National Statistics feature

Developments in ONS earnings statistics: an overview

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Key points

- A substantial work programme has been conducted in the United Kingdom to create an extensive series of timely, relevant statistics on all aspects of earnings.
- Two new experimental measures, Average Weekly Earnings (AWE) and the Index of Labour Costs per Hour (ILCH), have been introduced.
- The Annual Survey of Hours and Earnings (ASHE) is a development from the New Earnings Survey (NES), which it replaced in October 2004.
- Developments have been made in the established National Statistic, the Average Earnings Index (AEI).
- These developments have resulted in the ONS producing some of the richest and most comprehensive earnings statistics in Europe. ONS has been instrumental in the development of labour cost statistics within Europe promoting the sharing of common methodology.

Introduction

This overview highlights important developments in earnings statistics since the Distribution of Earnings Review in 2002, and introduces two new measures, Average Weekly Earnings (AWE) and the Index of Labour Costs per Hour (ILCH), on which separate articles are also available. Together with the new Annual Survey of Hours and Earnings (ASHE), published for the first time last October, they represent the culmination of a substantial work programme in the UK to create an extensive series of timely, relevant statistics on all aspects of earnings. The UK Office for National Statistics (ONS) now provides some of the richest and most comprehensive earnings statistics in Europe. ONS has been instrumental in the development of labour cost statistics within Europe promoting the sharing of common methodology. The main omission from this portfolio of earnings statistics is a Labour Price Index (LPI). As explained in **technical note**, it has not yet been possible to develop such an index – currently no other EU country publishes this indicator – as the measurement problems are significantly greater than for other measures, and it has not been a priority for users in the UK.

Earnings statistics can usefully be classified into two categories:

- structural statistics;
- short-term indicators.

Structural statistics tend to be more detailed. They are used to analyse trends in earnings over long periods, for both social and economic policy. The elements they focus on tend to change relatively slowly. As a result annual observations are usually sufficient. Short-term indicators, on the other hand, are used mainly for macroeconomic analysis and policy, where timely, monthly observations are more important. The trade-off for this greater frequency is less detail compared with structural indicators.

This article briefly explains what the various indicators measure, how they are produced and what they are ▶

used for. More detailed information on all ONS earnings statistics, their background and their relationship is provided in **technical note**, together with references to other articles which provide further details on the latest developments.

Structural earnings statistics

The main source of structural information concerning earnings in the UK is the Annual Survey of Hours and Earnings, which replaced the New Earnings Survey (NES) in October 2004. It measures earnings once a year, from a reference date in April, and the results are published at the end of October. The survey is based around a one per cent sample of employees in PAYE schemes. Earnings are defined as gross pay before tax, national insurance or other deductions and exclude earnings in kind. There is a rich amount of detail, allowing the estimates to be disaggregated into the following characteristics:

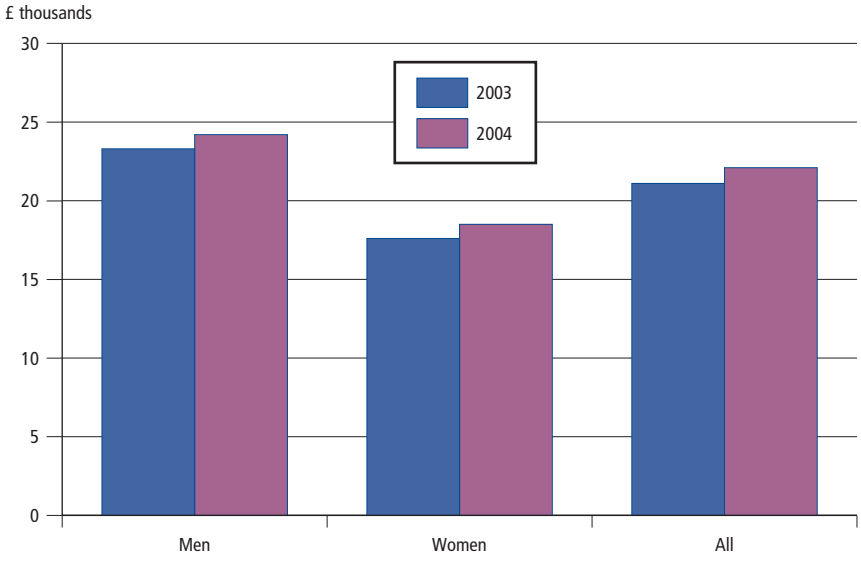
- gender;
- age;
- occupation;
- industry;
- full-time, part-time;
- make-up of pay between overtime, bonuses/commission, shift work and other; and
- standard geographical regions.

Summary estimates are given in the form of averages, with the median being the main focus of attention. Estimates of the distribution of the level of earnings are also provided.

The results from the latest ASHE survey are given in a series of articles published last autumn. By way of illustration, however, **Figures 1** and **2** opposite summarise median gross annual earnings of men and women and adult gross weekly earnings by

Figure 1

Median gross annual earnings for full-time employees;[a] United Kingdom; April 2003 and April 2004

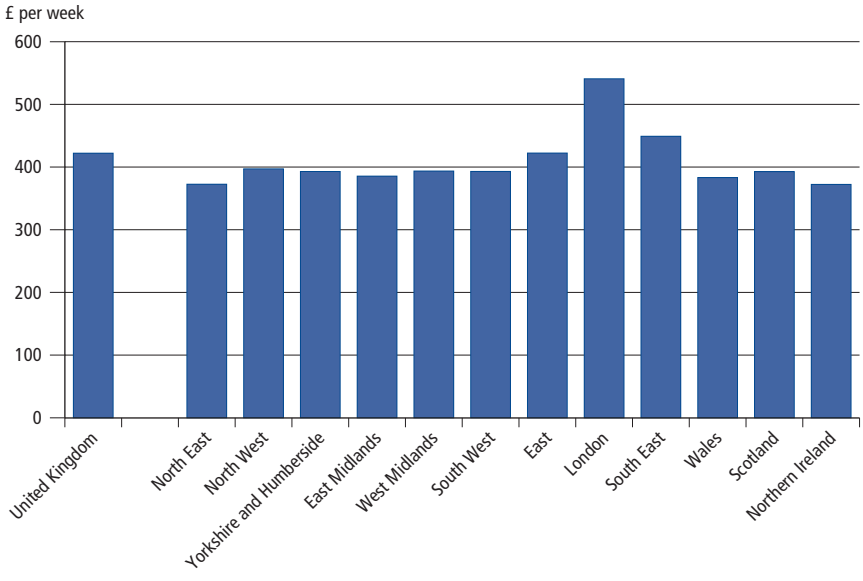


Source: Annual Survey of Hours and Earnings

a Adults who have been in the same job for at least 12 months, including those whose pay was affected by absence.

Figure 2

Median gross weekly earnings[a] by government office region; United Kingdom; April 2004



Source: Annual Survey of Hours and Earnings

a Full-time adults whose pay was unaffected by absence.

region respectively. Apart from earnings, ASHE provides information on:

- hours worked;
- collective agreements; and
- pensions.

The redesign of the New Earnings Survey in the form of the Annual Survey of Hours and Earnings has led to a number of improvements that have greatly enhanced the benefits for users, including:

- more reliable estimates as a result of extended coverage and methodological changes to reduce bias;
- explicit measures of quality in the form of error margins;
- better estimates at the lower end of the earnings distribution;
- a consistent time series from 1998 to 2004.

ASHE is mainly confined to employees in PAYE schemes, although supplementary surveys, included in the results provide some information on non-PAYE businesses (such as those registered only for VAT). Information on the earnings of the self-employed is available from the Labour Force Survey (LFS) and Her Majesty's Revenue and Customs (HMRC) tax data. The LFS is a quarterly survey of 60,000 households in the United Kingdom. It also provides information on hours (from everyone in employment) and earnings (from all employees sampled) of employees, though for the latter ASHE is the more reliable source.

Structural earnings statistics have a wide range of uses, with the following just a few examples:

- assessing the impact of government regulations on employment and pay;
- producing estimates of low pay, used by the Department of Trade and Industry and Low Pay Commission to set and monitor the National Minimum Wage;
- providing information to the Office of the Deputy Prime Minister (ODPM) to calculate the Area Cost Adjustment which helps determine local authority financial allocations;
- providing information to the Office of Manpower Economics for their support to the independent Pay Review Bodies;
- informing the Women and Equality Unit and the Equal Opportunities Commission to allow them to measure social inequality including the gender pay gap;
- providing information to ODPM, the Scottish Executive and the National Assembly for Wales to allow them to assess regional variations in pay;
- informing Eurostat, allowing international comparison of earnings.

Short-term earnings indicators

There is now a family of short-term earnings indicators comprising:

- the long-established Average Earnings Index (AEI);
- Average Weekly Earnings (AWE); and
- the Index of Labour Costs per Hour (ILCH).

The first two are monthly and the Index of Labour Costs per Hour is quarterly. The Average Earnings Index is a National Statistic, whilst the two new indicators are currently published on an experimental basis.

The main source of information for these indicators is the ONS Monthly Wages and Salaries Survey (MWSS) of around 8,500 companies. For the purposes of calculating the Index of Labour Costs per Hour, the survey is augmented with information on non-wage labour costs from a number of sources, including the LFS, ASHE, HMRC Survey of Personal Incomes and the ONS Annual Business Inquiry (ABI).

A table showing the comparison of definitions and methodologies of the three short-term earnings indicators is provided in **technical note**.

Average Earnings Index

This index measures the monthly change in average weekly earnings of employees. Estimates are available on both seasonally adjusted and unadjusted bases. The headline series is the seasonally adjusted change in the latest three months on a year earlier for the economy as a whole. Separate estimates are also available for public and private sectors, and for 20 industrial sectors. The design of the AEI means that it is affected by changes in the composition of employment within industries but not by changes in the composition of employment between industries.

Improvements in recent years mean that figures are now also available:

- including and excluding arrears;
- including and excluding bonuses, seasonally adjusted;
- for four sub-sectors of the public sector.

These developments make it easier to discern underlying movements in earnings and to judge inflationary pressures. For example, the Bank of England's Monetary Policy Committee looks at the new series of earnings excluding bonuses and arrears of pay, per job, along with a variety of other earnings measures.

Average Weekly Earnings

Like the Average Earnings Index, the new measure of Average Weekly ▶

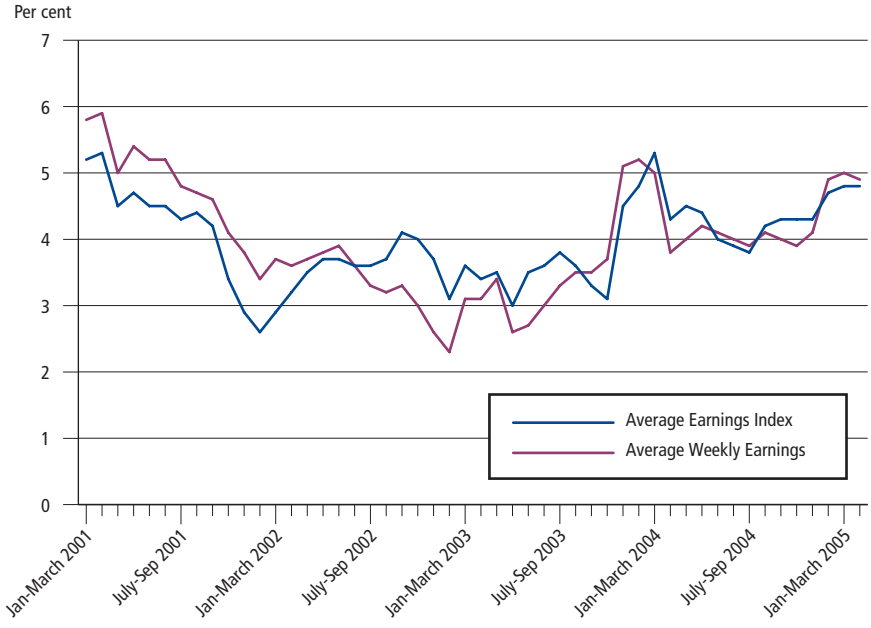
Earnings is designed primarily for analysis of short-term changes in average earnings. Compared with the Average Earnings Index, however, the Average Weekly Earnings indicator has the advantage of capturing changes in earnings which are caused by the change in the composition of employment between industries. This is because the Average Earnings Index is calculated using fixed employment weights when aggregating the average wage for each industry to get the whole economy average (the weights only being updated once a year). In Average Weekly Earnings, on the other hand, the employment weights of each industry are re-calculated every month, allowing the measure to capture the changing industrial structure of employment.

Another way of thinking of Average Weekly Earnings is that it is total earnings in the economy divided by the total number of employees. For this reason it has been described as 'true average earnings', for example in the Turnbull-King report. While such a label helped distinguish Average Weekly Earnings from the fixed-weight AEI, it has not been adopted as the name of the new series. In fact all the indicators measure what they are designed for, subject of course, to a statistical margin of error. The key thing is that users understand the estimates and what changes they do or do not capture.

Another advantage of the Average Weekly Earnings indicator over the Average Earnings Index is that for the first time there is a monthly time series of earnings which provides a meaningful pounds and pence value of average weekly earnings per job. However, it is anticipated that most users will continue to focus on the changes in average weekly earnings. The Average Weekly Earnings indicator also provides estimates of the proportion of average weekly wages accounted for by bonuses and arrears for the first time.

Figure 3

Annual growth in whole economy pay including bonuses and arrears;[a] Great Britain; January-March 2001 to February-April 2005, not seasonally adjusted



Source: Average Earnings Index/Average Weekly Earnings

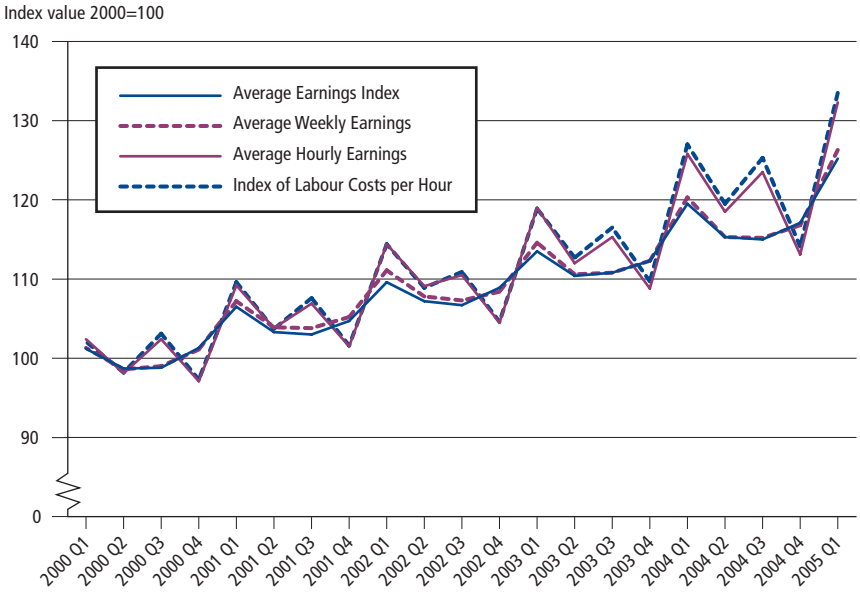
a Three-month rolling averages.

Average Weekly Earnings will therefore particularly add value to the understanding of short-term movements in earnings when there are shifts in employment from low-paying to high-paying industries and vice-versa. This is illustrated in **Figure 3**, which compares annual changes in the Average Earnings Index and the Average Weekly Earnings indicator. Towards the end of 2002 employment estimates used in the Average Weekly Earnings indicator were increasing in lower paid industries such as retail and education, but decreasing in higher paid industries such as wholesaling and computer related activities. Since the Average Weekly Earnings indicator used up to date employment information, these shifts of employees from one industry to another had an immediate effect on the growth rates. The Average Earnings Index, however, used industry weights based on the structure in July 2002, and because the weights were only updated annually, the changes were not incorporated until the weights were updated in July 2003.

Work is underway to produce estimates of sampling variability for Average Weekly Earnings, which will provide a measure of the quality of the estimates. ONS judges it essential to calculate these for the major series before Average Weekly Earnings can become a National Statistic. Similarly it is important to understand the underlying trend of Average Weekly Earnings, and so a seasonally adjusted series is being produced. It is anticipated that this

Figure 4

Comparison of the Average Earnings Index, Average Weekly Earnings, Average Hourly Earnings and Index of Labour Costs per Hour; Great Britain; 2000 to 2005, not seasonally adjusted



Source: Office for National Statistics

will be available from early autumn 2005.

Index of Labour Costs per Hour

The Index of Labour Costs per Hour is a more widely defined measure going beyond wages and salaries to include other labour costs such as employer National Insurance and pension contributions, sickness, maternity and paternity payments and benefits in kind. It allows users to observe changes in non-wage costs, which are not considered by the other indicators.

The second major feature of the Index of Labour Costs per Hour is that it responds to user demand for a per-hour indicator. The Index of Labour Costs per Hour is the first short-term indicator to provide an hourly measure of earnings. The hourly measure has two main advantages. Firstly, it picks up any short-term fluctuations in activity (that is, if employees are working more unpaid overtime, working shorter time or shorter-time contracts) as the salaries would stay the same but hours worked would change. Secondly, the Index of Labour Costs per Hour, in a similar way to Average Weekly Earnings, will be affected by changes in the composition of employment, in so far as employees move between different hourly rates of pay. These differences will be evident in the Index of Labour Costs per Hour, as it is a per-hour measure, but would not effect the other earnings indicators.

The Index of Labour Costs per Hour will be compiled and published quarterly. This (the total labour costs divided by total hours) can be compared with Average Weekly Earnings. The difference between these two indicators can be calculated by considering an intermediate measure; Average Weekly Earnings with an hours denominator (Average Hourly Earnings). This separates the fundamental differences between Average Weekly Earnings and the Index of Labour Costs per Hour into two parts:

- the difference between measuring earnings per job and measuring earnings per hour; and
- the addition of the non-wage costs.

Figure 4 compares these indicators, although the monthly Average Weekly Earnings measure has been presented as a quarterly index value to allow this comparison.

The graph shows that the Index of Labour Costs per Hour is more volatile, as would be expected, and peaks in quarters 1 and 3 each year. This is because most employees take leave in quarter 1 for New Year and Easter, and take their holidays during the July to September period, and so the hours worked decreases and the relative cost of labour therefore increases. It is noted that the inclusion of non-wage costs has a small impact.

The Index of Labour Costs per Hour appears very seasonal and so it is important to understand the underlying trend. Therefore a seasonally adjusted series has been produced, and will be published alongside the unadjusted series.

Conclusions

Following improvements in recent years, the UK now has a rich portfolio of structural and short-term earnings indicators.

- The new Annual Survey of Hours and Earnings offers a number of improvements over the New Earnings Survey by introducing ▶

weighting, which allows the results to be more representative of the population and improves coverage of the sample. These changes have also enabled ONS to improve the way it compiles estimates of the number of jobs paid below the National Minimum Wage. The published tables also include more information than was available for NES and measures are included to aid the assessment of the quality of the figures in the tables.

- The Average Earnings Index continues to be a valuable indicator of short-term movements in earnings, now with increased ability to monitor the effects of bonuses and arrears and the developments in different parts of the public sector.
- Average Weekly Earnings complements the Average Earnings Index by capturing the effect of changes in the industrial composition of employment and providing a monthly time series of the average level of earnings as a pounds and pence figure. It also provides estimates of the proportion of wages and salaries accounted for by bonuses and arrears for the first time.
- The Index of Labour Costs per Hour provides the wider measure of labour costs needed for an analysis of inflationary pressures and the external competitiveness of the economy. It also provides users with the first short-term earnings per hour measure.

However, more remains to be done.

- Developing Average Weekly Earnings with a view to it becoming a National Statistic. This will include completing seasonal adjustment and trend analysis, providing estimates of sampling variation and refining the outlier and imputation methodology. It will also continue the project to reconcile labour market statistics with national accounts information.
- Developing the Index of Labour Costs per Hour with a view to it becoming a National Statistic. This will include establishing an accurate back series to 1996, estimating for Northern Ireland, and producing a revisions history.
- Developing a Labour Price Index (see **technical note**).

More information on the Average Weekly Earnings indicator and the Index of Labour Costs per Hour may be found in the companion articles in this edition of *Labour Market Trends* (pp337-344 and pp345-352).

Further information

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Note

1 The *Labour Force Survey Quality Review Implementation Plan* may be found at http://statistics.gov.uk/about/data/methodology/quality/reviews/downloads/LFSimplementation.pdf

References

Bird D., 'Review of statistics on distribution of earnings', *Labour Market Trends*, November 2002.
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Technical note

The Labour Price Index

ONS has been involved in a feasibility project on the Labour Price Index which reached its conclusion in early 2004. This study, which was carried out by the Office for National Statistics in conjunction with Eurostat, has allowed ONS to assess the feasibility, cost and value of producing a quarterly labour price index. The Labour Price Index measures changes in the cost of labour at constant quality and quantity, and can be seen as the price of a basket of labour inputs, where the attributes of labour can be defined in terms of occupation, age, sex, length of service, etc. During the project ONS conducted a small pilot survey in the aerospace industry. The main conclusion was that extending the scope of the survey to provide a fully representative sample for the sector, or expanding the pilot to cover the whole economy would not be feasible. There are high costs associated with the measure, both for businesses and ONS, and respondents have difficulty providing the desired information.

The Labour Price Index project also considered the feasibility of generating a price type indicator from existing sources using hedonic methods. Hedonic pricing measures use analytical techniques on microdata to try to identify the 'price' of a unit of labour at the lowest level, by isolating the components that make up earnings. Wages and salaries data only were used in the analysis since estimates of total labour costs are not readily available for a sufficiently long period. The New Earnings Survey panel dataset provided information on wages and salaries at individual level and allowed research into hedonic and classificatory models. Work showed that the hedonic method produced tenable results, though, given the nature of the research, more work would be needed before the series might be considered for publication.

The relationship between ONS earnings statistics

Earnings statistics have been significantly improved and extended following the Distribution of Earnings Review in 2002, which aimed to review ONS earnings statistics in the context of user need, methodology, best practice and burden on data suppliers. This has mainly been achieved through the introduction of the Annual Survey of Hours and Earnings, Average Weekly Earnings and the Index of Labour Costs per Hour. The annual survey has been developed from the New Earnings Survey and addresses many issues raised as recommendations from the review. These include the measuring of low pay, hours and part-time employment, improving survey designs, outputs, respondent burden, and progressing quality and data collection methodology. The Average Weekly Earnings indicator and Index of Labour Costs per Hour meet the recommendations to extend the short-term earnings indicators. There have also been developments to the current earnings indicator, the Average Earnings Index, and work continues to improve the earnings measures in the Labour Force Survey. The relationships between these earnings statistics are shown in **Figure 5**.

The structural survey, the Annual Survey of Hours and Earnings, which includes information on low pay, is based on a sample of 230,000 employees and provides extensive information regarding earnings and hours to several regional, gender, age, industrial and occupational aggregations. The short-term earnings indicators, the established Average Earnings Index and the new experimental series, Average Weekly Earnings and the Index of Labour Costs per Hour, are based on the short-term earnings survey, the Monthly Wages and Salaries Survey. The two new indicators also incorporate information from the annual survey to create estimates for businesses with fewer than 20 employees, and businesses from Northern Ireland (which are not included in the short-term earnings survey). The Index of Labour Costs per Hour additionally uses information from the Annual Business Inquiry, Labour Force Survey and European Labour Costs Survey (ELCS) to estimate the non-wage costs. The Labour Force Survey provides further information on annual earnings. The ELCS, produced to comply with Eurostat requirements, provides information on all types of labour costs, every four years. The Labour Price Index project was carried out by ONS in conjunction with Eurostat (to meet its requirements), to assess the feasibility, cost and value of producing a quarterly labour price index.

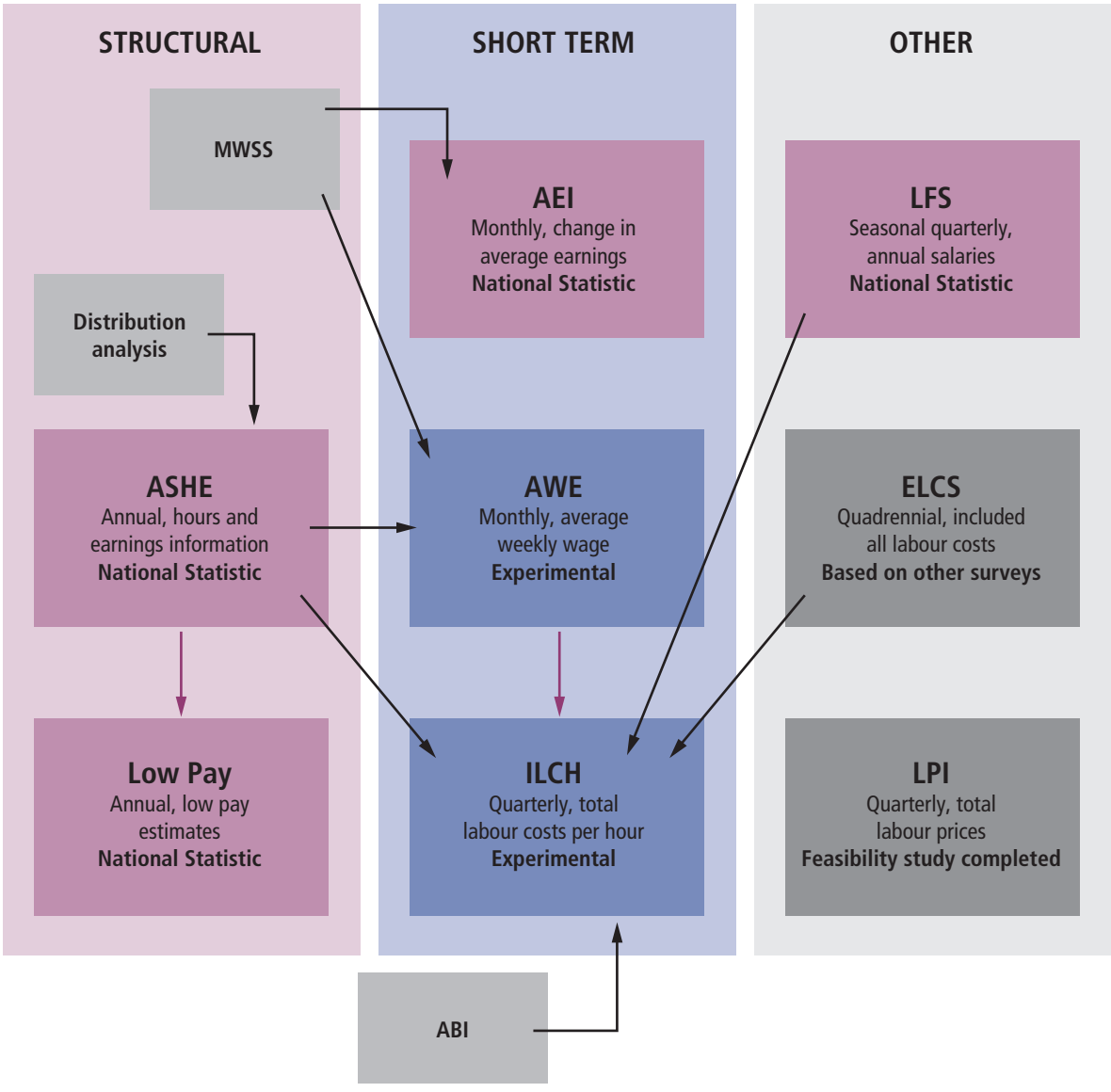
Much of the work recommended by the review was addressed with the introduction of the Annual Survey of Hours and Earnings. This is explained in more detail in 'Methodology for the 2004 Annual Survey of Hours and Earnings', *Labour Market Trends*, November 2004. The development of the Annual Survey of Hours and Earnings to replace the New Earnings Survey was ONS' first major survey redesign as part of the modernisation programme. The New Earnings Survey was designed to meet the policy needs of the 1970s and had changed little over the past thirty years. However, it had several deficiencies, in particular it included no imputation, was unweighted and it did not cover those employees not in PAYE, or who had moved jobs or started employment between the sample being selected and the survey reference period. The new annual survey, published in October 2004, responds to the recommendations and provided an opportunity to improve the methodology of the survey, to better meet users' requirements and to make use of new ONS corporate statistical tools.

The Labour Force Survey developmental plan further addresses the review recommendations. This is explained in more detail in *National Statistics Quality Review of the Labour Force Survey Quality Review Implementation Plan*.[1]

Technical note

Figure 5

Relationships between earnings statistics



This development plan notes that several achievements have been made in the context of improving the outputs.

One of the top priorities for earnings statistics was to address the limitations in its provision of short-term indicators. In response to this ONS has developed the existing Average Earnings Index, including producing an 'excluding bonuses and arrears' series, and introduced two new short-term indicators, Average Weekly Earnings and the Index of Labour Costs per Hour, to address the needs raised in the Distribution of Earnings Review. Accompanying this article are details of these two new earnings indices, developed by the Office for National Statistics. The monthly Average Weekly Earnings is described in 'The new experimental measure of Average Weekly Earnings' (pp337-344) and the quarterly Labour Cost Index is described in 'The new experimental Index of Labour Costs per Hour' (pp345-352).These new series are additions to the Average Earnings Index that has been the main official index of earnings growth.

Comparison of the short-term earnings indicators

Table 1 discusses some of the different characteristics and purposes of these indices.

Technical note

Table 1

Characteristics and purposes of the earnings indices

	Average Earnings Index	Average Weekly Earnings	Index of Labour Costs per Hour
What it measures	Monthly change in average earnings	Average weekly earnings	Average hourly labour costs
Denominator	Employment	Employment	Hours worked
Non-wage costs	None	None	Includes employer NI & pension contributions, sick, paternity and maternity payments and benefits in kind
Source of data	Monthly Wages and Salaries Survey	Monthly Wages and Salaries Survey	Monthly Wages and Salaries Survey
Frequency	Monthly	Monthly	Quarterly
Index Reference Period	Updated every 5 years	Not an index – no reference period	Updated each year
Weighting	Each company represents a number of similar companies, based on employment. This number is updated annually.	Each company represents a number of similar companies, based on employment. This number is updated monthly.	Each company represents a number of similar companies, based on employment. This number is updated monthly.
Estimation	Matched-pairs estimator, calculates monthly change in earnings per employee	Ratio estimator, grossed to the Inter-departmental Business Register	Ratio estimator, grossed to the Inter-departmental Business Register
Imputation	No automatic rules – some manual imputation	Previous pay carried forward from a maximum of 5 months ago	Previous pay carried forward from a maximum of 5 months ago
Outliers	Outliers set manually, only represent themselves	Firms with extreme pay (identified by a set boundary) only represent themselves	Firms with extreme pay (identified by a set boundary) only represent themselves
Firms with fewer than 20 employees	Employment of these firms is allocated pro-rata to companies within the same industry	Estimated using data from the Annual Survey of Hours and Earnings	Estimated using data from the Annual Survey of Hours and Earnings
Seasonal Adjusted	Yes	In progress, expected Autumn 2005	Yes
Sample Size (number used)	About 8,500 (7,500) companies	About 8,500 (8,000) companies	About 8,500 (8,000) companies
Periods available	January 1990-present	January 2000-present	January 1996-present (from January 2000 on a consistent basis)
Delay between response period and publication	6-7 weeks	7-8 weeks	7-8 weeks