Break in the data series in the WTA in connection with transition to the LMA

On 15 September 2016 revised Working Time Accounts were published with data as from 2008 and up to and including the 2nd quarter 2016.

The background and the changes made to the WTA in connection with the transition to using the Labour Market Accounts as primary statistical data are described below.

Table of Contents

1. The most significant data and methodological changes

1.1. Data sources

1.1.1. Background: Former data sources are left out

Previously, the register-based labour force statistics and the statistics on employment in businesses were used by the WTA. The annual structural statistics contain data on paid hours and compensation of employees, which were available at an annual level and job and employment statistics were only available by the end of November. The register-based labour force statistics and the statistics on employment in businesses compiled on the basis of e-Income register (i.e. before the labour market accounts) are no longer produced. This implies that the previous structural statistics, to which the WTA were linked, are no longer compiled. Consequently, this would result in major quality problems for the WTA, if the statistics were not readjusted to the labour market accounts.

1.1.2. Labour market accounts new data input

The WTA provide monthly data on employment, jobs, temporary absence and paid hours of work for all employed, as well as compensation of employees.

1.1.3. Fast preliminary structural statistics

Another important quality improvement is that the labour market accounts can produce faster preliminary employment statistics for the working time accounts, implying that preliminary statistics for the reference year 2015 are already available in August 2016 from the labour market accounts.

This implies that final data for 2015 are almost ready when the WTA are published in September 2016. This also implies that 2 annual statistics (in September with a preliminary year and in February with a final year) will be published by the WTA.

1.1.4. Short-term statistics are only used for the most recent months

With LMA data input, which is entered into the WTA and thereby structural statistics in each month during the year, this implies that projections are only conducted by means of the short-term statistics employees in employment during the rather short period, when structural statistics are not available from the LMA. As preliminary structural statistics are included, the period during which projections are made will be reduced, implying that projections are only conducted on the basis of not more than 15 months. The 15-month projections are only included in the statistics for the first quarter in the month of June, while in connection with, e.g. the statistics for the second quarter figures in September are only projected for 6 months. This gives rise to a substantial improvement in the quality of the statistics.

1.1.5. Leave is included on a monthly basis

The LMA has made it considerably easier to determine on the basis of the longitudinal data whether leave is the result of either employment or unemployment. Consequently, a description of leave is given throughout the months of the year from the LMA in the WTA. Furthermore, leave from employment (sickness and maternity leave) is projected during the months when structural statistics are not available. This projection is conducted by continuing the latest development from the LMA.

Previously, leave from employment was only included on the basis of the register-based labour force statistics (RAS statistics) / employment in businesses (ERE statistics) at the end of November, and the intervening months were in the WTA only estimated as a straight line between two November statements, similar to the level following the most recent RAS/ERE was kept constant.

1.2. Supplement of employee jobs in shorter periods without any pay

An important adjustment to the WTA compared to previously is that persons who have not received any pay for a period of up to 45 days, but who have subsequently returned to the same employer is included in the calculation of jobs and employment during the period in which there was no payment of wages and salaries[1].

1.3. Conversion from paid hours to hours worked

The structural statistics on earnings are used in the WTA for conversion from paid hours[2] to hours worked. The WTA do not cover unpaid overtime hours and criminal works (including black work). This implies that the concept of hours worked in the WTA could more precisely described as "registered employer-paid hours worked"[3].

During the years 2010-2012 hours of absence have been revised in the structural statistics on earnings. This revision has been incorporated into the revised WTA. The revision has an impact on the relation between hours worked and paid hours and thereby the number of hours worked in the WTA; see section 2, overview of the magnitude of the revision.

As the compilation of the structural statistics on earnings is now also faster and has speeded up the annual statistics to September of the year following the reference year, it is possible to use these statements for conversion from paid hours to hours worked also for the preliminary year with structural data (i.e. in September 2016, data for 2015 are available).

1.4. Hours worked throughout the year

Before the revision of the WTA in 2016, the Labour Force Survey (LFS) was used for describing the development in the number of hours worked throughout the year. Due to the margins of sampling errors, the LFS was only used at aggregated level, i.e. the development month by month for all employees as a whole.

Following the main revision of the WTA in 2016, the structural statistics on earnings are not only used for determining the relative level of hours worked in relation to paid hours during the year. The statistics on earnings are now also used for determining the distribution of the number of hours worked throughout the year, see annex B.

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[1] The periods are not reported to e-Income, but jobs and employment are imputed during the periods in the statistics employees in employment and in the LMA (and thereby also the statistics RAS and employment in businesses now based on the LMA). The persons are still in employment and have an active job, but they have not received any pay during the period, e.g. due to unpaid absence.

[2] Paid hours are similar to what is called paid hours worked in the statistics on employees in employment and the LMA, i.e. the hours worked for which the employers paid out wages and salaries. In the international guidelines (ILO og ESA2010) they are called *hours paid for*.

[3] A supplement for unpaid overtime hours and criminal work (including black work) is made in the National Accounts.

1.5. Inclusion of the Easter holiday and other absence is data-driven

Using monthly information on employees paid by the hour, the inclusion of Easter holiday and holidays taken, etc. is data-driven on the basis of actual absence for employees paid by the hour. Previously, the Easter effect was estimated on the basis of the LFS and entered manually, taken into account when the Easter holiday took place in each individual year.

1.6. Average – no longer status at the end of the month

Before the revision the levels for employment, jobs and leave in November were determined by the level in the November statistics from RAS statistics and the ERE statistics at the end of November. Following the revision in September 2016, employment, jobs and leave are determined as an average per day in the month. It is now possible to estimate such types of averages, because the LMA is a longitudinal database, where it is possible to pinpoint any arbitrary day during the year or to estimate an average for any reference period in the years where the LMA are available.

1.7. A more detailed estimation of self-employed

The development in jobs and employment for self-employed and assisting spouses was previously estimated a smooth trend from one structure statement to the next (employment in the RAS statistics and number of jobs in the ERE statistics). In the projection period (as from December 2013) the general development in employment for this group in rolling annual statements from the the Labour Force Survey (LFS) was used.

With LMA data are available throughout the year. Furthermore, LFS are used in the LMA to make it probable that the jobs include sufficient activity. This has resulted in a decrease in the number of self-employed, and especially sideline jobs as self-employed have fallen as a result of this activity requirements. In return with the new data it has become possible to have a sideline job as assisting spouse.

As the developments (due to the margins of sampling errors) cannot be estimated at a particular detailed level against the background of the LFS, it has been decided that the revised WTA use projections based on the previous development from the LMA in the industry groups in question.

With the LMA, we are for the first time able to see a seasonal pattern in employment, jobs and hours for self-employed and assisting spouses for detailed industry groups. Data in the WTA are used for compiling the development at the level of the standard 19-industry grouping. This constitutes a more accurate description than previously, when it was assumed that the development in all industry groups was similar.

1.8. Extended population of persons in employment

Furthermore, employment of au pairs is included for the first time, which must be counted as persons in employment in accordance with international guidelines. The information stems from information on the basis for residence permit in the LMA and is included in the WTA.

2. Overview of the magnitude of the revision

Table 1. **Magnitude of the revision**

Year	Persons employed	Persons employed in sideline jobs	Number of jobs	Hours worked	Compensation of employees
			percent		
2008	1,3	-1,0	1,4	-0,2	1,0
2009	1,2	-2,3	1,1	-1,0	1,2
2010	1,1	0,2	1,2	0,1	0,6
2011	1,2	1,3	1,4	-0,3	0,8
2012	1,1	2,0	1,3	-0,1	0,8
2013	1,0	1,3	1,1	-1,4	0,7
*2014**	*1,3*	*0,1*	*1,0*	*-2,1*	*0,6*
*2015**	*1,5*	*0,4*	*2,3*	*-1,6*	*0,3*

Note: * The latest structural data in the previous WTA covered the reference year 2013. This implies that 2014 and 2015 was compiled only by means of projections based on the short-term statistics.

Employment and jobs

Employment has been adjusted upwards by an average of 34,000 persons per year, corresponding to an average of 1.2 percent in the period 2008-2015.

The predominant reason for this is that imputed data on employee jobs in connection with absence without any pay up for a period of up to 45 days are not included. This effect resulted in an increase in employment of well over 35,000 persons (corresponding to an average of 1.3 percent in the period). The number of imputed is especially high during the holiday periods.

The imputed jobs have a greater effect on sideline jobs than on main jobs, because the share with unpaid absence in their job is higher in sideline jobs than in primary jobs. Thus, in the imputed sideline job constitute viewed in isolation an average increase of 5.2 percent compared to the number of sideline jobs before the revision.

The reverse is true due to especially the following effects:
- average employment is no longer based on the status at the end of November from RAS statistics / EBS statistics, but on average employment per day during the month and
- that the number of self-employed persons and assisting spouses are not only estimated by means of a straight line between statistics at the end of November, but comes from longitudinal data from the LMA subjected to processing of overlaps throughout the year. The new data has especially led to a fall in the number who are self-employed in their sideline jobs.

The effect of au pairs and leave is of smaller importance.

Hours worked

The total number of hours worked is adjusted downwards by an average of 0,8 percent.

Paid hours for employees are adjusted downwards for employees in flex jobs, which has contributed with a downward adjustment of the total number of hours worked by an average of 0.8 percent. An upward adjustment of paid hours for childminders counts in the opposite direction, as this has given rise to an upward adjustment in the total number of hours worked by an average of 0.2 percent.

During the years 2010-2012 the total number of hours worked would have been further adjusted down by almost 1 percent, if the number of hours due to absence had not been subjected to revision in the structural statistics on earnings.

The revised statistics on jobs and employment for the self-employed and assisting spouses also have an effect on estimating the number of hours worked for the self-employed and assisting spouses, as the number of hours worked depends on, e.g. the underlying number of jobs. The annual effect of the adjusted data and method for estimating the number of hours worked for self-employed persons and assisting spouses gives rise to a downward adjustment on the total number of hours worked in the TWA by an average of 0.6 percent in the period 2008-2015.

For the first time it is possible to include working hours during leave, i.e. during part-time leave, where the person has partially worked in connection with his/her leave. If these hours were not included, then the total number of hours worked would have been adjusted downward by an additional 0.4 percent.

Au pairs are for the first time included in the number of persons in employment. This effect has on the whole given rise to an upward adjustment of the total number of hours worked by 0.1 percent, i.e. the number of hours worked would have been adjusted downward by an additional 0.1 percent if they had been excluded.

Furthermore, the data subjected to processing of overlaps in the LMA, which can shorten the duration of states and reduce the number of hours by means of overlaps between several states, has given rise to a downward adjustment of the number of hours worked.

Finally, the more detailed description of hours worked throughout the year in relation to paid hours throughout the year has had a great effect on the redistribution of hours within the calendar year. However, the latter effect does not influence the annual levels.

Compensation of employees

The compensation of employees has been adjusted upwards by an average of 0.7 percent. The predominant reason for the change in the compensation of employees is due to the circumstance that funded labour market pensions were previously excluded from the social security pensions, see documentation.

Additionally, there are differences resulting from:
- use of more updated versions of the sources which have been applied (e-Income register, sickness and maternity benefits register, pension contributions, etc. in the statistics on income), and
- that the previous WTA in 2014 and 2015 were not based on structural statistics, but projections only. Projections are always subject to greater uncertainty.

Annex: Estimation of hours worked throughout the months of the year

With the revision in September 2016, data from the structural statistics on earnings are used as auxiliary information for describing the distribution of hours worked throughout the months of the year in the WTA. The statistics are used for identifying jobs for persons paid by the hour.

Hours worked by persons paid by the hour
Hourly paid persons are characterized by not receiving pay during their absence. Against this background, the paid hours of work by persons paid by the hour are similar to the number of hours worked by the hourly paid persons.

The hourly paid persons can be identified in the structural statistics on earnings. When the average number of paid hours per job for hourly paid persons in the LMA is estimated for each month, we have consequently estimated the average number of hours worked per job in the month for persons paid by the hour. Similarly, the average number of hours worked per job throughout the year can also be estimated. By assuming that the distribution of hours worked throughout the year is the same for persons paid by the hour as that of other employed, a relative distribution of hour worked is thereby achieved throughout the months of the year for all employed.

On the basis of the LMA, it is possible to estimate paid hours per job during the month and paid hours per job during the year for all employees. Consequently, we have estimated a relative distribution of paid hours throughout the months of the year.

The distribution of hours worked throughout the year differs from that of paid hours
Against the background of this information, the relative distribution of hours worked in relation to paid hours throughout the months of the year for all employed in the WTA can be estimated.

Although we only have information on paid hours during the month from the e-Income register (LMA and employees in employment), we can on the basis of the above information estimate what this is equivalent to, in terms of the number of hours worked from the basis of our knowledge of the distribution of hours worked in relation to the number of paid hours throughout the months of the year. The distribution of paid hours differs throughout the months of the year compared to the number of hours worked, because hours of absence are not equally distributed throughout the months of the year.

Different development in the various industry groups
The data material opens up the possibility of operating with a *different distribution of hours worked throughout the year in the various industry groups*. In the revised WTA, the relative distribution of hours worked in relation to the number of paid hours throughout the year is estimated on the basis of 19 industry groups (the 19-standard industry grouping used by Statistics Denmark).