STATISTICS DENMARK

Topic 3, item 3.2: LCS/LCI consistency

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Background
When the Labour Cost Survey (LCS) for 2012 was compared to the annual labour cost levels of 2012, estimated by Eurostat by extrapolating the LCS 2008 with results from the Labour Cost Index (LCI), a discrepancy of 3.6 percent was found in the case of Denmark. More specifically, the extrapolation underestimated the level of labour cost by 3.6 percent. As the two statistics serve different purposes and vary in both coverage and methodology, it was never expected that they would show the same growth in total hourly labour costs. At the same time, as they are based upon much of the same material, it was found a bit peculiar that the difference between them was in fact that large.

A discrepancy between the estimated LCS2008-LCI level of total labour costs and the LCS2012 data is by no means only a Danish phenomenon. In fact, as the table in Annex 1 shows, a difference was found in case of most of the EU countries. But when looking at how much the difference meant in absolute terms, the Danish and Swedish cases stood out with figures of € 1.4 for Denmark and -€1.9 for Sweden. Before the estimated LCS2008-LCI levels where revised with data from the LCS 2012, Sweden was recorded as having the highest labour costs per hour (€40.1) in the EU28, followed by Denmark (€38.4).[1] After the revision it was Denmark (€40.1) that turned out to have the highest total hourly labour cost, followed by Belgium (€38.1) and Sweden (€37.3).[2]

The situation described above illustrates how even relatively small differences in the estimated level of the labour costs can have large consequences on the ranking of countries and, not least, the level presented to users. Given the high level of labour costs in Denmark, even small percentage differences will result in large adjustments of the total figure. As a response to this it has been decided that annual levels of labour costs in Denmark will be made and sent to Eurostat when available in order to reduce the bias in the levels estimated by Eurostat.

As it takes more than a half year to produce and publish the annual results of the labour cost level nationally, it will still not be possible to deliver last year's results in March. Still, when delivering annual levels with a delay, we hope to reduce the margin of error by providing a new and updated benchmark to be extrapolated on. So in the case of 2014 national data of the Danish annual labour cost levels for 2013 has just been delivered to Eurostat and used by them to compute the levels for 2014 (published in a news release in March 2015).

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[1] Eurostat, *Labour costs in the EU28*. News release No. 49/2014.
http://ec.europa.eu/eurostat/documents/2995521/5180846/3-27032014-AP-EN.PDF/11426513-c28b-49c4-b591-df0ce1dde7bf?version=1.0
[2] Eurostat, *Labour cost structural statistics – levels*. Statistics Explained.
http://ec.europa.eu/eurostat/statistics-explained/index.php/Labour_cost_structural_statistics_-_levels.

Although it was expected that the two statistics to some degree would create different growth rates in labour costs, it was never expected that the difference would mean so much in absolute terms. To find out what was causing this inconsistency Statistics Denmark decided to perform an analysis based on the two main national statistics behind the LCS and LCI: the Structure of Earnings Survey (SES) and the Indices of Average Earnings (IAE).

In both these statistical surveys it is wages and salaries plus payments made to pension schemes that are mainly being measured. Other labour costs are added from another survey to both of them to create data for the LCS and LCI. But since wages and payments to pension schemes represent the biggest share of total labour costs in Denmark, it was found reasonable to leave out other labour costs from the analysis and focus on the variables already available in the SES and IAE. This approach is furthermore confirmed by the fact that the overall result of an apparently higher growth rate in the SES compiled in the quarterly index also is a clear fact on national level, if one defines "growth" in the SES by simply comparing wage levels between years, as is shown in table 1 for some major selected industries.

Table 1 Annual growth in average hourly earnings in the SES and the IAE, 2010-2013 (in %).

	Structure of earnings survey (SES)				Index of Average Earnings (IAE)			
	2010	2011	2012	2013	2010	2011	2012	2013
TOT Industry, total	2.4	3.3	3.0	1.1	2.3	1.8	1.5	1.2
C Manufacturing	3.6	2.1	2.6	2.2	2.5	2.3	1.8	1.6
F Construction	0.1	2.3	3.4	0.5	1.6	0.7	1.2	0.6
G Wholesale and retail trade	2.6	3.1	3.7	1.1	1.5	1.7	1.2	0.7
H Transportation	1.1	5.0	2.3	0.2	2.3	2.4	1.7	1.1
K Financial and insurance	6.0	2.5	2.7	2.8	4.2	3.2	1.7	1.6
M Knowledge-based services	3.3	2.7	3.4	0.9	2.2	2.1	2.0	1.3

It is quite obvious that especially in 2011 and 2012 growth in average earnings per hour worked in the SES is much higher than the corresponding figure in the IAE, both in total and for all economic activities. Note moreover that total growth in the average level in the SES amounts to 3 percent or more in 2011 and 2012, which however also in Denmark is a period, which without doubt is affected by the economic crisis. Normally one should only expect such high growth in earnings under better economic circumstances. The IAE however tells a different story with growth rates below 2 percent in both 2011 and 2012.

The aim of performing the analysis is above all hopefully to identify the variables that are mainly causing the difference in growth rates in labour costs between the annual SES and the IAE. Alternatively, if it is found that the difference is not caused by any particular variables, the analysis might make it possible to see whether the difference instead has to do with the way the two statistical surveys are structured. Just the fact that the SES covers 12 months of a year compared to 4 months in the IAE, could have implications on the level of labour costs registered and possibly also on its evolvement.

Besides finding out what the most important factors are explaining the different growth rates, it is also the aim of the analysis to provoke a discussion on the applicability of the LCI as an instrument to estimate levels of labour costs. If the estimations produce figures that are either too high or too low compared to the actual levels, then this might create a problem with users who might believe the published figures are the actual ones and use them in different forums. A relevant question to ask is also whether the aim should be at making the LCS and LCI as coherent as possible, or if it instead is an acknowledged and accept-

ed fact that they tend to differ. If the latter is the case, is it at all justified to use the LCI as a way to compute annual levels of total hourly labour costs?

In addition to the above mentioned, the analysis might also contribute to the discussion of whether the publication of annual labour cost levels should be extended with further NACE breakdowns, which is something Eurostat is currently looking into.

Coverage and methodology behind the Danish LCS and LCI
In Denmark there are three main surveys/censuses that in some way or the other form the basis for producing the LCS and the LCI. These are:

- The Structure of Earnings Statistics (SES) – a full-scale census of all enterprises in NACE-sections B-S with more than 9 full-time employees. The survey is carried out each year and contains data for all 12 months.
- The Indices of Average Earnings (IAE) – a sample survey compiled quarterly containing only enterprises with more than 9 full-time employees in NACE-sections B-S. Only data from the middle month in the quarter is collected, thus February, May, August and November.
- Other Labour Costs – an annual sample survey of enterprises in the private sector with more than 9 full-time employees.

LCS

In the calculations of the LCS and the national labour cost statistics, information on wages and earnings are gathered from the SES and then supplemented with data on other labour costs, such as vocational training costs and subsidies received by the employer, from the survey on other labour costs. Nationally, other labour costs are only collected and published for the private sector. In preparing labour costs for the public sector in the LCS, information from administrative data or other statistical surveys is used instead.

As wages represent by far the biggest share of total labour costs, it is the SES that is considered to have the biggest impact on the developments of the LCS. Because of this and the real situation mentioned in table 1 above the SES is clearly deemed adequate for this purpose.

The wage component used in the SES statistics is similar to the wages and salaries variable in the LCS (D11) with the addition of employers and employees payments to pension schemes. The wage component is expressed against hours worked and also against hours paid.

LCI

The Danish LCI is mainly based upon same data source as the IAE in the private and public sectors, which provide information on the part of the labour costs relating to wages and salaries. The remaining part of the labour costs is found in the sample survey of other labour costs, in much the same way as the LCS. Thus, it is also the case with the LCI that it is wages and salaries and not other labour costs that are causing the largest shifts in the movements of the total labour costs. This is reinforced by the fact that in contrast to the data on wages and salaries, data on other labour costs is only collected annually. The LCI is therefore only revised once a year with respect to other labour costs. For the sake of simplicity and comparability only relevant data for compiling the IAE have been used in the comparability analysis as a proxy for the LCI.

In Denmark, the coverage of the IAE is close to a 100 percent in the case of the public sector. In the private sector the sample survey covers between 4000 and 5000 enterprises. This corresponds to about 20 to 25 percent in total of the amount of enterprises covered by the annual census in the SES.

When estimating the rate of increase between two subsequent quarters, only enterprises where data is available for both quarters are included in the estimation procedure. If an enterprise fails to deliver data, or the data it delivers does not satisfy the minimum quality requirements, then it is omitted from both quarters used to perform the estimation. One of the quality requirements regards the number of employees leaving or entering the enterprise. When relatively large fluctuations in the number of employees are spotted the enterprise is removed from the calculations in order to, as far as possible, ensure that growth in earnings is not caused too much by structural changes in the composition of labour.

The wage component is the same as in the SES, only less payments for vacation/holiday and irregular payments such as bonuses. The main difference is that while wages in the SES are expressed against actual hours worked, the hours used in the indices are instead an approximation of hours worked, where absence due to illness and vacation are assumed to be constant in each month.

How the analysis is structured

The analysis only includes enterprises from the private sector. Therefore only data for the IAE for the private sector is used in the analysis together with data from the SES also covering the private sector. The years looked at are 2011 and 2012, or more specifically the change between them. Given the figures in table 1 above this absolutely should be an appropriate case with a difference in total growth of 1.5 percentage points.

As a first step a joint dataset was made containing all enterprises that had been used in the estimations of all 8 quarters between 2011 and 2012 and that also appeared in the structural statistics for both years. The number of enterprises living up to this criterion is about 930, corresponding to less than 25 percent of the total sample size in the quarterly data collection for the index. The 930 enterprises will form the basis for the analysis.

The idea is to see if the development of labour costs is different in the IAE compared to the annual SES, even when they are measured using the same set of enterprises. If this is the case this exercise will make it possible to look more into the behaviour of the relevant variables, and how they differ in the two statistics. Some of the variables that could have implications on the growth in the level of labour costs (and mainly wages and salaries) are gross wages and salaries, employers and employees payments to pensions schemes, irregular payments like e.g. bonuses and the number of hours worked/paid.

If none of the most important variables are found to have an influence on the varying growth rates of labour costs, then other factors might be looked at such as coverage and structure of the statistics.

Preliminary conclusions and points for discussion

The analysis is actually still ongoing, so there are no final results yet. As the analysis is quite complex, it is likely that the work will continue also after the end of the workshop.

Still the first results of the analysis, some of them depicted in table 2, indicate no pattern of higher growth rates in the SES compared to the IAE, despite the fact that the change in the total is a little higher in the SES. As can be seen in the table the difference in growth rates varies a lot between some of the biggest economic activities.

In wholesale and retail trade table 2 shows that the growth in average hourly earnings is higher in the SES than in the IAE, while the opposite holds in the case of manufacturing. This despite the fact that the growth rates of both activities in the nationally published levels (see table 1 on page 2) was about 3 per-

cent between 2011 and 2012. In both cases this was much higher than the corresponding growth rates in the IAE. A similar tendency is found in the case of construction, where the growth rate according to the nationally published figures in table 1 was 3.4 percent in the SES in 2012 and only 1.2 percent in the IAE. In table 2, where only the same enterprises are measured, the growth rate in wholesale and retail trade is about 2 percent in both surveys.

Table 2 Growth in average hourly earnings in the SES and IAE, 2011-2012, based on the same 930 enterprises (in %).

	Structure of earnings survey (SES)	Index of Average Earnings (IAE)
TOT Industry, total	2.2	1.8
C Manufacturing	0.9	1.3
F Construction	2.2	2
G Wholesale and retail trade	2	1.3

The same variation is found when the enterprises in the analysis are looked at individually. In many cases the growth rates of earnings in the same enterprise are different depending on which one of the two statistics is applied. The most logical explanation for this is the amount of coverage in the two surveys. As already mentioned the SES covers 12 months a year whereas the IAE only covers 4 months. The SES thus captures everything that has happened during a year, while the LCI only captures fragments of this. Because the number and characteristics of the employees in an enterprise might change during the year, this can have large implications on the labour costs registered in the two surveys. This will especially be the case in times of crisis or during economic upswings where large shifts in the structure of employment are more likely to take place, as illustrated by table 1.

Although the analysis is far from finished the preliminary results indicate that there are large variations between the SES and IAE even when the same set of enterprises is looked at. When considering that the SES in reality contains more than 16,000 enterprises and the IAE about 4000-5000 enterprises the picture looks even more complicated. For structural reasons the two statistics are not equal, and the way they are structured reflect their purpose, which in the case of the SES is to show levels of earnings and for the IAE to indicate real trends in wages. If the intention is to make them coherent then they will no longer fulfil their intended roles. Should the primary goal be to make them coherent or to make sure they live up to their intended national roles?

Another question to be asked is whether it can be justified to use the indices as a benchmark during 4 years when it already has been shown that the difference can be quite large even between just 2 years. As the table in Annex 1 shows most countries had large relative differences between the estimated and actual level of total hourly labour costs. And although this did not translate into large changes in absolute levels for some countries, it did in fact have a large consequence for countries like Denmark and Sweden where labour costs are high. As labour costs are increasing in most countries it is likely that this will be the case with more countries in the long run.

Furthermore, in Denmark the attention towards total hourly labour costs in the EU is increasing, which is probably also the case in most other EU countries. It is therefore important that the levels presented to users are not biased as they are used for many important things, like e.g. by enterprises when deciding where to set up new production facilities.

Annex 1

Difference between the LCS2008-LCI based estimates and LCS2012 data for the total hourly labour costs, i.e. revision to be expected with next release. (Scope: NACE B-to-S excluding O, enterprises > 10 employees)

	Relative	Absolute
Bulgaria	-4.9%	-€ 0.2
Czech Republic	-4.9%	-€ 0.5
Denmark	3.6%	€ 1.4
Germany	-0.1%	€ 0.0
Estonia	2.0%	€ 0.2
Ireland	#N/A	#N/A
Spain	0.7%	€ 0.1
France	-1.3%	-€ 0.4
Croatia	9.0%	€ 0.8
Latvia	-0.8%	-€ 0.1
Lithuania	1.2%	€ 0.1
Luxembourg	-2.3%	-€ 0.8
Hungary	-1.7%	-€ 0.1
Malta	-5.8%	-€ 0.7
Netherlands	0.5%	€ 0.2
Austria	-2.5%	-€ 0.8
Poland	6.1%	€ 0.5
Romania	0.9%	€ 0.0
Slovenia	4.6%	€ 0.7
Slovakia	7.6%	€ 0.6
Finland	1.7%	€ 0.5
Sweden	-4.9%	-€ 1.9

Source: Working group labour market statistics – meeting October 2014. Doc.: *Eurostat/F3/LAMAS/28/14* on annual labour cost levels.