally, the changes in labour division also imply fewer revisions of the Working Time Accounts, which is hereby no longer dependent on the final data in the national accounts.

The new WTA also includes jobs for employees who do not live in Denmark, if they have jobs in companies in Denmark or on Danish ships. The WTA does not include employees of foreign companies working in Denmark the rules on hiring out of labour.

The compilation of Working Time Accounts is based on the idea that the figures are comparable over time to the highest possible degree. The sources will continuously be improved and replaced by other sources if these have proved to be more accurate. New sources will always be adapted to the concepts of the Working Time Accounts System. This implies that adjustments of existing sources cannot immediately be seen as changes of variables and concepts in the Working Time Accounts Statistics, although adjustments of the level of the specific variable may be made according to the

new and improved information.

There may be several reasons for the lack of data comparability between the different statistics: - Differences in compilation methods - Differences in the population - Differences in the definitions - Differences in the margins of statistical errors - Differences in the time of publication.

## **7.4 Coherence - internal**

The big improvement in relation to internal consistency between variables in the WTA is due to a system that primarily build on a single source, namely eIncome. Previously, data from many different statistics were used. See note on [data breach in ATR on transition to eIndkomst](#).

In the transition to LMA the internal consistency increased further, mainly because there are now significantly better information of leave of absence from sickness and maternity as well as jobs and employment for self-employed and assisting spouses during the year, and that all this information is processed and overlap treated in the same system, namely the LMA. Furthermore, the internal consistency increased because the period projected using short term statistics has been reduced significantly.

## **8 Accessibility and clarity**

The statistics are published in News from Statistics Denmark (Nyt fra Danmarks Statistik in Danish only), in the series Statistical Reports (Statistiske Efterretninger - in Danish only) and in the Statbank Denmark.

You can read more on our [website on the Working Time Account, WTA](#) and our [website on employment](#).

### **8.1 Release calendar**

The publication date appears in the release calendar. The date is confirmed in the weeks before.

### **8.2 Release calendar access**

The Release Calender can be accessed on our English website: [Release Calender](#).

### **8.3 User access**

Statistics are always published at 9:00 a.m. at the day announced in the release calendar. No one outside of Statistics Denmark can access the statistics before they are published. Theme publications etc. may be published at other times of the day. The National Statistician can decide that such publications may be released before their official publication time, e.g. to the media and other stakeholders.

### **8.4 News release**

The Working Time Accounts (WTA) is published in News from Statistics Denmark, [see - in Danish only](#).

## 8.5 Publications

The Working Time Accounts (WTA) is included in the Statistical Yearbook of Chapter Labour, earnings and income Section Employment.

A report: *Integrated labour market statistics - the Labour Market Accounts and the Working Time Accounts 1995-97* (Integreret arbejdsmarkedstatistik - Arbejdsmarkedsregnskab og Arbejdstidsregnskab 1995-97) was published in December 1998. In this report, the Working Time Accounts were presented including a far more detailed description of the applied primary sources and conceptual differences between these (The report is available at [Dst bookshop](#)).

## 8.6 On-line database

Data from the Danish Working Time Accounts (WTA) are available, free of charge, from the database [Statbank Denmark](#), see [WTA-tables](#).

The quarterly tables are:

- [ATR110](#): Quarterly Working Time Accounts distributed by Statistics Denmark's Industrial Classification of All Economic Activities (DB07), sector, type and socioeconomic status (replaces ATR20, ATR11KV)
- [ATR112](#): Working Time Accounts (seasonally adjusted) distributed by industrial activity (DB07 10-grouping), type and socioeconomic status (replaces ATR24, ATR3KV)
- [ATR114](#): Working Time Accounts (seasonally adjusted) distributed by sector, type and socioeconomic status (replaces ATR26, ATR4KV)

The annual tables are:

- [ATR116](#): Annual Working Time Accounts distributed by Statistics Denmark's Industrial Classification of All Economic Activities 2007 (DB07), sector, type, socio-economic status and sex (replaces ATR30, ATR11)
- [ATR118](#): Annual Working Time Accounts on the basis of the National Accounts industrial classification by activity (DB07), sector, type, socio-economic status and sex (replaces ATR32, ATR22)
- [ATR122](#): Index of working hours data (2010 = 100) by gender, sector and type (replacing ATR, ATRI)

The former (not continued) time series are available from StatBank Denmark under finished series.

It is not possible to draw comparisons between the new WTA and the former WTAs, as the sources, population, method and concepts have been changed compared to the previous WTAs.

## 8.7 Micro-data access

Data is aggregated, where the number of hours worked, compensation of employees, the average number of jobs and the average employment summed to 6 digit industry level (DB), sector, socioeconomic status 3, sex, and 5 groups of scope of work. From this level data is summarized for publication level (including different types of industrial aggregates).

The basic material consists only of existing statistics. The primary statistical data for the compilation of quarterly working time accounts is widely stored, but detailed non-published information is not made available.

## 8.8 Other

The statistics transmit various market sector data series to the EUROSTAT-STS (regulation on business short term statistics).

In addition, the statistics delivers data to internal users, especially for the national accounts.

## 8.9 Confidentiality - policy

There is usually no need to discretionate since the statistics is based on aggregated data. See also [Data Confidentiality Policy at Statistics Denmark](#).

## 8.10 Confidentiality - data treatment

There is usually no need to subject the data to Statistics Denmark's non-disclosure practice since the statistics is based on aggregated data.

However, data have been subjected to the non-disclosure practice in relation to deliveries to EU-STS, as some industry groups are not relevant or only relevant to a very limited extent in Denmark. These are industry 2-digit NACE groups : 'Bo6', 'Bo8', 'Bo9', 'C19'.

## 8.11 Documentation on methodology

The methods used in the Working Time Accounts (WTA) are described in more detail in the series *Labour Marked* (Statistical Reports - in Danish only).

Method changes in connection with the transition to the Labour Market Accounts ( LMA) are described in note [data break in the WTA on transition to AMR](#).

Method changes in connection with the transition to elncome are described in note [data break in WTA on transition to elncome](#).

A report: *Integrated labour market statistics - the Labour Market Accounts and the Working Time Accounts 1995-97* (*Integreret arbejdsmarkedsstatistik - Arbejdsmarkedsregnskab og Arbejdstidsregnskab 1995-97*) was published in December 1998. In this report, the Working Time Accounts were presented including a far more detailed description of the applied primary sources and conceptual differences between these (The report is available at [Statistics Denmark's bookshop](#)).

## 8.12 Quality documentation

Results from the quality evaluation of products and selected processes are available in detail for each statistics and in summary reports for the Working Group on Quality.

## 9 Contact

The administrative placement of this statistics is in the division of Labour Market. The persons responsible are Michèle Naur, tel. +45 3917 3414, e-mail: mln@dst.dk and Pernille Stender, tel. +45 3917 3404, e-mail: psd@dst.dk

## **9.1 Contact organisation**

Statistics Denmark

## **9.2 Contact organisation unit**

Employment, Labour Market, Social Statistics

## **9.3 Contact name**

Michèle Naur

## **9.4 Contact person function**

Responsible for the statistics

## **9.5 Contact mail address**

Sejrøgade 11, 2100 Copenhagen

## **9.6 Contact email address**

mln@dst.dk

## **9.7 Contact phone number**

+45 3917 3414

## **9.8 Contact fax number**

+45 39 17 39 99