

Article

Public and private sector earnings: 2019

The results of statistical models that explore the relationship between mean hourly earnings and a range of independent variables, based on Annual Survey of Hours and Earnings (ASHE) 2019 provisional data.



Contact:
Blessing Chiripanhura
economic.advice@ons.gov.uk
+44 (0)1633 582512

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1 . Main points

- The modelled average public sector earnings premium was 7% in 2019.
- The modelled average public sector earnings premium is the difference between average earnings of public sector and private sector employees after controlling for worker, job and firm characteristics; and there is greater diversity of workers in the private than public sector.
- The modelled public sector earnings premium was 3 percentage points higher in 2011 than in 2019.
- At a more granular level, a higher public sector earnings premium existed in 2019 among low-skilled workers.
- Private sector high-skilled employees in the knowledge-intensive services had higher earnings on average than their counterparts in the public sector.

2 . Public sector earnings premium

This article has considered four definitions of the earnings variable, namely gross pay (which includes overtime pay), gross pay including bonus payments, total remuneration and total remuneration including employee pension contributions in a salary sacrifice arrangement. The results change with the type of earnings variable considered.

The modelled average public sector earnings premium compares the average worker in the public sector with average worker in the private sector, but there is greater diversity in the private than public sector. The estimation of the public sector average earnings premium controls for variables that influence earnings, like job type, industry and personal characteristics. The estimated average premium is the change in earnings that is not explained by the controlled for variables. The models, on average, explain 57% of the variation in earnings. The premium may be a result of unobserved firm and worker characteristics that are not included in the model. Such characteristics may differ between the public and private sectors, something that one cannot observe from the average premium.

The results of the analysis show that the modelled average public sector earnings premium trended downwards between 2011 and 2019. The premium values had statistical significance for all the years. The changes from one year to the next are not always statistically significant. This is because the raw premiums may mask variations between the public and private sectors in relation to some of the factors that determine earnings.

The article has considered public sector earnings premium variations for similarly skilled occupational groups by organisation size and by industry grouping. The results based on total remuneration showed that, on average, employees in the public sector received a larger remuneration package than their counterparts in the private sector in almost every occupation grouping regardless of company size.

Our analysis shows that the modelled average public sector earnings premium based on gross pay including overtime pay and bonuses is higher for private sector employees in upper-middle and upper-skill groups in medium-sized firms, large firms and very large firms than for public sector employees. We also found that the modelled average public sector earnings premium is mainly concentrated among low-skilled workers, while high-skilled employees in the public sector tend to have lower earnings than employees in the private sector employed in the knowledge-intensive services and primary sectors. Further, public sector workers have positive earnings premiums over their counterparts working in the less knowledge-intensive sectors in the private sector.

3 . Structural characteristics of public and private sector earnings

The headline figures of median and mean earnings for the public and private sectors are published in [Employee earnings in the UK: 2019](#). This article uses the same data source, the Annual Survey of Hours and Earnings (ASHE), but changes some of the variables to suit our analysis. As a result, the figures presented in this article are not directly comparable with the headline figures.

The comparative analysis of private and public sector earnings is complex because of the different structural characteristics of the sectors. Direct comparisons of earnings in the two sectors (for example, using mean or median earnings) that do not consider factors such as job types, employee and employer characteristics and job location give crude indications of similarities and/or differences between the sectors. Therefore, in this analysis we use regression modelling to account for some employee and employer characteristics that impact on earnings.

The first step to this modelling exercise is choosing the appropriate earnings dependent variable. This is important because apart from variations in gross hourly earnings in the private and public sectors, there are other payments that constitute earnings that also vary between the sectors. Bonuses are a large component of the remuneration package in the private sector. Pensions are a large component of the remuneration package in the public sector where 89% of the workers contributed to a pension in 2019, compared with 75% in the private sector, notwithstanding the introduction of auto-enrolment in 2012.

Our analysis considers employer and employee pension contributions, which makes some statistics in the analysis different from those [published in the main ASHE publication](#). We consider two dependent variables for the regression analysis: the log of total remuneration (consisting of gross hourly pay, overtime, bonuses and employer pension contributions) and the log of total remuneration including employee pension contributions (that is, total remuneration including employee pension contributions made under salary sacrifice schemes). Employee pension contributions can take different forms, including additional voluntary contributions (AVCs) and workplace schemes. The ASHE questionnaire requires AVC contributions not to be included in the employee contributions recorded.

We treat employee pension contributions made under salary sacrifice schemes separately in calculating the total remuneration variable for our analysis. This helps us to check if such contributions have a significant impact on the analysis. Employee pension contributions made under salary sacrifice can reduce the overall taxable earnings of an employee, resulting in [greater take-home pay](#), depending on individual circumstances. In addition, there is less clarity on the treatment of the employee pension contributions made under salary sacrifice schemes, raising potential double-counting problems. Where workers participate in salary sacrifice schemes, it is not clear whether the employee contribution in a salary sacrifice scheme, which is paid to the pension scheme by the employer, is recorded as an employee or an employer contribution. For instance, [the People's Pension](#), a pension administrator and provider organisation, says any contribution paid to them under a salary sacrifice arrangement will be treated as employer-only contributions. This would bias the earnings upwards.

This analysis of public and private sector earnings includes both descriptive and regression analysis of earnings in the period 2011 to 2019. For more information on regression analysis and its limitations, see our [2018 publication's Quality and methodology section](#).

Data sources

We use the Annual Survey of Hours and Earnings (ASHE) data for this analysis. The ASHE dataset does not include all employee characteristics that affect pay such as education, experience and employee ability or motivation. It only covers the earnings of paid employees in the UK and does not include data on self-employed workers (who can be found on both the high and low ends of the earnings spectrum).

4 . Factors affecting earnings: summary of descriptive analysis

This section briefly summarises the main factors used in analysing private and public sector earnings. The detailed analyses of the variables are provided in [Section 6: Detailed analysis of main factors affecting earnings](#).

Employer and employee pension contributions

We include employer pension contributions in our analysis because pensions are a significant proportion on employee remuneration, especially in the public sector. Of all the employees in the public sector, 82% were in [defined benefit schemes](#), while only 8% of all employees in the private sector were in such schemes. In the private sector, employees were predominantly either in a defined contribution scheme (21%), in a group personal pension scheme (21%) or in a National Employment Savings Trust (15%). Of those with no pension with the employer, 11% were in the public sector and 26% were in the private sector.

Employees can contribute to pensions through salary sacrifice arrangements. Under these schemes, employees give up a portion of their gross salaries for additional pension-related benefits; as explained in Section 3, this can lead to greater take-home pay, depending on individual circumstances. Employees in the private sector (30%) are more likely to have a salary sacrifice arrangement than public sector employees (9%).

Age

Age is an important determinant of earnings that is used as a proxy for experience. Young workers tend to be paid less than older workers. For example, the minimum wage for workers aged 21 to 24 years was £7.70 in 2019, while that for workers aged 25 years and older was £8.21.

Age is also highly correlated with experience and the build-up of human capital over time. In 2019, the mean age of private sector employees was 40 years, while in the public sector it was 44 years. The age distribution shows that employee jobs in the private sector are skewed towards the younger age groups, while in the public sector employee jobs are skewed towards the older age groups (see Figure 6 in Section 6). Average hourly earnings increased sharply at younger age groups and then peaked in both public and private sectors in the age range 40 to 44 years.

Sex

Sex is an important determinant of earnings. Women, on average, earn less than men per hour, as explored in the [ONS's gender pay gap article](#). Our results show that in 2019 the median hourly earnings for men were higher than those for women in both the public and private sectors. The differential in pay between men and women was smaller in the public sector where men earned 22% more than women, than in the private sector where men earned 34% more than women. Women in the public sector earned more on average (£17) than those in the private sector (£11).

Skills (occupation groups)

The Annual Survey of Hours and Earnings (ASHE) records the occupations of employees using the [2010 Standard Occupational Classification](#), which is grouped into four broad skill levels. The groups consider the qualification levels, training, skills and the type of tasks undertaken. The data for 2019 show that the public sector employs a higher proportion of upper-skilled employees (47%) than the private sector (25%). These occupations include scientists, IT engineers, health, educational professionals and solicitors.

In 2019, higher-skilled occupations in the private sector, on average, earned more than similar occupations in the public sector. Employees in lower-skilled occupations (sales; process, plant and machine, and elementary occupations) in the public sector, on average, earned higher average hourly earnings (£13.62) than their counterparts in the private sector (£11.24).

Organisation size and working patterns

Another job-related characteristic associated with different levels of earnings are organisation size, location and type of industry. The size of the organisation is important for various reasons such as economies of scale, access to finance and productivity that can affect earnings.

Full-time or part-time status of the job can also affect the earnings of an employee for reasons such as different accumulation of human capital and employers' fixed labour costs. The 2019 ASHE data shows that in the private sector, 74% of the employees worked on a full-time basis, and 26% worked on a part-time basis. In the public sector, 68% of the employees were full-time and 32% were part-time. In the three months to June 2020, the Labour Force Survey shows that there were more men (15.1 million) than women (9.4 million) working on a full-time basis, while women (6.3 million) dominated in part-time employment compared with men (2.2 million).

Other factors

There are several other factors that influence earnings determination. Local labour market conditions and cost of living can be among the geographic factors affecting earnings. Job tenure, often used as a proxy for organisation-specific experience, is also an important factor that influences earnings. People with higher organisation-specific work experience tend to get paid more than those with less such experience. Permanent staff tend to be paid more than temporary staff, and full-time workers tend to be paid more than part-time workers. Firms also pay benefits-in-kind to workers. Benefits-in-kind may affect the level of earnings when, for example, employees agree to forgo a part of their salary in exchange for a benefit such as a company car or company-paid health insurance.¹

Notes for: Factors affecting earnings: summary of descriptive analysis

1. Trade union membership also influences earnings, with union members earning a premium over non-union members. However, we do not consider union membership in our analysis because the ASHE does not have a unionisation variable.

5 . Econometric modelling of private and public sector earnings analysis

The econometric modelling of the relationship between private and public sector earnings involves estimating an earnings equation with conventional explanatory variables (for example, age, years of schooling, experience and other demographic and job-specific variables), including one that identifies private and public sector employment. For a detailed discussion of the methodology, refer to the paper discussing the application of [Mincer-type earnings functions](#) (PDF, 691KB).

The estimation of an earnings equation makes it possible to account and control for some differences between people in employment before calculating the public sector earnings premium (when the average public sector worker earns more than the average private sector worker) or penalty (when the average public sector worker earns less than the average private sector worker). We alternatively call the premium or penalty (that is, the difference between public and private sector earnings) the earnings difference.

The estimated model

We estimate the model with the following independent variables: age, age-squared, sex, working pattern (full-time or part-time), tenure, occupational classification, organisational size, benefits-in-kind, whether the employment is permanent or temporary, region and various interactive terms of some variables, to capture the joint impact of some variables on earnings. The Annual Survey of Hours and Earnings (ASHE) data do not have variables for individual characteristics, which are related to earnings such as experience, qualifications or marital status. We use age to proxy experience, and occupation to proxy qualifications.

A full description of the methodology and variables is covered in our [2018 publication's Quality and methodology section](#). An important variable also included in the model is the dummy variable indicating the individual works in the public sector (and not in the private sector). The coefficient to this variable indicates the average earnings difference for working in the public sector.

Interpretation of the results

The variable of interest in our model is the one that captures the earnings difference. The coefficient representing the earnings difference is an average figure representing the average public sector worker compared with average private sector worker. The average worker in the private sector is more likely to differ across industries than the average public sector worker.

Our analysis with total remuneration and total remuneration including employee pension contributions under salary sacrifice schemes as dependent variables show that the premiums from the two models are not significantly different. Therefore, and because of the limitations of the salary sacrifice variable highlighted in section 2, we base our analysis on total remuneration rather than on total remuneration including employee pension contributions.

In Figure 1 we show two econometrically modelled average public sector earnings premiums and three raw public sector earnings premiums for the period 2011 to 2019. The modelled premiums are based on total remuneration and total remuneration including employee pension contributions. The raw premiums are based on unmodelled private and public sector earnings. They are based on three earnings variables, namely:

- gross pay including overtime pay
- gross pay including overtime and bonus pay
- total remuneration (consisting of gross pay, overtime and bonus pay, and employer pension contributions)

All variables are measured on per hour basis.

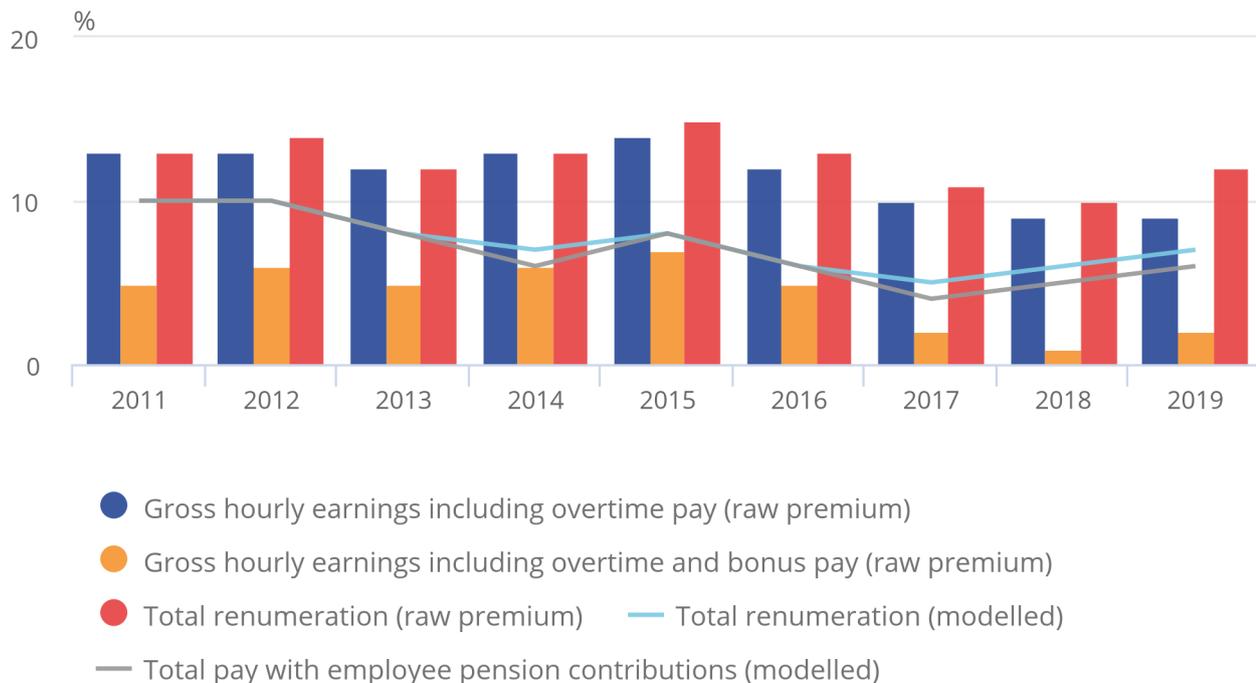
The raw premiums show average earnings and are not controlled for the effect of the dependent variables in the regression modelling. As such, they disregard possible heterogeneity in the premium because of variables such as occupation and organisation size. Positive values represent public sector earnings premiums and negative values represent private sector earnings premiums.

Figure 1: The public sector earnings premium declined between 2011 and 2019

Regression-based and raw average percentage of the public sector earnings premium, 2011 to 2019

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Regression-based and raw average percentage of the public sector earnings premium, 2011 to 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Figure 1 shows that the modelled average public sector earnings premiums are lower than the raw premiums. For example, total remuneration raw premium is higher than total remuneration modelled premium. The difference between the raw and modelled average premiums is explained by differences across individual jobs and businesses in the different sectors.

The modelled total remuneration-based average public sector earnings declined from 10% in 2011 to 7% in 2019, while the modelled average premium based on total remuneration including employee pension contributions declined from 10% to 6% over the same period. The premium based on total earnings with employee pension contributions is lower than that based on total remuneration (from 2015 onwards) because there are more workers with salary sacrifice arrangements in the private sector (30%) than in the public sector (9%). The difference between modelled average premiums based on total remuneration and on total remuneration including employee pension contributions is very small. From now on, we base our analysis on the total remuneration earnings variable.

Figure 1 shows that the raw premiums have similar trends. They peaked in 2015, declined between 2015 and 2018, and increased in 2019 even though the data for 2019 are still provisional. The raw premium based on gross pay including overtime pay reduced from 13% in 2011 to 9% in 2019. That based on gross pay including overtime and bonus payments reduced from 5% in 2011 to 2% in 2019. Comparing the two raw premiums shows that bonus payments are an important source of earnings in the private sector, and they reduce the earnings gap between the average workers in the private and public sectors. Bonus payments reduce the public sector earnings premium.

The raw premium based on total remuneration reduced from 13% in 2011 to 12% in 2019. Comparing the total remuneration-based raw premium with the raw premium based on gross earnings including overtime and bonus payments shows that employer pension contributions are an important component of the earnings package in the public sector. Taking employer pension contributions into account increased the raw public sector earnings premium by 10 percentage points in 2019.

The average worker in the public sector continued to earn a premium over the average worker in the private sector over the period, even after controlling for personal and job characteristics. However, the modelled average premium declined between 2011 and 2019.

Why might the modelled average public sector earnings premium be lower than the raw premium?

The modelled average premium is lower than the raw premium because some of the difference between public and private sector earnings is spread across the different control variables and interaction effects in the model. The modelled average premium is lower than the raw premium because some of the difference between public and private sector earnings depend on the different control variables and interaction effects in the model.

The auto-enrolment regulations were phased in between October 2012 and April 2019 and over the period, the private sector membership of pension schemes increased fast. The impact of pension contributions therefore declined over time as more private sector employers contributed to pensions. [The 2019 Office for National Statistics' publication on employee workplace pensions in the UK](#) states that the pension contribution rates in ASHE are different from the automatic enrolment minimum contribution legal definitions hence they are not directly comparable. The ASHE rates are pension contributions as a percentage of pensionable earnings and not as a percentage of qualifying earnings.

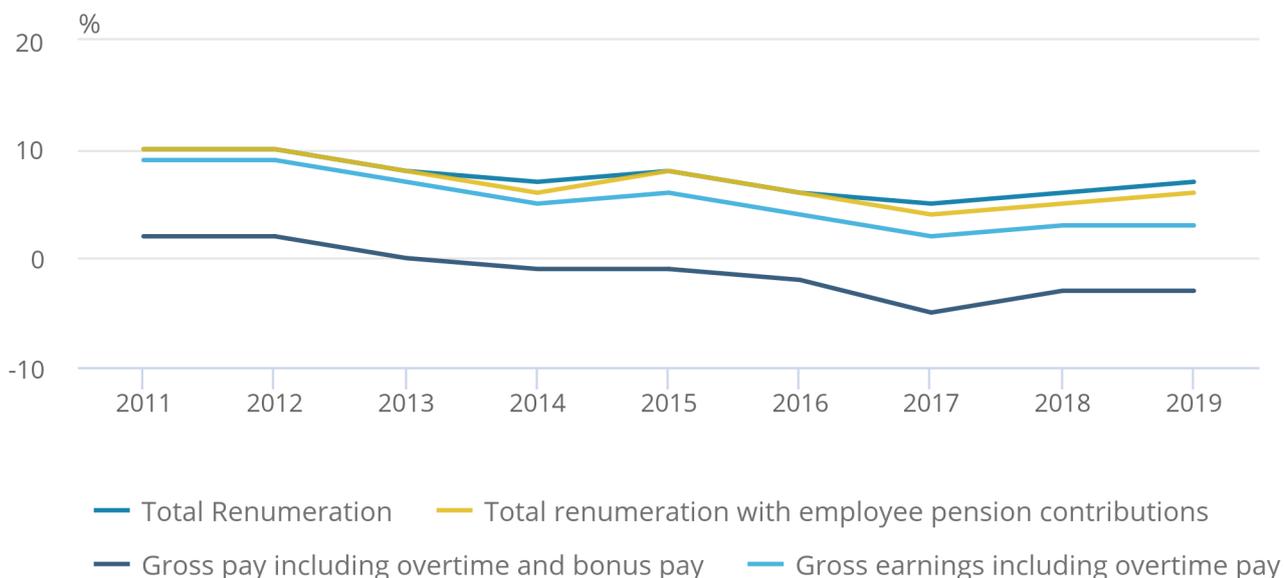
In Figure 2, we show the impact of bonus payments on modelled average public sector earnings premiums. We estimate four equations with the same explanatory variables but with different dependent variables. The four dependent variables are gross pay including overtime pay, gross pay including overtime and bonus pay, total remuneration, and total remuneration including employee pension contributions. The trends of the estimated premiums show that they had declining trends between 2011 and 2019. They were all statistically different from zero except for the gross pay including overtime and bonus pay in 2013.

Figure 2: The modelled average public sector earnings premium falls when bonus pay is considered; the premium increases when employer pension contributions are considered

Modelled average public sector earnings premiums based on different earnings variables, ASHE, 2011 to 2019

Figure 2: The modelled average public sector earnings premium falls when bonus pay is considered; the premium increases when employer pension contributions are considered

Modelled average public sector earnings premiums based on different earnings variables, ASHE, 2011 to 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

The model with gross pay, overtime and bonus payments as the dependent variable shows that considering bonus pay causes the modelled average public sector earnings premium to decline. The inclusion of bonus pay in the analysis significantly reduces the modelled average earnings premium. In 2011, including bonus pay in the dependent variable reduced the modelled average earnings premium by 7 percentage points and by 6 percentage points in 2019.

The modelled average premium based on gross pay including overtime and bonus pay was statistically significant over the analysis period except in 2013. In 2011, 2012 and 2013, the public sector modelled average earnings premium was positive. From 2014 onwards, it was negative. It became less negative between 2017 and 2019.

The modelled average earnings premium based on total remuneration reduced from 9% in 2011 to 7% in 2019. Including employer pension contributions in the analysis increased the modelled average premium. For example, in 2019, the modelled average premium based on total remuneration was 10 percentage points higher than the one based on gross pay including overtime and bonus pay. This means after controlling for employer pension contributions and other variables in the model, the premium increases. To explain the change in the gap between the gross pay including overtime and bonus pay, and total remuneration, one would need to refer to our publication on the [Annual Survey of Hours and Earnings - Summary of pension results](#) for 2019.

The value of the modelled average public sector earnings premium can also be called the unexplained component of earnings after controlling for the variables included in the regression model.¹ The model includes observed characteristics available in ASHE.² However, there are other person, job or industry characteristics that can affect earnings, which are either not available in the survey data used in the regression analysis or cannot be easily observed.

For example, skills inherent in workers that are not measured by the variables in the equation and unobserved differences in the quality of workers form part of the wage premium. Other examples of unobserved worker qualities that impact on earnings are productive abilities, communication skills and career ambition. These characteristics are omitted variables in the modelling process, and these may drive the size of the premium. Further, the choice to work in the private or public sector may not be random, which may explain the presence of the premium. Whatever modelled average public sector earnings premium one ends up with depends on the dependent variable chosen and on the specification of the model used.

The modelled public sector average earnings premium must be interpreted with caution because of differences between the private and public sectors. The value of the premium is an average across the average individuals, and the average employee can vary across occupations, firms and industries.

Other regression-based results

We have highlighted some of the limitations of the single figure public sector premium. To better capture the impact of heterogeneity on the public sector earnings premium using data for 2019, we interact some independent variables in our model.

Our model controls for many individual, occupation and job characteristics including interaction terms.³ Since we followed the modelling approach used in the 2017 study of private-public sector earnings, additional details are available in [the appendix of the 2017 public and private sector earnings in the UK](#).

We now move to capture the impact of heterogeneity on the public sector earnings premium using data for 2019. We do this by interacting some independent variables in our model with the public sector employment dummy. We continue to show the impact of including or excluding employer pension contributions in private-public sector earnings differentials. We have shown that including or excluding employee pension contribution when salary sacrifice is included does not cause significant change to the results. We therefore use the total remuneration excluding employee pension contributions in the following analysis.

The public sector premium differs by occupational groups and organisation size

The effect of organisation size may differ for different occupational group classifications as according to internal labour markets theory, larger firms offer more opportunities to workers and a suitable occupational match.

Therefore, on average, workers in larger firms are employed in better matches and earn higher wages. Conditional on wages, they are less likely to separate from the firm, but more likely to switch occupations within the firm, while the wage premium is higher for workers with longer tenure. There is clear evidence that employees in large organisations on average earn more than employees in small organisations for similar jobs (see Table 7 in Section 6).

However, a word of caution is in order. Observations within the same occupational group used in this analysis may have different levels of educational qualification, skills or responsibility and may not be distributed evenly between the public and private sectors. For example, in our 2018 publication, we explained that jobs in a narrowly defined occupational category of "teaching and educational professionals" includes all teaching professionals such as university lecturers, secondary education teaching professionals or nursery teachers and the distribution of these jobs between the public and private sectors are not perfectly balanced. Even within a more narrowly defined occupation, there can be a range of different types of skills, specialisations and productivity levels of workers.

We use the same linear model as before to get the metadata for the variables of interest. Firms in the private sector have been split into six categories based on the number of employees and the public sector is treated as a whole. (Figures 3(a) and 3(b)). Figure 3(a) is based on gross pay including overtime and bonus pay as the dependent variable, while Figure 3(b) is based on total remuneration as the dependent variable. Both figures use the estimated coefficients from the individual effects of occupational groups, firm size and the interaction effect between occupational groups and firm size. We report the results that are [statistically significant](#). The differences between the two figures are attributed to employer pension contributions (in total remuneration).

Since the impact of organisation size can vary according to occupational groups (as modelled by the interaction term "occupational group multiplied by organisation size"), we present the comparison for each of four categories of occupations. Figure 3(a) shows the percentage differences in average hourly earnings of workers in the public sector compared with workers working in different-sized private sector organisations for four occupational groups. Positive values represent public sector earnings premiums and negative values represent private sector earnings premiums.

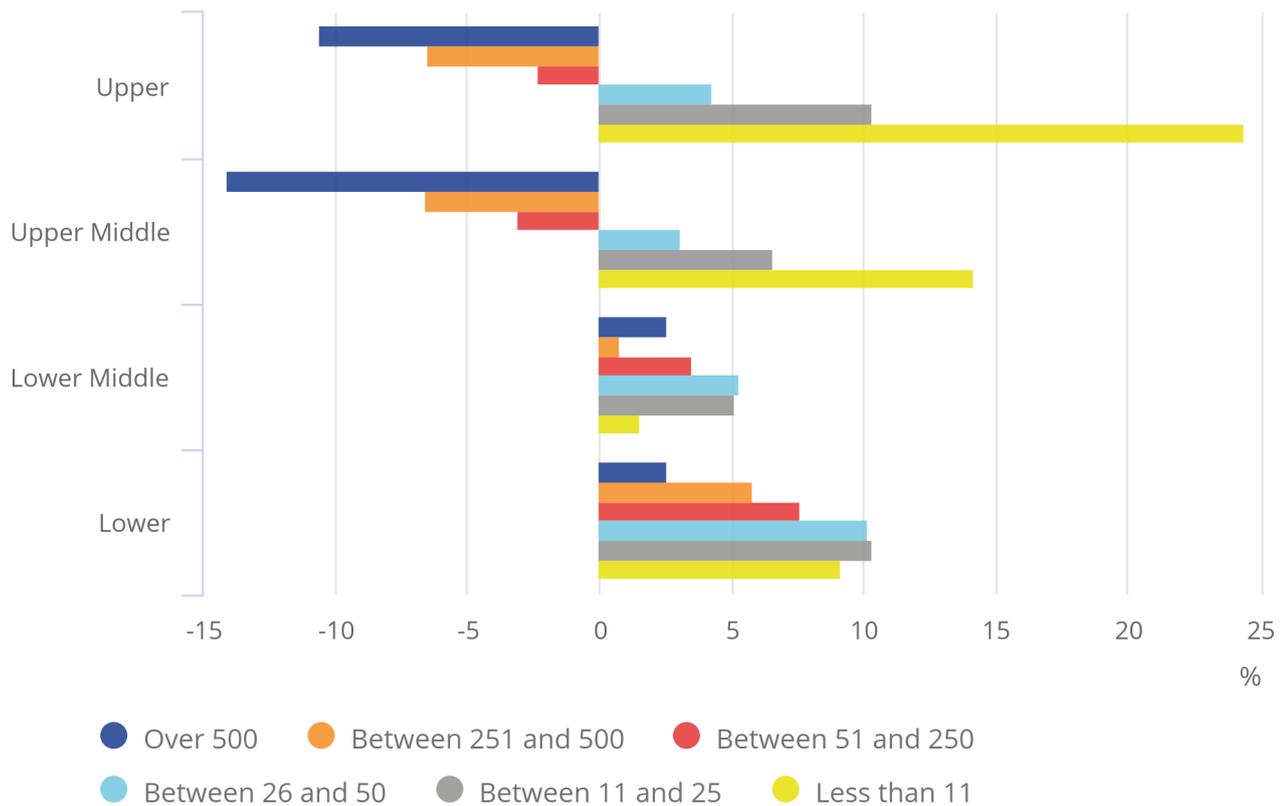
The results in Figure 3(a) suggest that when gross pay including overtime and bonus pay is modelled, employees with lower and lower-middle skills working in the public sector on average earn more than similarly skilled employees in the private sector in small enterprises (that is, firms with 50 or fewer employees). Employees in upper-middle and upper skill groups in all firms with over 50 employees on average tend to earn more in the private than public sector. For example, upper-middle skilled workers in firms with over 500 employees earn on average 8% more than their public sector counterparts, while upper-skilled employees earn on average 12% more.

Figure 3a: Employees in upper-middle and upper skill groups in firms with over 50 employees tend to earn more in the private sector than counterparts in the public sector

Gross pay including overtime and bonus pay modelled public sector earnings premiums by occupation groups and firm sizes, UK, 2019

Figure 3a: Employees in upper-middle and upper skill groups in firms with over 50 employees tend to earn more in the private sector than counterparts in the public sector

Gross pay including overtime and bonus pay modelled public sector earnings premiums by occupation groups and firm sizes, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Bars show the percentage by which public sector earnings are higher or lower than private sector earnings. The negative values show how much the private sector earns more than the public.
2. Data for 2019 are provisional.
3. Results include all observations.

On average, the public sector receives a larger remuneration package in the lower-skilled occupation grouping regardless of firm size. However, middle-upper and upper occupational groups in medium-sized firms (that is, firms employing 51 to 250 employees), large firms (that is, firms employing 251 to 500 workers) and very large firms (that is, firms employing over 500 workers) in the private sector earn more than their counterparts in the public sector.

The biggest earnings difference between the public and private sectors exists for upper-skilled occupations in very small firms (employing 10 or fewer workers), where the public sector employees earn on average 24% more than private sector employees in firms with fewer than 11 employees.

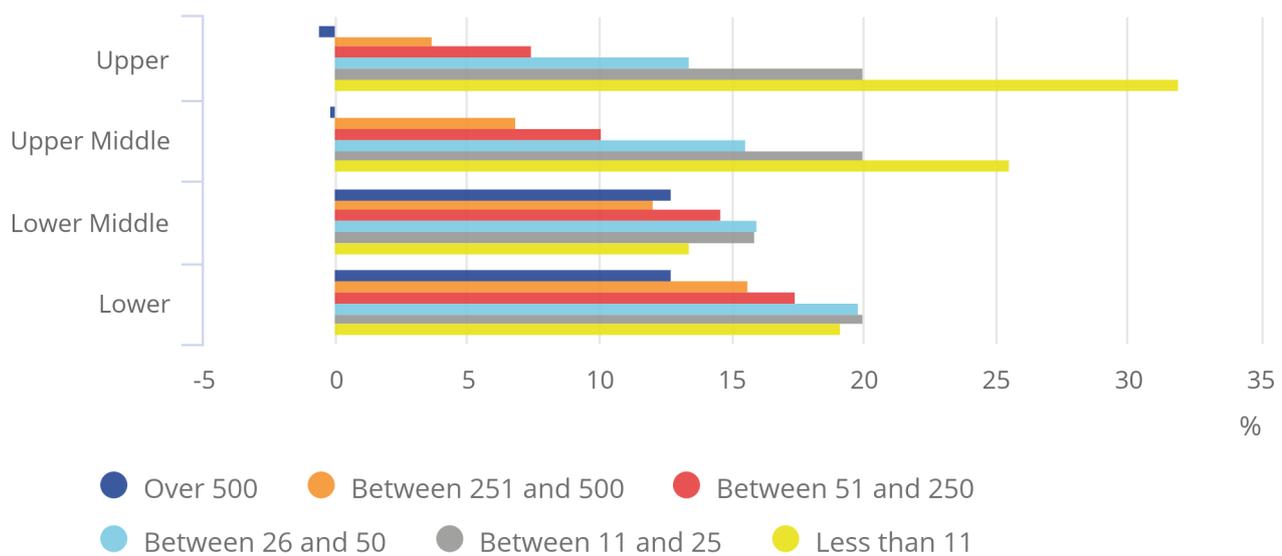
Figure 3(b) shows that including employer pension contributions in the analysis increases the modelled public sector earnings premium. It shows that when total remuneration is modelled, employees working in the public sector on average earn more than similarly skilled employees in the private sector regardless of the size of their organisation, except for upper-middle-skilled and upper-skilled workers in very large firms. For example, upper-middle skilled workers in very large firms on average earn 0.6% more than their public-sector counterparts, while upper-skilled employees earn on average 0.2% more.

Figure 3b: Most occupation groups in the public sector on average earn more than similarly skilled occupations in the private sector across most firm sizes

Total remuneration modelled public sector earnings premiums by occupational groups and firm sizes, UK, 2019

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Total remuneration modelled public sector earnings premiums by occupational groups and firm sizes, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Bars show the percentage by which public sector earnings are higher or lower than private sector earnings. The negative values show how much the private sector earns more than the public.
2. Data for 2019 are provisional.
3. Results include all observations

The biggest difference between public and private sector total remuneration is found for upper-skilled occupations in smaller firms, where the average public sector employee on average earns 32% more than the average private sector employee in firms with fewer than 11 employees.

Earnings premiums for different industry groups

Several studies have shown that in many countries there are large and persistent earnings differentials for seemingly similar workers and jobs across industries. Some of the explanations for this phenomenon include:

- compensating differences for some unmeasured undesirable aspects of the working conditions in some industries, such as unpleasant and unsafe working conditions in some industries such as mining
- unobserved quality of the workers (when unobserved quality of the labour force is not randomly distributed among industries)
- on-the-job training or industry experience may not be randomly distributed among industries
- labour market imperfections such as market power of the firm, discrimination, rent sharing, non-profit maximising firms and labour supply elasticity

We classify private sector industries (based on [Standard Industrial Classification: SIC 2007](#)) into five groups, namely manufacturing, construction, primary industries, knowledge-intensive services and less knowledge-intensive services. The public sector is treated as a single unit.

Knowledge-intensive services include private sector information and communication; and financial and insurance and real estate activities. Less knowledge-intensive services include private sector wholesale and retail trade and repair of motor vehicles; transport and storage; accommodation and food services; administrative services; education; human health and social work activities; and "other services" activities. In this analysis we do not control for organisation size to keep the model specification simpler and to avoid the problem caused by the high concentration of large organisations in the public sector only.

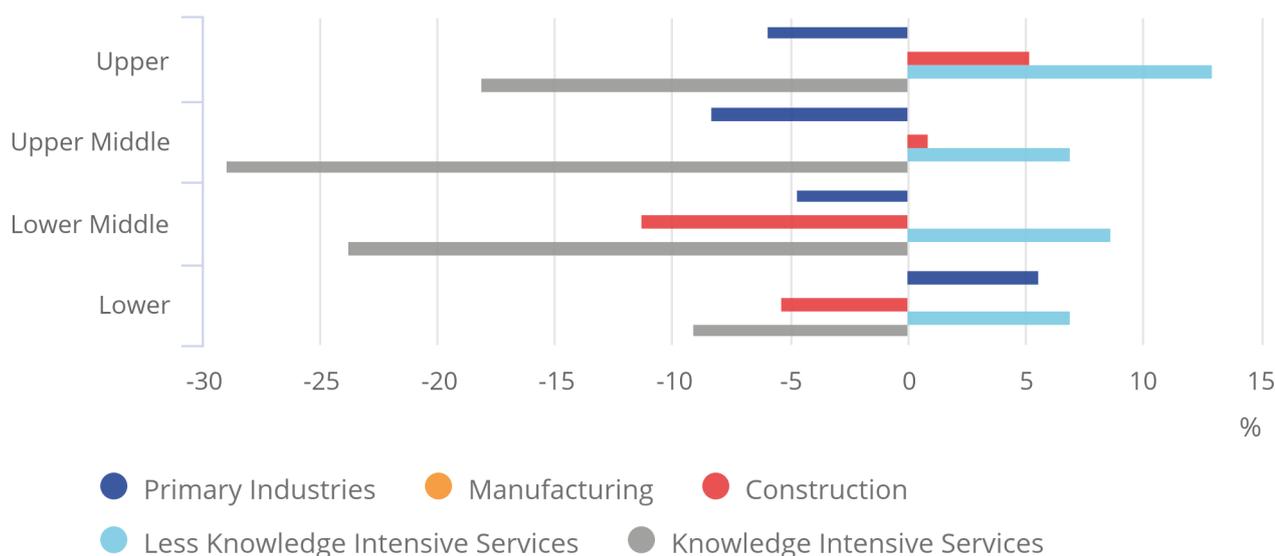
We estimate the modelled public sector earnings premiums in different industry groups for four occupational groups. Figure 4(a) has gross pay including overtime and bonus pay as the dependent variable; Figure 4(b) has total remuneration as the dependent variable. As before, we use a linear model that interacts occupational groups with different industry groups and report results that are statistically significant. The regressions for both figures are based on the estimated coefficients from the individual effects of occupational groups, industry groups and the interaction effect between the two groups.

Figure 4a: Private sector employees in all occupation groups in the knowledge-intensive industries have positive earnings premiums over their counterparts in the public sector

Private and public sector average percentage differences in mean hourly earnings by occupational and skill groups, UK, 2019

Figure 4a: Private sector employees in all occupation groups in the knowledge-intensive industries have positive earnings premiums over their counterparts in the public sector

Private and public sector average percentage differences in mean hourly earnings by occupational and skill groups, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Bars show percentage by which public sector earnings are higher or lower than private sector earnings. Negative values show how much the private sector earns more than the public sector.
2. Data for 2019 are provisional.
3. Results include all observations.

Figure 4(a) shows that private sector employees in all occupation groups in the knowledge-intensive services on average earn more than their public sector counterparts. Public sector employees in all occupation groups on average earn more than private sector employees in the less knowledge-intensive services industries. The situation changes significantly when employer pension contributions is included in total remuneration.

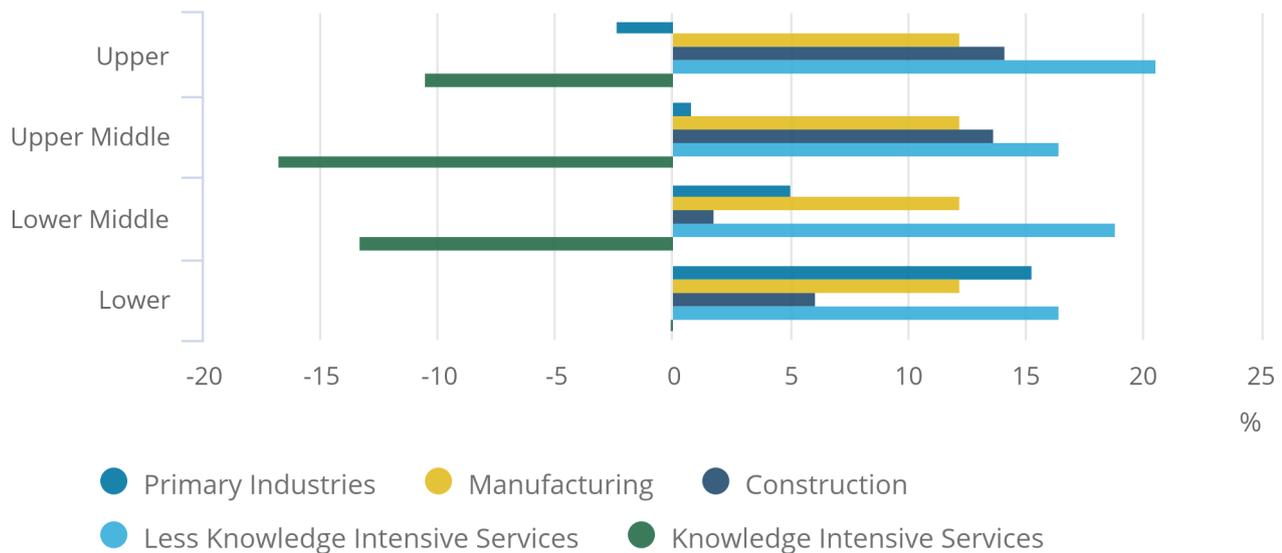
Figure 4(b) shows that when we consider employer pension contributions, the average public sector worker earns a premium on average over a similarly skilled average worker in manufacturing, construction and in less knowledge-intensive industries in the private sector.

Figure 4b: Higher-skilled employees in the knowledge-intensive services sectors earn more on average than their public sector counterparts

Total remuneration modelled average public sector earnings premiums by occupational groups and industry, UK, 2019

Figure 4b: Higher-skilled employees in the knowledge-intensive services sectors earn more on average than their public sector counterparts

Total remuneration modelled average public sector earnings premiums by occupational groups and industry, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Bars show the percentage by which public sector earnings are higher or lower than private sector earnings. The negative values show how much the private sector earns more than the public.
2. Data for 2019 are provisional.
3. Results include all observations.

Figure 4(b) shows that the higher-skilled private sector employees in the knowledge-intensive industries earned more than their public sector counterparts, with the upper-skilled occupations earnings 17% more on average. The results show that taking employer pension contributions significantly increases the earnings of public sector workers relative to those of private sector workers.

Notes for: Econometric modelling of private and public sector earnings analysis

1. It is important to note that the premium is not the variation in earnings not explained by the regression. However, it may be affected by the omitted factors in the model.
2. On average, the modelled variables explain 57% of the variation in earnings.
3. We are also aware that there are complex decisions behind the choice to join the private or public sector, which require estimating a selection equation. We do not do this because in ASHE there is no information on how workers choose the sector to work in.

6 . Detailed analysis of main factors affecting earnings

This section presents descriptive statistics for some main variables that are included in the econometric model to gain an initial insight into the differences in earnings between the private and public sectors. These are age, sex, industry groups in the private sector, occupation group, region, job tenure, job status and employer size. This cross-sectional analysis is based on 2019 Annual Survey of Hours and Earnings (ASHE) data.

For the analysis in this section, we consider two earnings variables: gross pay including overtime and bonus pay, and total remuneration (consisting of gross pay and employer pension contributions). In some cases we compare the two to show the effect of taking employer pension contributions on variables of interest.

Pension contributions

Pension contributions are a significant proportion on employee remuneration, though the composition of pension entitlement varies between sectors. Table 1 shows that 82% of public sector employees were in defined benefit schemes, while only 8% of employees in the private sector were in such schemes. In the private sector, 42% of the workers were equally distributed between defined contribution schemes and group pension schemes.

Table 1: Public sector workplace pensions are predominantly defined benefit schemes while private sector pensions are predominantly defined contribution schemes

Employees with workplace pensions percentages by type of pension, UK 2019

	Public sector % of workers with type of pension	Private sector % of workers with type of pension	All employees % of workers with type of pension
Defined Benefit scheme	82	8	27
Defined Benefit Group Self Invested Personal Pension (SIPP)	0	2	1
Defined Contribution scheme	4	21	17
Group Personal Pension scheme	1	21	16
National Employment Savings Trust (NEST)	1	15	11
Group Stakeholder Pension	0	6	5
No pension with employer	11	25	22
Unknown Pension type	1	2	1
All	100	100	100

Source: Office for National Statistics – Annual Survey of Hours and Earnings

There were more workers who are not members of an employer-supported pension scheme in the private sector (25%) than in the public sector (11%), despite the introduction of automatic enrolment in 2012.

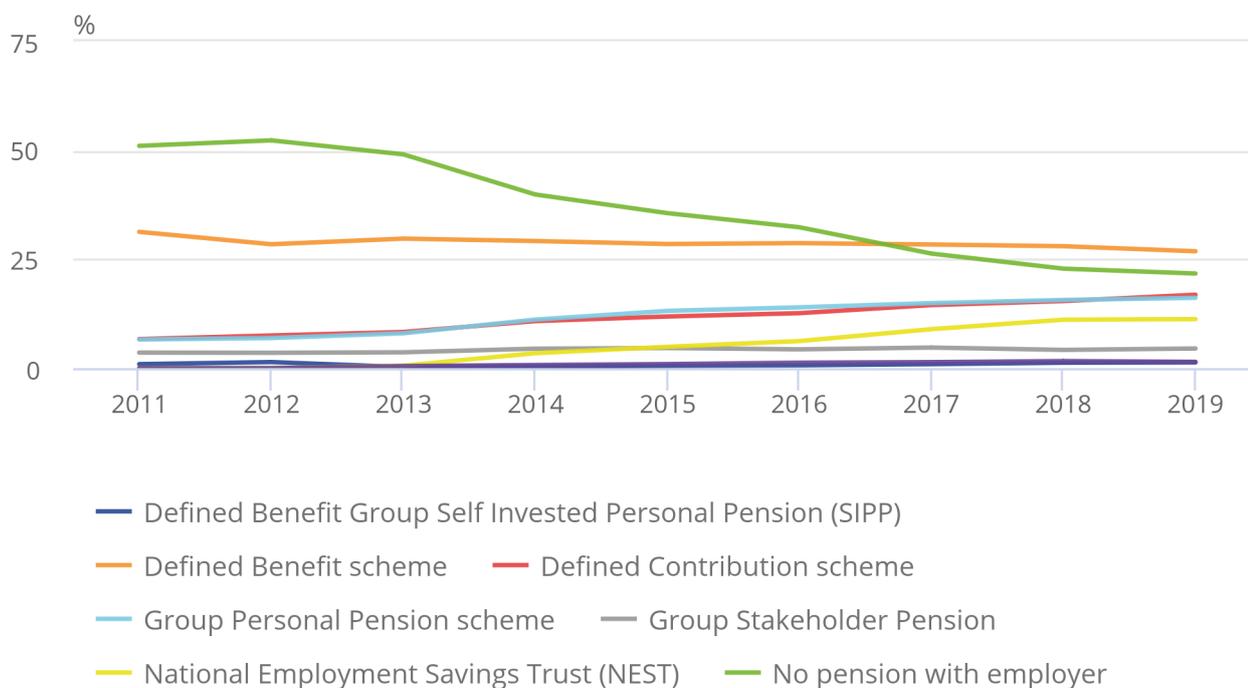
Figure 5 shows the longer-term trend in the different types of pension schemes since the introduction of automatic enrolment in 2012. There has been an increase in the number of employees in occupational pension schemes. Occupational defined benefit schemes pay a pension based on final or career average salary and the number of years of service. [Defined benefit schemes have been declining since 1997](#), particularly in the private sector as firms closed their final salary schemes because of increasing costs and rising life expectancy.

Figure 5: The proportion of workers in pension schemes increased drastically since the introduction of automatic enrolment in 2012

Proportion of employees with workplace pensions: by type of pension, UK, 2011 to 2019

Figure 5: The proportion of workers in pension schemes increased drastically since the introduction of automatic enrolment in 2012

Proportion of employees with workplace pensions: by type of pension, UK, 2011 to 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

The increase in workplace pension participation has mainly been in occupational defined contribution, group personal and group stakeholder membership schemes. Enrolments to both occupational defined contribution and group personal and group stakeholder pension schemes were broadly similar from 2001 onwards.

The Department for Work and Pensions' [2019 evaluation report](#) shows that since the start of automatic enrolment in 2012, more than 10.2 million workers have been automatically enrolled by their employers, while 709,000 workers having been automatically re-enrolled by their employers by the end of 2019. As of the end of March 2019, National Employment Savings Trust (NEST) membership stood at 7.9 million members, with over 720,000 employers.

Salary sacrifice

Table 2 shows the proportion of employees who have a salary sacrifice scheme. These schemes enable employees to agree to exchange part of their salary to get extra benefits from their employer. Benefits offered can include childcare vouchers, a company car and additional pension contributions. The results show that employees in the private sector (30%) are more likely to have salary sacrifice arrangement with their employer than employees in the public sector (9%).

Table 2: Only a quarter of all employees have a salary sacrifice arrangement with their employer, with a significantly higher proportion of these being in the private sector
Proportion of employees with a salary sacrifice scheme, UK, 2019

	Public sector (%)	Private sector (%)	All sectors
Yes	9	30	25
No	82	45	55
Unknown	9	25	21
All	100	100	100

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Individual characteristics

Private and public sector workers' age distribution

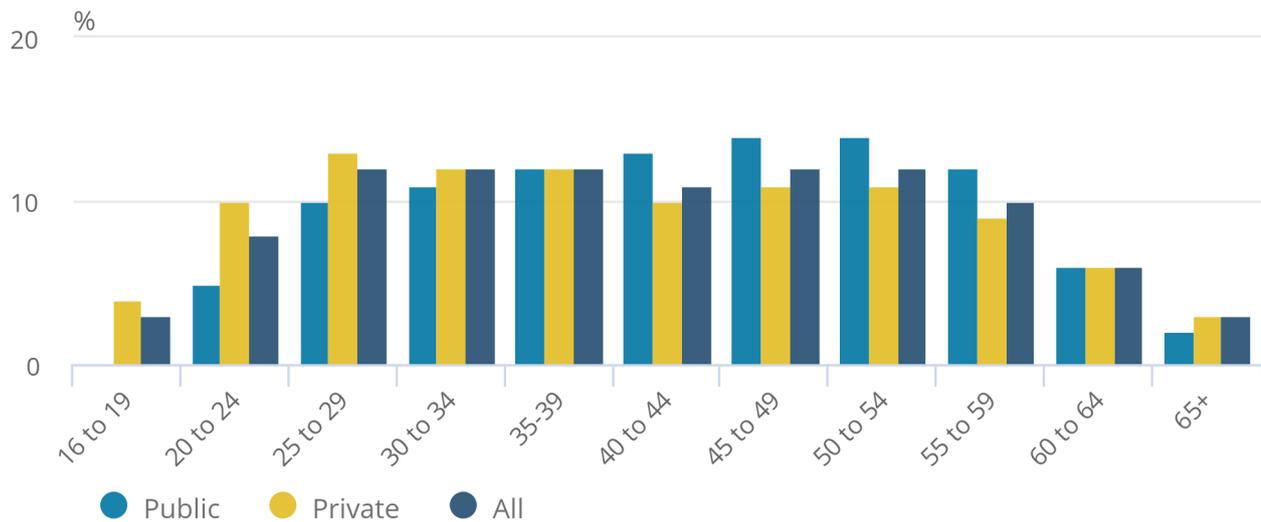
Age is an important determining factor for earnings. In our analysis, we use age to proxy for experience and the build-up of human capital over time. Figure 6 shows the distribution of employees by age groups. It shows that there are more young workers (16 to 34 years) in the private than public sector; and there are more older workers (35 to 64 years) in the public than private sector.

Figure 6: The distribution of private sector jobs is skewed towards younger workers

Share of all employees by age group and sector, UK, 2019

Figure 6: The distribution of private sector jobs is skewed towards younger workers

Share of all employees by age group and sector, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Data for 2019 are provisional.

Given the correlation between age and experience, it is likely that proportionately, public sector workers have more experience. With experience comes higher earnings, pension contributions and benefits. This may contribute to higher total earnings in the public than private sector.

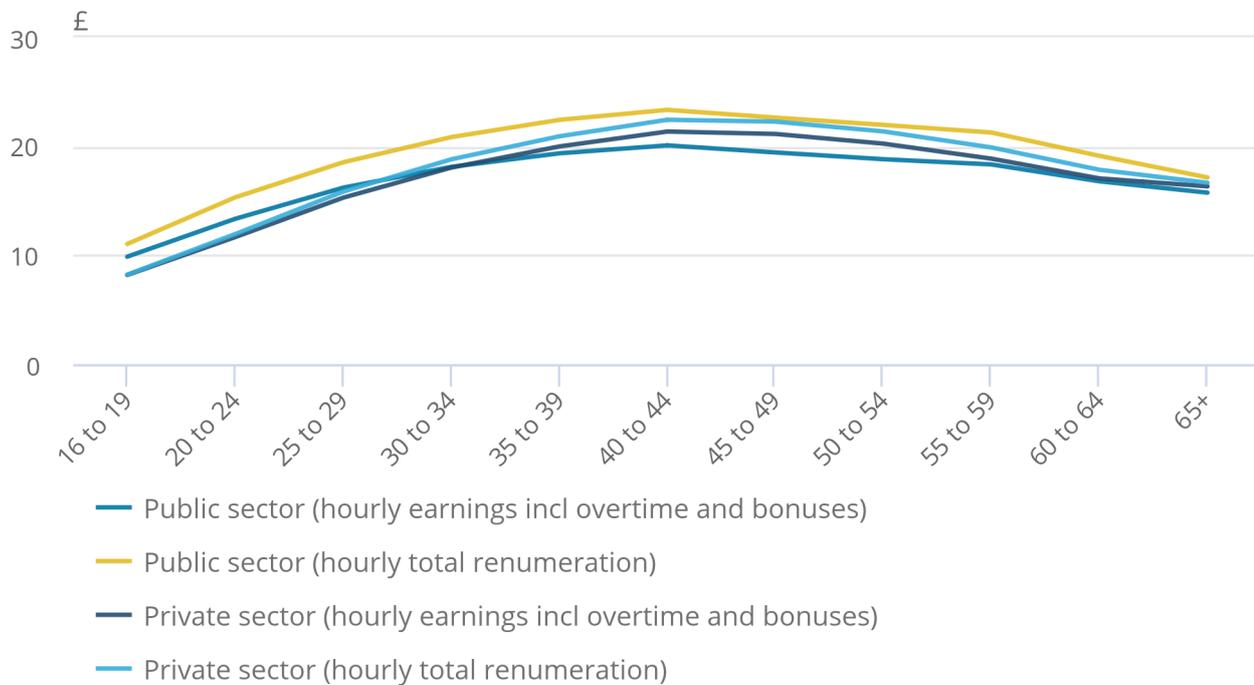
Figure 7 shows the average hourly earnings for different age groups in the public and private sectors. The average hourly remuneration in the public sector is higher than the average hourly remuneration in the private sector in all age groups. In both sectors, average hourly earnings (excluding employer pension contributions) increase sharply between age groups 16 to 19 years and 40 to 44 years. This is an indication of high return to experience.

Figure 7: Average hourly earnings, regardless of sector, rise sharply in the younger age groups

Mean hourly earnings of all employees by age and sector, UK 2019

Figure 7: Average hourly earnings, regardless of sector, rise sharply in the younger age groups

Mean hourly earnings of all employees by age and sector, UK 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Data for 2019 are provisional.
2. SALSAC is a variable in ASHE that records whether an employee participates in a salary sacrifice arrangement or not.

Between 40 years and 60 years, average hourly earnings growth slows for both public and private sectors with the private sector seeing a steeper fall. In both sectors, average earnings growth starts declining for workers aged 45 years and older.

Distribution of workers by sex

Table 3 shows the proportions of men and women in private and public sector employment. It shows that there are more women employed in the public than private sector; and that more men are employed in the private than public sector.

Table 3: There are proportionately more women than men employed in the public sector
Employment share by sector and sex, UK, 2019

	Female share (%)	Male share (%)
Private	42	58
Public	68	32
Whole economy	49	51

Source: Office for National Statistics – Annual Survey of Hours and Earnings

In the UK economy, there are more men than women in employment. However, recent data from the Labour Force Survey for May to July 2020 show that there is a near-equal number of male (14.1 million) and female (13.9 million) employees in employment. However, more men (15.1 million) than women (9.6 million) work full-time, while women (6.2 million) still dominate in part-time employment compared with men (2.2 million).

Sex is an important determinant of earnings. For example, women are more likely than men to take career breaks to raise children and to look after family. Women are also not well represented in high-earning positions; they are also more represented among part-time and low-earning jobs. These factors have negative impacts on women's lifetime career earnings. This analysis shows that in 2019 men earned more than women in both the private (34%) and public (22%) sectors. Women in the private sector earned 53% less than women in the public sector, and men in the private sector earned 39% less than men in the public sector. Table 4 shows the average hourly earnings for women and men in both private and public sectors.

Table 4: Men earn more than women in both the private and public sectors
Average hourly total remuneration by sex, UK, 2019

	Women: median hourly earnings (£)	Men: median hourly earnings (£)
Private	£11	£15
Public	£17	£21
Whole economy	£13	£16

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Differences in skill (or occupational) groups

Earnings tend to differ with the level of skills of employees. For example, engineers (high-skill workers) are paid more than shop assistants (low-skill workers). Given that skills are distributed differently across industries, the average earnings in different industries and skills levels also differ.

ASHE records the occupations of employees using the [Standard Occupational Classification: SOC 2010](#), which considers the qualification levels and the type of task undertaken. This makes SOC occupation a good proxy for skill level, given that the survey does capture individual workers' education levels.

In this analysis, we define skill levels as consisting of groups of occupations based on SOC 2010.

Professional or upper-skill group jobs include occupations such as scientists, IT engineers, and health, educational professionals and solicitors. These occupations have significant barriers to entry as many of these roles require graduate and post-graduate qualifications, followed by many years of on the job training. Lower-skill group jobs consist of elementary occupations such as farm workers, window cleaners, and waiters and waitresses. Lower-middle skill group jobs consist of secretaries, carers, hairdressers, cashiers, machine operatives, transport drivers; upper-middle skill group jobs include professionals such as teachers, doctors, scientists, engineers, managers and directors.

Table 5 shows the distribution of skill groups in the private and public sectors in 2019. It shows that the UK economy, lower-middle and upper-middle skill groups dominate the UK labour market.

Table 5: The public sector has a higher proportion of upper-skilled occupations, while the private sector has a higher proportion in all other skill occupations

Percentage distribution of skill groups in the public and private sectors, UK, 2019

	Public Sector (%)	Private Sector (%)	Whole economy (%)
Lower	5	14	11
Lower Middle	30	36	34
Upper Middle	18	26	24
Upper	47	25	31
% of total workforce	25	75	100

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes

1. Data for 2019 are provisional.

Table 5 shows that public sector workers are predominantly in high-skill jobs while private sector workers are predominantly in low-skill jobs. This is likely to be because [large occupations in the public sector](#) such as teachers, doctors and nurses now require at least a degree.

More private sector workers were in lower and lower-middle skill jobs (49%) compared with public sector workers (35%). In the public sector, 65% of the workers were in upper-middle and upper skill jobs, compared with 51% of private sector workers. The disparities in skills concentrations result in different average earnings.

There are more than [300 different reported occupations in the public sector](#). These include business and administration roles as diverse as economists, accountants, people working in human resources and office managers, as well as teachers, nurses and social workers. However, while there is a huge range of public sector occupations, most workers are clustered into a relatively small number of areas. Almost half are in specific occupations related to health, education, social work, government, the police, and domestic services. For example, of all public sector workers, one-tenth are schoolteachers and a quarter work in the health and social care sectors.

Table 6 shows the mean, median and standard deviations of hourly remuneration in the private and public sectors' disaggregated occupations. It shows that higher-skilled occupations have relatively similar mean hourly remuneration in both sectors; and that lower-skilled occupations in the public sector have higher average remuneration than in the private sector.

Table 6: The standard deviations suggest that total remuneration in the private sector has more dispersion than in the public sector

Mean and median hourly total remuneration by occupation groups, UK 2019

	Public Sector			Private Sector		
	Mean hourly remuneration (£)	Median hourly remuneration (£)	Standard Deviation (£)	Mean hourly remuneration (£)	Median hourly remuneration (£)	Standard Deviation (£)
Managers, directors and senior officials	30	27	18	32	23	30
Professional occupations	26	24	12	27	24	21
Associate professions	20	19	8	23	18	19
Administration and secretarial	16	14	7	16	13	11
Skilled trades	16	15	6	15	14	8
Caring, leisure and other occupations	13	13	4	11	9	4
Sales occupations	17	15	8	11	10	6
Process, plant and machine	18	15	8	13	12	5
Elementary occupations	12	11	5	10	9	4
Total	21	19	11	19	14	18

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Data for 2019 is provisional
2. The standard deviation is a statistic indicating how the values for a group are spread from the mean. A low standard deviation means that most of the values are very close to the mean. A high standard deviation means that the values are spread out.
3. The standard deviation is for each occupation by sector

When the median is lower than mean, the distribution is skewed to the left with a tail stretching toward the right (high values), so a long tail of low values (on the left) pulls the mean down. The standard deviation is a statistic indicating how the values for a group are spread from the mean. A low standard deviation means that most of the values are very close to the mean. A high standard deviation means that the values are spread out.

There is greater variation of average earnings in the private than in the public sector, particularly in high-skill occupations. In both sectors, the largest variation in average earnings is among managers, directors and senior officials. Jobs in the same occupation can vary in terms of educational qualifications, skills and responsibilities, and may not be evenly distributed between the two sectors.

Job-related characteristics

In both the private and public sectors, employment level, skills requirements and productivity differ across industries. In addition, factors such as industry composition, location and organisational size are important determinants of earnings.

Industry and firm size

The public sector comprises of local and central government business activities. At the beginning of 2019, micro and small enterprises (employing 0 to 49 workers) accounted for 1.1% of all employees while [medium-sized enterprises \(employing 50 to 249 workers\) and large enterprises \(employing at least 250 workers\) accounted for 6.2% and 92.8% of all employees respectively \(XLS, 2.39MB\)](#).

The private sector consists of companies, sole proprietors and partnerships. These are entities driven by the profit motive that operate in different industries, for example, banking and finance, information technology, manufacturing and pharmaceutical production. At the beginning of 2019, private sector micro and small enterprises accounted for 37.9% of all employees, while medium-sized and large enterprises accounted for 15% and 47.1% of all employees respectively.

The public sector is dominated by large enterprises, while the private sector is dominated by small and medium-sized enterprises. Firm size is an important determinant of earnings. Numerous empirical studies have shown a strong and positive relationship between employer size and earnings. For example, [Berlingieri, Calligaris and Criscuolo \(2018\)](#) (PDF, 584KB), [Lallemand, Plasman and Rycx \(2005\)](#), and [Barth, Davies and Freeman \(2016\)](#) (PDF, 286KB) looked at the relationship between firm size and earnings and their results showed that there was a significant and positive relationship between earnings and firm size after controlling for many individual characteristics and working conditions. A substantial part of the firm size wage premium is derived from higher productivity and stability of the workforce in large firms. In addition, [efficiency wage models](#) also provide a complementary explanation of the firm-size wage premium.

Location

Geographical location is another important factor that influences earnings. Local labour market conditions, for example, the unemployment level in a region, and the cost of living are among the geographic factors that affect earnings. Both public and private sector employment is distributed around the country. Some industries in the private sector (for example, banking and finance) are highly concentrated in London.

The concentration of economic activity and production in London and higher cost of living result in professionals working there earning significantly more than in some parts of the country. Hourly earnings are higher in London for several reasons. It benefits from significant economics of agglomeration, where many organisations are co-located near to each other. Many international companies have their headquarters in London, which attracts people from all over the world. However, this does have a knock-on effect on the cost of living.

Professionals in Northern Ireland have the lowest hourly earnings. In 2019, [Northern Ireland had the highest share of public sector employment \(25%\) \(PDF, 632KB\)](#), followed by Scotland (21%) and Wales (20%). London had the lowest share (14%) of public sector employment.

Organisation sizes in the private and public sectors

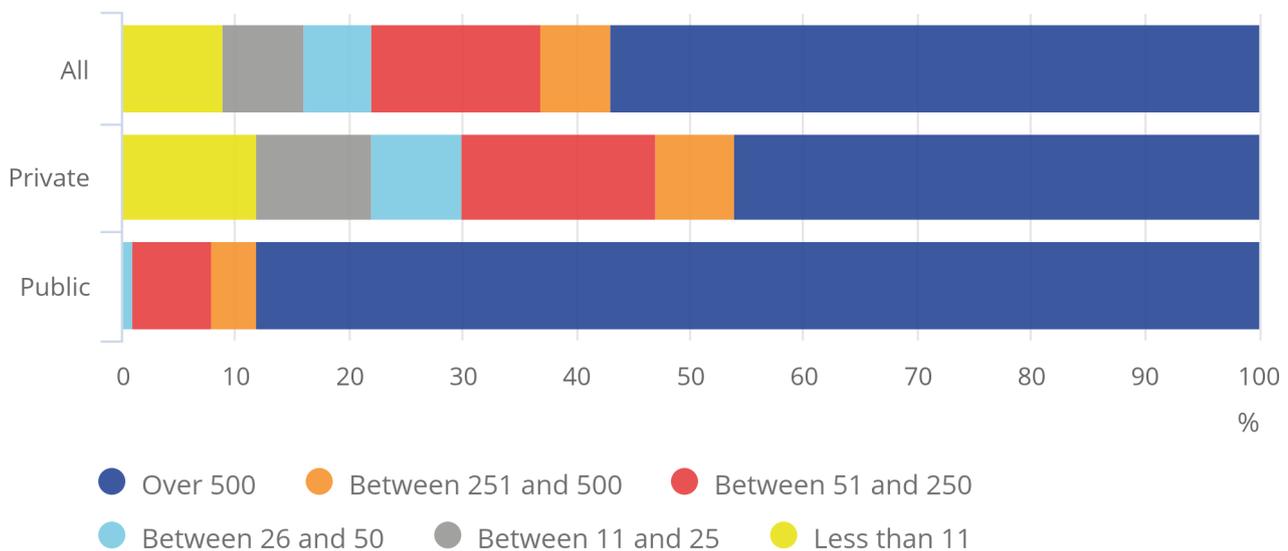
In 2019, 58% of all employee jobs were in organisations employing over 500 employees, with a significant difference between the private and public sector. In the public sector, 89% of employee jobs are in organisations with over 500 employees, with 47% in the private sector. Nearly half of employee jobs in the private sector are in organisations with fewer than 250 employees, while in the public sector around 8% of employee jobs are in organisations with under 250 employees.

Figure 8: There is a higher proportion of employees in the public sector working for large organisations compared with the private sector

Percentage of employee jobs by size of organisation and by sector, UK 2019

Figure 8: There is a higher proportion of employees in the public sector working for large organisations compared with the private sector

Percentage of employee jobs by size of organisation and by sector, UK 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Data for 2019 are provisional.

Table 7 shows the impact of organisation size on earnings. It shows that on average, an employee in a large organisation tends to get higher hourly remuneration than the average employee in a small organisation. The organisation sizes are based on the number of workers.

Table 7: On average, employees in large organisations tend to earn higher remuneration than those in smaller organisations

Mean hourly total remuneration by organisation size, UK, 2019

	Public sector (£)	Private sector (£)	All sectors (£)
Less than 11	14	15	15
Between 11 and 25	19	16	16
Between 26 and 50	20	17	17
Between 51 and 250	23	19	19
Between 251 and 500	21	20	20
Over 500	21	20	20
All firm sizes	21	19	19

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes

1. Public sector (includes all sizes).
2. Data for 2019 are provisional.

There are very few small and medium-sized public sector organisations. We therefore treated the public sector as one entity in Table 8.

Table 8: Employees in knowledge-intensive industries earn higher remuneration than those in less-knowledge-intensive industries

Mean and median hourly total remuneration in different industry groups

	Mean hourly earnings (£)	Median Hourly earnings (£)
Private	19	14
Primary Industries	21	16
Manufacturing	19	15
Construction	19	16
Less Knowledge Intensive Services	15	11
Knowledge Intensive Services	29	22
Public	21	19
Whole economy	19	15

Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes

1. Data for 2019 are provisional.

Distribution of earnings

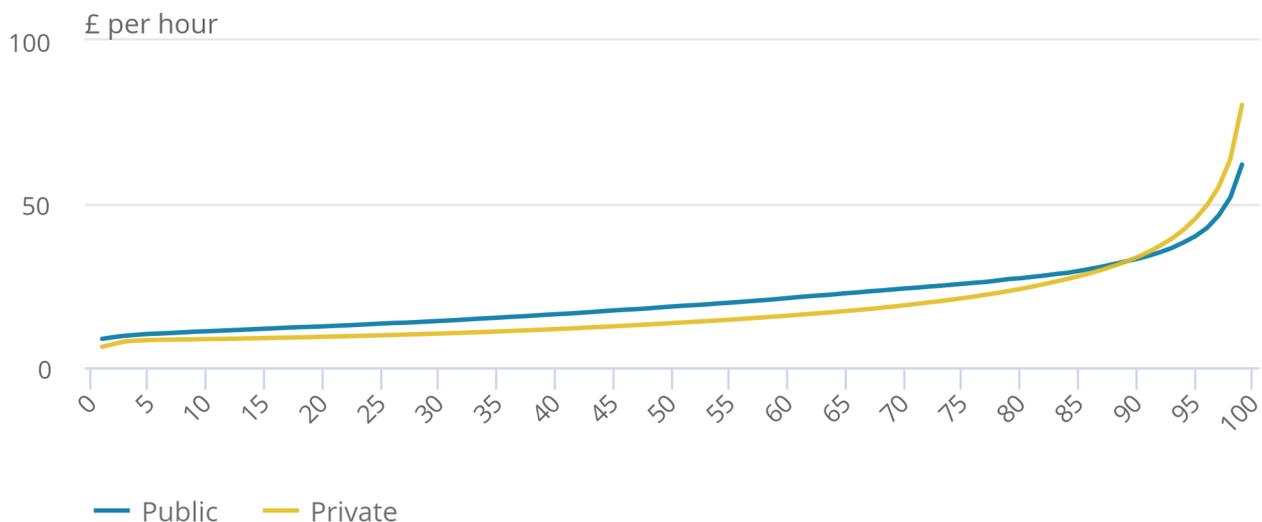
Figure 9 shows that mean hourly remuneration was generally higher for public sector employees across the earnings distribution, apart from the top 10% where employees in the private sector earned higher remuneration. Mean hourly public sector remuneration exceeded the private sector by between £0.00 and £5.00 per hour until the 89th percentile of the earnings distribution.

Figure 9: Mean hourly remuneration in the public sector exceeded that in the private sector up until the 89th percentile of the total remuneration distribution

Distribution of hourly earnings (includes pensions) in the public and private sector, UK, 2019

Figure 9: Mean hourly remuneration in the public sector exceeded that in the private sector up until the 89th percentile of the total remuneration distribution

Distribution of hourly earnings (includes pensions) in the public and private sector, UK, 2019



Source: Office for National Statistics – Annual Survey of Hours and Earnings

Notes:

1. Data for 2019 are provisional.
2. Only data between the first and 99th hourly earnings percentile have been used.

At this point, both mean hourly public and private sector remuneration were around £32 per hour. In April 2019, hourly remuneration for private sector employees at the 99th percentile was around £18 per hour more than for employees at the same percentile in the public sector.

7 . Glossary

Average weekly earnings

[Average weekly earnings](#) measures money paid by employers to employees in Great Britain before tax and other deductions from pay. The estimates are not just a measure of pay rises as they also reflect, for example, changes in the overall structure of the workforce. More high-paid jobs in the economy would have an upward effect on the earnings growth rate.

Earnings

A measure of the money people receive in return for work done, gross of tax. It includes salaries and, unless otherwise stated, bonuses but not unearned income, benefits in kind or arrears of pay.

Private sector

All people in employment are classified to the private sector except those employed by central government, local government and public corporations.

Public sector

The public sector comprises central government, local government and public corporations as defined for the UK National Accounts. The national accounts are compiled based on an internationally comparable accounting framework and describe the activities in a national economy.

8 . Data sources and quality

The strengths and limitations of the Annual Survey of Hours and Earnings (ASHE) can be found in the [Quality and Methodology Information \(QMI\) report](#) and the [Guide to sources of data of earnings and income](#).

The value of the modelled average public sector earnings premium may be influenced by unobservable variables that affect earnings. These are variables that affect earnings, which are either not available in the survey data used in the regression analysis or cannot be observed easily. Whatever modelled average public sector earnings premium one ends up with depends on the dependent variable chosen and on the specification of the model used. Lastly, the modelled public sector average earnings premium must be interpreted with caution because it is an average across the average individuals, and can vary across occupations, firms and industries.

9 . Related links

[Employee earnings in the UK: 2019](#)

Bulletin | Released 29 October 2019

Measures of employee earnings, using data from the Annual Survey for Hours and Earnings (ASHE).

[Average weekly earnings in Great Britain](#)

Bulletin | Monthly

Estimates of growth in earnings for employees before tax and other deductions from pay.