

Statistical bulletin

Human capital stocks estimates in the UK: 2004 to 2022

National and regional estimates of human capital stock in the UK from 2004 to 2022.
Includes full and employed human capital estimates for each year.

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To be announced

Notice

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All publications on human capital estimates in the UK will be located in this series from March 2024.

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1 . Main points

- In 2022, the value of the acquired skills and knowledge, known as the human capital stock, of the working age population living in the UK was estimated at £25.5 trillion.
- Lifetime earnings grew between 2004 and 2020, although they declined for the first time in 2021 and failed to grow in 2022; this fall was largely owing to the ageing UK population and slower growth in the number of people obtaining advanced qualifications.
- The gap between women's and men's per person lifetime earnings fell steadily, decreasing by 3.7 percentage points between 2004 and 2022.
- Regional differences in per person lifetime earnings were at their lowest since the series began in 2004.
- Between 2017 and 2022, London and the South East showed no growth in per person lifetime earnings; this contrasted with Northern Ireland and the North East, which showed the highest growth in per person lifetime earnings.

2 . Human capital in 2022

What human capital is

This release presents the latest results on the UK's human capital.

The Organisation for Economic Co-operation and Development's (OECD) report on [The Well-being of Nations: The Role of Human and Social Capital](#) defines human capital as the measure of the "knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being". It plays an important role in productivity and sustainability, and it is one of the main impacts on individual well-being and health.

In this release, we measure real human capital through people's projected present value lifetime earnings. All of the data reported in this bulletin refer to real and full values unless otherwise specified (see [Section 6: Glossary](#) and [Section 7: Measuring the data](#)). Nominal values can be found in the associated data tables.

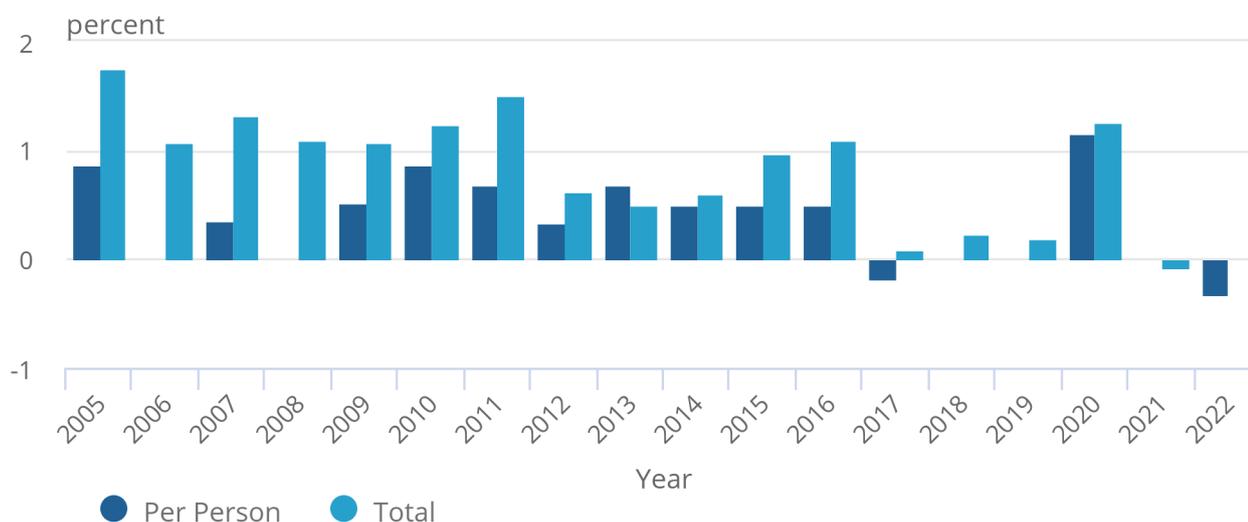
Variations over time and differences between groups can be explained by changes to the population's distribution, earnings differences and qualifications achieved. For example, if all else was constant, an increase in the proportion of the population with higher average qualifications would increase lifetime earnings. Similarly, an increase in the proportion of younger people in the population leads to an increase in the earning potential, as younger individuals work and earn for longer and lifetime earnings therefore increase. Decomposition analysis allows users to understand the individual contributions to the growth of total lifetime earnings.

Figure 1: Total lifetime earnings fell in 2021 and did not grow in 2022

Annual growth in total and per person lifetime earnings in the UK, 2004 to 2022

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Annual growth in total and per person lifetime earnings in the UK, 2004 to 2022



Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Notes:

1. Real figures with 2022 as the base year.
2. Full human capital captures the human capital of the employed and the unemployed.

The UK's full human capital stock in 2022, accounting for the lifetime earnings of all employed and unemployed people aged between 16 and 65 years old, was £25.5 trillion. Total lifetime earnings declined for the first time since records began in 2004, in 2021, followed by no growth in 2022.

Lifetime earnings per person in 2022 were £606,000, down 0.3% from 2020 (£608,000 per person). The highest annual decline in per person lifetime earnings was observed in 2022.

Figure 2: Slowing growth in total lifetime earnings has been driven by the ageing population and overall slower population growth

Contributions to annual growth in total lifetime earnings in percentage points and growth in percent, UK, 2004 to 2022

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Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Notes:

1. Real figures with 2022 as the base year.
2. May not sum because of the rounding and chain-linking methodology, which is not additive.
3. Population changes are calculated by applying the average increase in the economically active population only, for the year, compared with the year before, while keeping average lifetime earnings fixed to the previous year.
4. Increase in educational attainment or formal qualifications is calculated by applying the qualification distribution only, for that year compared with the year before, while keeping average lifetime earnings fixed to the previous year.
5. Ageing is calculated by applying the age distribution of the population only, compared with the year before, while keeping average lifetime earnings fixed to the previous year.
6. Gender balance is calculated by applying the balance of both sexes for each age and qualification category for each year measured and the year before, while keeping average lifetime earnings fixed to the previous year.
7. Increase in per capita component broadly captures the diverse distributional shifts in the rise of per person lifetime earnings.

As people age, their lifetime earnings decrease owing to fewer working years ahead, leading to a reduction in lifetime earnings. Figure 2 shows that the effect of ageing has generally reduced lifetime earnings each year. This reflects the increase in older members of the population. In 2004, people aged 46 to 65 years old accounted for 36.6% of the population, which increased to 40.5% in 2022. At the same time, the proportion of people aged 16 to 45 years old decreased by 3.9% from 2004 to 2022. As the proportion of younger adults decreases, there will be a negative effect on lifetime earnings.

In 2020, the negative contribution of ageing to lifetime earnings was offset by a notable 7.7% increase in the number of people with an undergraduate degree and 11.1% increase in the number of people with a Masters or PhD. Higher educational attainment correlates with higher lifetime earnings. Ageing continues to be a significant factor contributing to the longer-term trend of diminishing growth in lifetime earnings, and has not since been offset by increases in educational qualifications. Lifetime earnings per person and by qualification can be found in the associated data tables.

3 . Lifetime earnings by sex

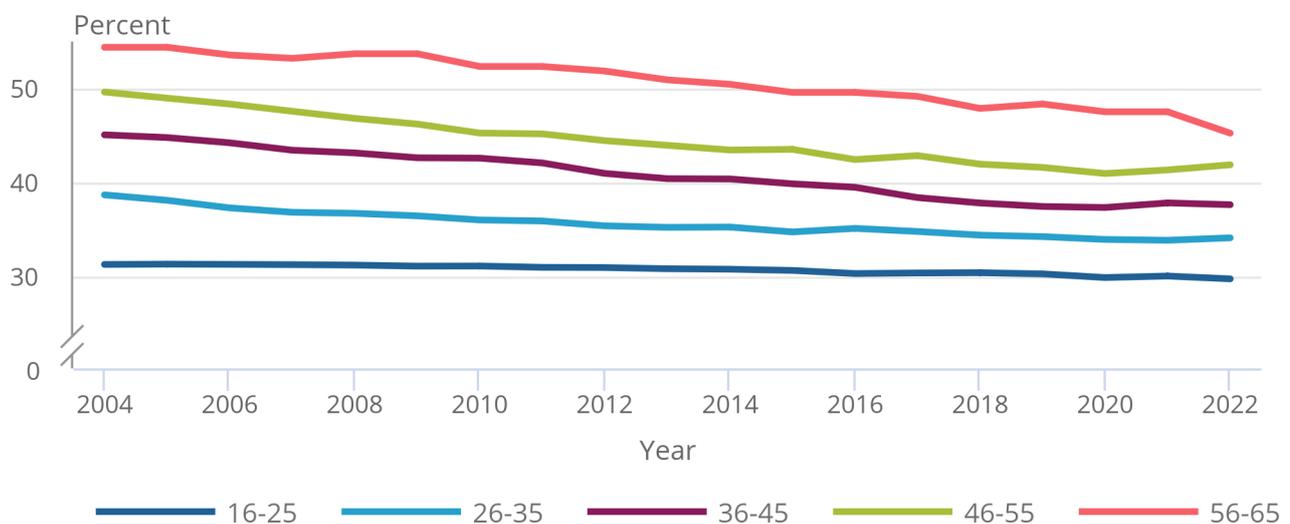
In 2022, women's per person lifetime earnings were 35.9% less than men's, which was the smallest difference since 2004. Between 2004 and 2022, the sex lifetime earnings gap decreased by 3.7 percentage points. The sex lifetime earnings gap varied by age group, qualification, and region, which can be found in the associated data tables.

Figure 3: The sex lifetime earnings gap is smaller for younger age groups

Percentage difference in women's per person lifetime earnings compared with men by age groups, UK, 2004 to 2022

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Percentage difference in women's per person lifetime earnings compared with men by age groups, UK, 2004 to 2022



Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Notes:

1. Calculated as the percentage difference by which women's per person lifetime earnings are less than that of men for each age group.

Figure 3 highlights that the gap between women and men's lifetime earnings increases as people age. Overall, Figure 3 shows that the gap between women's and men's lifetime earnings has been decreasing over time and the gap is at its lowest since 2004.

When controlling for the effects of age and qualification level, women's lifetime earnings in 2022 were 36.1% less than men's. There were a number of possible reasons for this difference. These include, but not exclusively, the gender pay gap, employment rates, working patterns, and types of job roles.

Firstly, there is evidence of a gender pay disparity where women are paid less than men on average. In 2022, women were paid 14.4% less on average than men per hour of work (see our [Gender pay gap in the UK bulletin](#) for more information). The pay gap increased with age, which reflects the findings in Figure 3, whereby the youngest age group (those aged 16 to 25 years) had the smallest difference in women and men's pay, and the oldest age group (those aged 56 to 65 years) had the greatest difference in women and men's pay.

A similar proportion of women and men were in employment in 2022; 71.9% of women and 78.6% of men were in work (see our [Employment in the UK bulletin](#) for more information). However, a greater number of women worked part time. By working part time, a person's total earnings are proportionally less than if working full time. In 2022, 6 million women worked part time and 2.37 million men worked part time; therefore, the impact was greater on women's lifetime earnings (see our [Labour market statistics time series](#) for more information).

A greater number of women (25.2%) were economically inactive in 2022 compared with men (18.1%). There can be many reasons for this, including full-time education, health and caring responsibilities, amongst other factors (see our [Employment in the UK bulletin](#) for more information). As fewer women were in employment, this will have reduced lifetime earnings estimates for women.

Finally, there is evidence to suggest that compared with men, fewer women aged over 40 years old were in managerial or professional jobs. These roles were typically higher paid, which therefore offers some explanation as to why women's lifetime earnings were less than men's (see our [Families and the labour market, UK article](#) and our [Gender pay gap in the UK bulletin](#) for more information).

In contrast, for the first time, in 2020, it was more common for both parents to work full time as opposed to one working full time and one working part time (see our [Families and the labour market, UK article](#) for more information). As the age of the youngest child increased, more mothers worked full time. In 2021, 30.8% of mothers with a child aged one year worked full-time, compared with 40.4% of mothers with the youngest child aged 9 years old. Over time, the rise in full-time working parents may have a long-term effect on lifetime earnings, which we will continue to monitor.

4 . Lifetime earnings by region

The per person lifetime earnings of London, the South East and the East of England were above the UK average in 2022. People living in those areas have consistently had higher than UK average lifetime earnings in the last five years between 2017 and 2022. However, people living in areas with lifetime earnings below the UK average have seen some convergence to the UK average over that time.

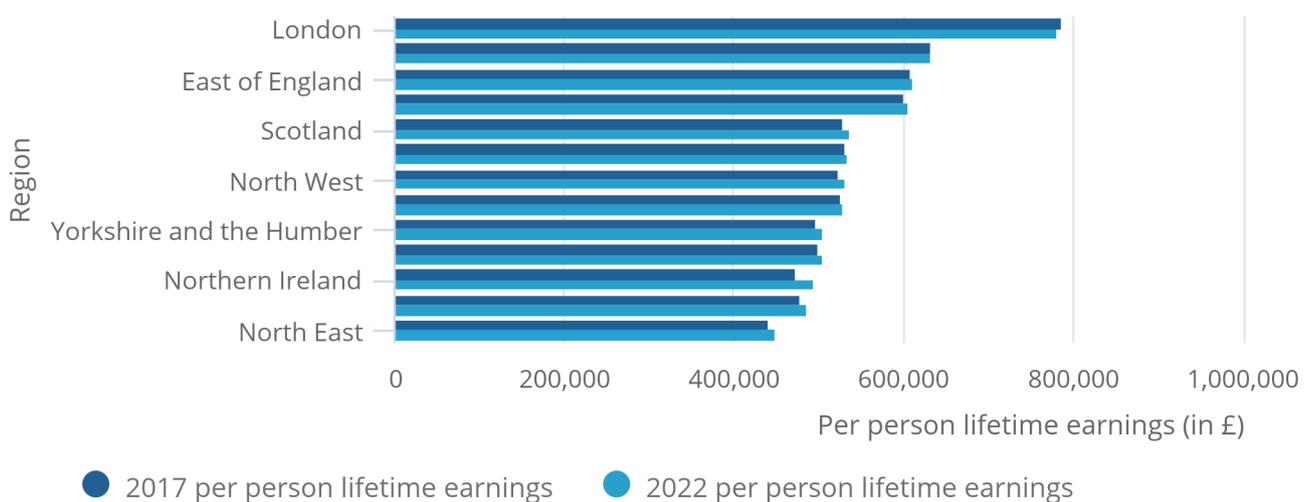
Those living in Northern Ireland and the North East in particular have had faster than average growth in their average lifetime earnings since 2017.

Figure 4: Since 2017 lifetime earnings per person have grown the most proportionally in Northern Ireland and the North East

Regional per person lifetime earnings rankings, UK, 2017 and 2022

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Regional per person lifetime earnings rankings, UK, 2017 and 2022



Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Between 2017 and 2022, people living in Northern Ireland saw a growth of 4.6% in per person lifetime earnings, higher than any other region in the UK. The region also demonstrated the [highest productivity growth in 2021 among all regions](#), in terms of output per hour. Lifetime earnings grew owing to an increase in the male population, who have higher earnings on average.

Similarly, while an increasing proportion of men drove the growth of per person lifetime earnings in the North West by 1.5% between 2017 and 2022, this trend was also accompanied by a notable increase in the number of individuals that had at least an undergraduate degree or equivalent.

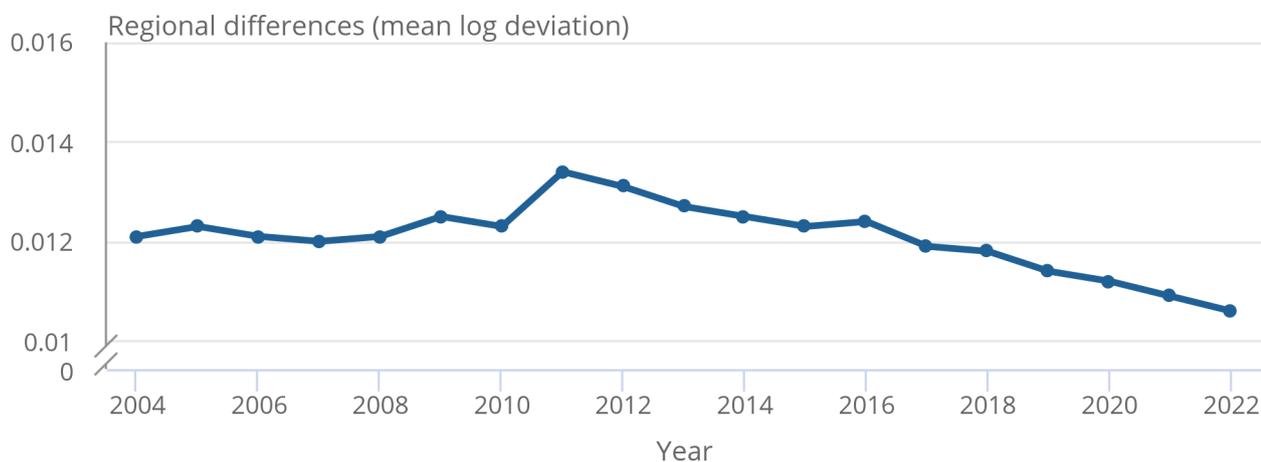
Although the people in the North East had the lowest per person lifetime earnings, they saw the highest annual growth in 2022 and a growth of 1.8% between 2017 and 2022. This was primarily led by a much larger proportion of men, and a slightly younger population with the potential for higher earnings over their lifetime.

Figure 5: Regional differences in lifetime earnings per person are the lowest since 2004

Regional differences in per person lifetime earnings, UK, 2004 to 2022

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Regional differences in per person lifetime earnings, UK, 2004 to 2022



Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Notes:

1. Regional differences in per person lifetime earnings for each year from 2004 to 2022 are calculated using mean log deviation (MLD).
2. MLD is a measure of dispersion that computes the average of the natural logarithm of the ratio between the average earnings of all regions for a year and the individual earnings of the region for that year.

Using the mean log deviation method, we can study the distribution of per person lifetime earnings across regions. It is a method used to look at income inequalities and shows the gap between regions in terms of income. This analysis shows that regional differences were the lowest since 2004.

The greatest difference in per person lifetime earnings was observed in 2011 and subsequently, this decreased. For example, in 2011, per person lifetime earnings in London were £783,000 compared with £427,000 in the North East. By 2022, London's per person earnings slightly decreased to £781,000, while people living in the North East saw an increase to £449,000.

Figure 6: The slowing growth in lifetime earnings in London since 2020 has been driven by low population growth and a decline in individuals with higher qualifications

Contributions to annual growth in total lifetime earnings in percentage points and growth in percent, London, 2004 to 2022

Figure 6: The slowing growth in lifetime earnings in London since 2020 has been driven by low population growth and a decline in individuals with higher qualifications

Contributions to annual growth in total lifetime earnings in percentage points and growth in percent, London, 2004 to 2022



Source: Annual Population Survey, Longitudinal Labour Force Survey, and National Life tables from the Office for National Statistics

Notes:

1. Check the [associated data tables](#) for the decomposition charts of the other regions and countries in the UK.

Although those living in London had the highest lifetime earnings among all other regions, they experienced the highest decline (0.8%) in lifetime earnings per person between 2017 and 2022. The slowdown in lifetime earnings since the coronavirus (COVID-19) pandemic can be attributed to the increasing population with no qualifications and the decline in the number of people with degree or equivalent and Masters or PhD degrees as their highest qualifications.

However, a reverse was observed in the South East and the East of England, with a steep rise in the number of individuals with at least undergraduate degree or equivalent qualifications. Increased [internal migration from London to these regions](#) in search of [greater access to green spaces](#), particularly after the COVID-19 pandemic, could be responsible for such a rise. As a result, people moving from London to those regions increased the per person lifetime earnings there compared with the remaining people living in London.

Furthermore, distributional shifts in per person lifetime earnings had a negative impact on annual growth in lifetime earnings for London in 2022. This was partly caused by younger men with other qualifications as their highest qualification seeing an above average rise in per person lifetime earnings in 2022, contrasting with smaller changes elsewhere. However, this effect of the "increase in per capita" component can be a result of effects from smaller sample sizes in our data, so such results in that component should be used with caution.

5 . Human capital estimates data

[Human capital estimates: supplementary tables](#)

Dataset | Released 19 March 2024

Human capital stock and per head values, equating to lifetime labour earnings, at national and regional geographies, supplementary to human capital stock publications.

6 . Glossary

Employed human capital stocks

Employed human capital methodology assumes those who are unemployed have zero human capital. Employed human capital stocks are calculated for nominal and real. Employed estimates are available in the [associated datasets](#).

Full human capital stocks

Full human capital estimates are provided in this bulletin as our headline measure. Full human capital estimates assume that unemployed people have the same lifetime earnings as those who are employed with the same age, sex, and highest qualification. Full human capital stocks are calculated for nominal and real.

Labour market

The labour market is an economic term that refers to the supply and demand for employment and work. In this bulletin, we refer to labour market statistics including employment levels, working patterns, earnings and types of work.

Nominal human capital stocks

Nominal human capital stocks are projected lifetime earnings estimates summed across the working age population across the UK.

Projected lifetime earnings

Projected lifetime earnings is a term used to describe human capital stocks. They are calculated by assuming people's current earnings reflect future earnings trends, and adjusting for the likelihood people remain in the labour force through employment and mortality rates. Further detail can be found in our [Measuring the UK's Human Capital Stock methodology guidance \(PDF, 208KB\)](#).

Real human capital stocks

In this bulletin, we measure real human capital using the calculated nominal human capital stocks value adjusted through a Törnqvist indexing methodology to remove general price effects.

7 . Measuring the data

In this release, we estimate human capital by looking at a person's highest qualification, their earnings, and assume that they will contribute to the labour market until age 65 years old. This method is in line with international recommendations from the [United Nations Economic Commission for Europe \(UNECE\) Guide on Measuring Human Capital \(PDF, 2.8MB\)](#). As such, an individual's human capital is referred to as their lifetime earnings. Earnings are perceived to be indicative of human capital as it is expected that people with more valuable attributes, such as higher qualification levels, skills, and abilities, will earn more in the labour market. Social attributes, personality and health attributes are also reflected in wage rates. For these reasons, human capital in the UK is measured in monetary terms as the total potential future earnings of the working age population. This is often referred to as the output- or income-based approach to measuring human capital stocks and is fully in line with the best practice set out in the aforementioned UNECE guide.

We have used the Törnqvist index to measure how real human capital changes over time. This is to try and remove the effect of general price increases in stocks. They are derived by directly accounting for the shares of the population across age, sex and highest qualification, and how those shares change over time. This means that populations have different effective "prices" of their human capital. Nominal estimates are the data estimates before adjusting using the Törnqvist index, and so fluctuate with earnings changes more. Further information on this can be found in our previous [Human capital estimates in the UK: 2004 to 2018 article](#).

Quality

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in our [Measuring the UK's Human Capital Stock methodology guidance \(PDF, 208KB\)](#)

8 . Strengths and limitations

One strength of the Törnqvist method is that it calculates a single figure for lifetime earnings, while accounting for changes to the population by age, sex, and highest qualification. This allows for an indication of how human capital changes over time. It also means that different populations have different human capital values providing useful information to users. Decomposition of the UK human capital stock shows the relative contributions age, sex, and qualifications have on the total. Further information about our choice of methodology can be found in the [Methodology developments section of our Human capital estimates in the UK: 2004 to 2018 article](#).

As outlined in our [Measuring the UK's Human Capital Stock methodology guidance \(PDF, 208KB\)](#), there are several assumptions that go into deriving human capital stocks through lifetime earnings. One assumption of the current human capital methodology is that future trends are projected from current-year trends. Economic, social, and political contexts affect wages, qualifications achieved and mortality rates. The current cost of living may affect future wages, qualifications achieved and mortality rates, making the projected lifetime earnings accurate for 2022; but it will be important to monitor further changes in later years.

In our analysis, we used mortality data from 2020. New mortality data has subsequently been released, which could have a small impact on the results (see our [National life tables: UK](#) for more information). In our 2020 publication, we compared our analysis with different mortality rates that were projected forward so that they better reflected the levels seen before the coronavirus (COVID-19) pandemic. The results showed little difference between the two methods (see our [Overview of human capital estimates in the UK article](#) for more information). Therefore, we anticipate a very small effect by using the latest mortality data.

We recognise that there are opportunities to further develop the methodology in response to feedback on user needs. This includes incorporating health into our methodology given a person's ability to achieve qualifications, work and mortality are affected by their health. We are also assessing other sources to use in future, such as the Transformed Labour Force Survey (see our [Transformed Labour Force Survey -- user guidance](#) for more information) and the potential for administrative data to provide further granularity and improved quality of our statistics.

9 . Related links

[Overview of human capital estimates in the UK: 2004 to 2020](#)

Article | Released 25 April 2022

National estimates of human capital stock in the UK for years between 2004 and 2020. Includes full and employed human capital estimates for each year.

[Measuring the UK's Human Capital Stock methodology guidance \(PDF, 208KB\)](#)

Methodology guidance | Released December 2013

Document detailing the recommended method for calculating human capital stock estimates, taking into account academic literature.

[Gender pay gap in the UK: 2023](#)

Bulletin | Released 1 November 2024

Differences in pay between women and men by age, region, full-time and part-time work status, and occupation.

[Exploring educational attainment and internal migration, within English Travel to Work Areas: 2002 to 2019](#)

Article | Released 19 September 2023

Analysis from HM Treasury using the Longitudinal Education Outcomes (LEO) dataset, exploring the variation in educational outcomes across English travel to work areas.

[Labour demand volumes by profession and local authority, UK: January 2017 to December 2022](#)

Article | Released 13 February 2023

Experimental analysis of labour demand changes, split by profession and local authority (and other geographies), according to Textkernel data.

10 . Cite this statistical bulletin

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