Office for
National Statistics

Human Capital Estimates, 2014

Author Name(s): **Lee Mallett and Ellys Monahan, Office for National Statistics**

Abstract

This release looks at the changes in human capital values in the United Kingdom between 2004 and 2014, including during the economic downturn of 2007 to 2008. It also includes analysis showing breakdowns by age, sex and education level. Human capital is the value of individuals' skills, knowledge, abilities, social attributes, personality and health attributes. These factors enable individuals to work, and therefore produce something of economic value. It is measured as the sum of the total potential future earnings of everyone in the labour market. Working age population refers to those aged 16 to 64.

Main points

- The value of employed human capital increased to £18.22 trillion in 2014, a change to the broadly flat trend seen between 2011 and 2013.

- In 2014, the average employed human capital stock per head of working age population was £448,358, an increase of £4,623 on the 2013 estimate.
- In 2014, those with GCSE grades A*-C or equivalent or higher as their highest qualification held 87% of employed human capital.

What is human capital?

Human capital is a measure of individuals' skills, knowledge, abilities, social attributes, personality and health attributes[1]. These factors enable individuals to work, and therefore produce something of economic value.

At a whole economy level, we can also consider the contribution of human capital to economic output. Growth in an economy can be driven by increases or improvements in either:

- land - the natural resources that we have at our disposal, for example coal, wood etc
- labour - our workforce
- capital - the buildings and machines we use to produce goods and services

In this context, human capital refers to the labour and captures both the number of people in the workforce and the abilities they bring with them.

We place a value on the machines that we use to produce goods and services. However, these machines would be almost useless without the knowledge of how to use and maintain them; this is human capital and also needs to be valued.

Earnings are considered to reflect these elements 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 is measured in monetary terms as the total potential future earnings of the working age population.

The following estimates are subject to a number of assumptions that affect their final value; the labour productivity rate growth rate (2%), discount rate (3.5%) and age of retirement (64). The affect that these assumptions have on the final estimate can be found in the sensitivity analysis in annex 1. Full information on data sources and methodology (including the rationale behind any assumptions) can be found in the measuring human capital methodology document (208.4 Kb Pdf).

Notes

1. The OECD defines Human capital as "the knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances".

Why measure human capital?

Human capital and well-being

Human capital is important because of its positive contribution to a range of well-being aspects relevant to policy makers and researchers.

Firstly, it has been shown that individuals' labour market outcomes are linked to their human capital. In general individuals with low skills or levels of education are more likely to be unemployed and face social exclusion. Unemployment can have a negative impact on an individual's well being. In 2014 ONS found that unemployed people rated their life satisfaction significantly lower on average than employed people. The average life satisfaction of unemployed people was 6.7 out of 10 compared to 7.6 for employed people. In addition, higher human capital (in particular educational attainment) is associated with higher earnings. Earnings have been found to be related with life satisfaction and happiness. ONS (2014) finds "Those in households with higher incomes report higher life satisfaction and happiness, and lower anxiety on average".

It has also been shown that the distribution of human capital is important for equality. For example, part of the observed pay gap between men and women is related to men gaining higher levels of human capital (it has been suggested that this is a result of women, on average, having a weaker attachment to the labour market and therefore have less incentive to acquire human capital). Inequality might also persist over time as educational attainments of children are related to the educational attainment of their family, particularly their parents.

Finally, human capital can also have social impacts, in particular, improved health outcomes, lower crime rates, and higher rates of trust and social participation.

Human capital and the economy

Human capital is also recognised as having important economic impacts. Empirical work on economic growth suggests that countries with higher levels of human capital, other things being equal, have greater potential output and income in the future. The measures can also be used in the assessment of the impact of an ageing population, changes in retirement ages and in the evaluation of the economic benefits of different levels of education.

Human capital and sustainability

Human capital is also an important aspect of sustainability. Sustainability is seen as "what we leave to future generations; whether we leave enough resources, of all kinds, to provide them with the opportunities at least as large as the ones we have had ourselves" (UN, 2012). The capitals approach states that economic, natural, human and social capitals are all resources that matter for the present and future well-being of individuals. This was highlighted in the report by the Commission of the Measurement of Economic Performance and Social Progress (Stiglitz et al., 2009).

The value of human capital

Figure 1: Employed and full human capital

UK, 2004 to 2014
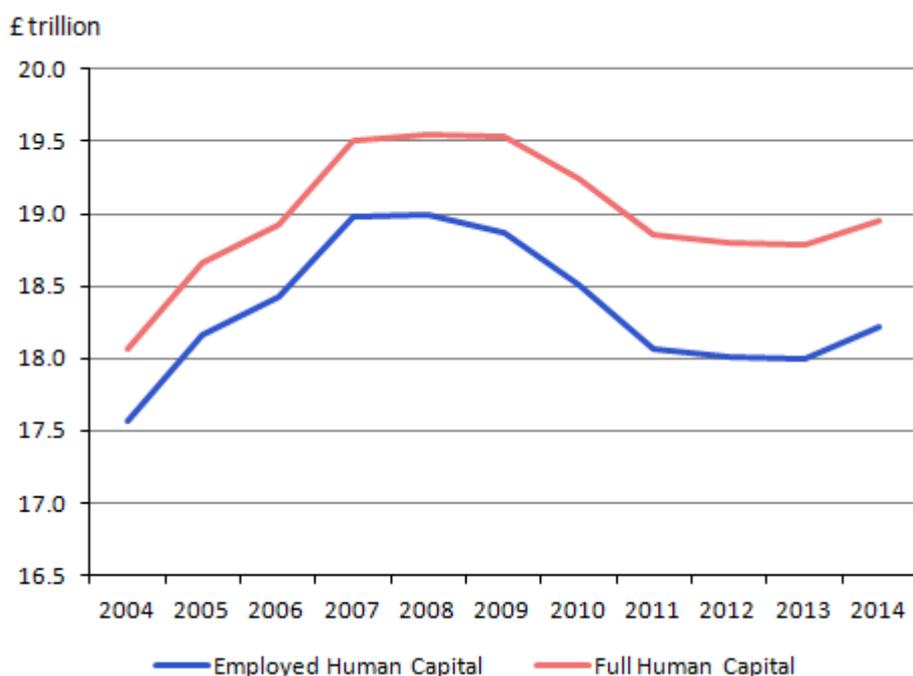
Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Figures in 2014 prices
2. Labour productivity growth rate = 2%.
3. Discount rate = 3.5%.

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Figure 1 shows the effect of the economic downturn on the UK's employed human capital stock. Between 2004 and 2007 the value of the UK's human capital stock increased steadily, at an average of 2.6% per year. This was driven by an increase in both the employed working-age population and the skills level of the population. Another important driver of the increase in the value of the UK's human capital stock was earnings growth, which generally grew in real terms between 2004 and 2007.

Growth in employed human capital slowed into 2008 (0.1%) before falling slightly in 2009 (-0.6%) beginning to reflect the effect of the economic downturn on the UK's human capital stock. In 2010 the employment rate and level of employment for those aged 16-64 fell[1]. This, alongside falls in real earnings[2], contributed to further falls in the value of the UK's human capital stock in 2010 and 2011 (of -1.9% and -2.4% respectively). Following these substantial falls in 2010 and 2011, the value of the UK's human capital stock began to stabilise in 2012 and 2013.

In 2014 the value of employed human capital was £18.22 trillion. This is an increase of £220 billion, or 1.2% from £17.99 trillion in 2013. The rise in employed human capital is a result of the earnings used to value human capital increasing faster than inflation, as well as an increase in the level and employment rate of 16-64 year olds over the period[3].

The value of the UK's full human capital stock (including the unemployed) was 18.95 trillion in 2014. Both employed and full human capital show similar trends between 2004 and 2014. Between 2007 and 2011, the decline in the UK's full human capital stock was not as severe as the decline in the UK's employed human capital stock, resulting in the gap between the two widening. This reflects the impact of higher unemployment on the estimates of employed human capital.

However, between 2011 and 2013 the gap between employed and full human capital remained fairly stable. In 2014 the gap was £0.73 trillion, slightly less than the £0.79 trillion in 2013. The slight narrowing in the gap between full and human capital reflects the increase in the employment rate seen over the period.

Figure 2: Employed and full human capital per head (working age population), 2004 to 2014

UK
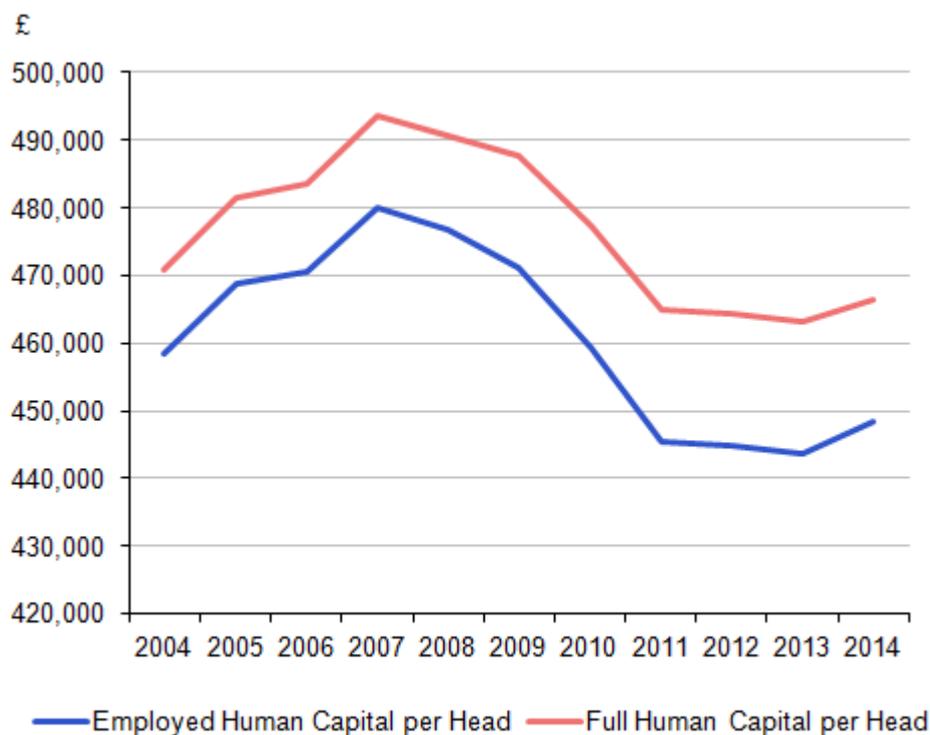
Source: Annual Population Survey (APS) - Office for National Statistics

Notes:
1. Figures in 2014 prices.
2. Labour productivity growth rate = 2%.
3. Discount rate = 3.5%.
4. Population figures used in this estimate come from the Annual Population Survey (APS)

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Figure 2 shows the stock of human capital per head of working-age population (for both full and employed human capital). Similar to the results for the total stock, there was a steady accumulation of human capital per capita between 2004 and 2007. In 2008, the per capita figure began to decline until 2011 before stabilising until 2013. In 2014, the average employed human capital stock per head of working age population was 448,358, an increase on the 2013 estimate of £4,623 (1.0%).

This is a result of the value of human capital growing at a faster rate than the size of the working age population.

Notes

1. ONS Labour Market Statistics show a fall in the level of 24,000 in 2010, and a 0.5 percentage point decrease in the employment rate (ONS, 2015a).

2. ONS Labour Market statistics show total pay growth year on year for December 2010 and 2011, 1.2% and 1.8% respectively. For the same time period ONS Consumer Price Index shows prices grew faster at 3.7% and 4.2% respectively (ONS, 2015a and 2015b).

3. ONS Labour Market Statistics show an increase in the level of 608,000 in 2014, and a 1.4 percentage point increase in the employment rate (ONS, 2015a).

The distribution of human capital

This section considers the distribution of employed human capital in 2014 by sex, highest qualification and age.

The total value of women's human capital (£6.82 trillion) was around 60% of men's (£11.40 trillion) and 37% of the total for 2014, due largely to less time in paid employment over their lifetime and lower average labour market earnings.

Figure 3: Employed human capital by highest qualification, 2014

UK
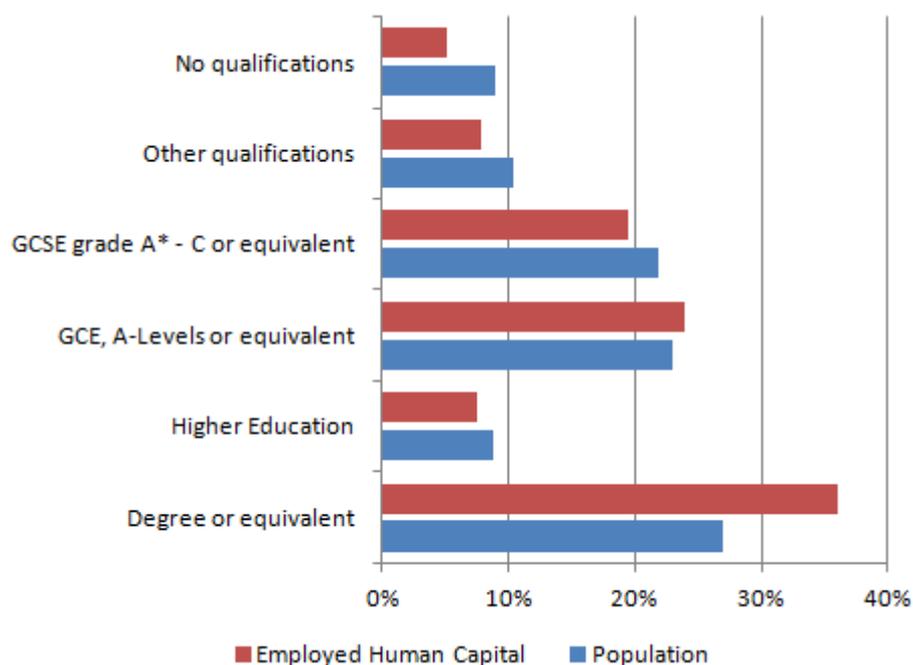
Source: Annual Population Survey (APS) - Office for National Statistics

Notes:
1. Labour productivity growth rate = 2%.

2. Discount rate = 3.5%.
3. Population figures used in this estimate come from the Annual Population Survey (APS)

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Figure 3 shows the proportion of the population and the proportion of human capital held by those with different levels of highest qualification in 2014. Overall, it shows that those with higher qualifications hold a greater proportion of the human capital.

In 2014, 36.1% of the human capital stock was embodied in the 27.0% of the working population whose highest educational attainment was a degree or equivalent. In contrast, only 5.1% of the UK's human capital stock was embodied in the 9.0% of the working age population who have no formal qualifications.

Those with GCSE grades A*-C or equivalent as their highest qualification held 19.5% of the human capital stock and made up 21.8% of the population. However, for those with GCSE grades A*-C or equivalent or higher as their highest qualification, employed human capital was £15.87 trillion in 2014, or 87.1% of total employed human capital. This group represents 80.6% of the working age population.

Those with GCE, A-Levels or equivalent held 23.9% of the human capital stock, and made up 23.0% of the population.

Figure 4: Employed human capital by age group, 2014

UK
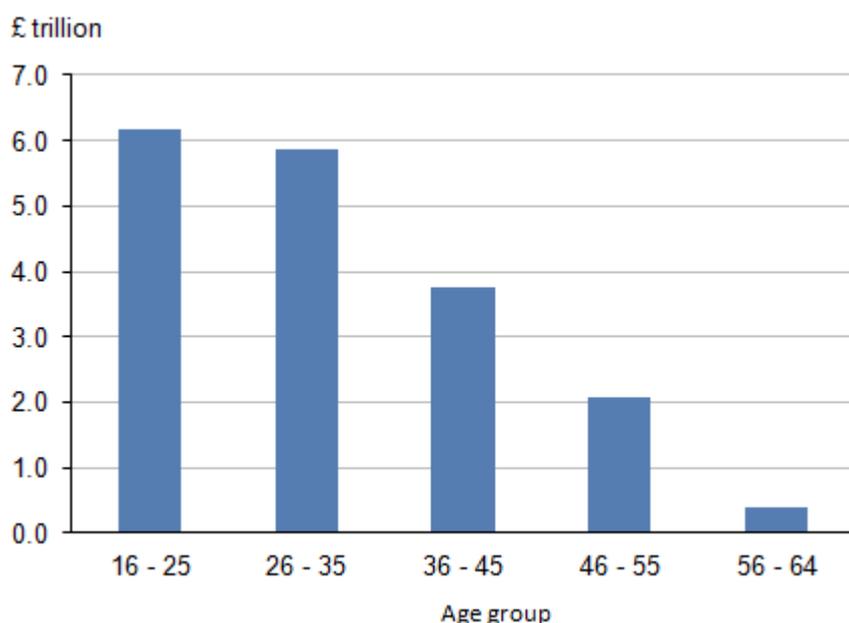
Source: Annual Population Survey (APS) - Office for National Statistics

Notes:

1. Labour productivity growth rate = 2%.
2. Discount rate = 3.5%.
3. Components may not sum to totals due to rounding

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Figure 4 shows that the stock of human capital is disproportionately concentrated in younger workers. For example, 41.4% of the working age population are aged between 16 and 35 but this group embodies 66.1% of the human capital stock, showing that being relatively young and having more years of paid employment remaining more than offsets the effect of having higher earnings whilst being relatively old.

Revisions

This edition of human capital estimates has minor revisions to some of the back series. In general, revisions can be attributed to revisions in the mortality statistics to incorporate 2011 Census data, as well as the reweighting of the Labour Force Survey (LFS) and Annual Population Survey (APS) datasets.

Table 1: Revisions to Employed Human Capital (£ trillions)

United Kingdom, 2004 to 2013

	Employed Human Capital (£ trillions)		
	Previously Published	**Current Estimate**	**Revision**
2004	£17.0	£17.3	£0.3
2005	£17.8	£17.9	£0.1
2006	£18.1	£18.1	£0.1
2007	£18.6	£18.7	£0.1
2008	£18.6	£18.7	£0.1
2009	£18.5	£18.6	£0.1
2010	£18.1	£18.2	£0.1
2011	£17.7	£17.8	£0.1
2012	£17.7	£17.7	£0.0
2013	£17.6	£17.7	£0.1

Table notes:
1. Labour productivity growth rate = 2%.
2. Discount rate = 3.5%.
3. Figures in 2013 prices.
4. Differences may not sum to revision total due to rounding.

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Table 2: Revisions to Full Human Capital (£ trillions)

United Kingdom, 2004 to 2013

	Full Human Capital (£ trillions)		
	Previously Published	Current Estimate	Revision
2004	£17.5	£17.8	£0.3
2005	£18.3	£18.4	£0.1
2006	£18.6	£18.6	£0.1
2007	£19.1	£19.2	£0.1
2008	£19.2	£19.3	£0.1
2009	£19.2	£19.2	£0.0
2010	£18.9	£19.0	£0.1
2011	£18.5	£18.6	£0.1
2012	£18.5	£18.5	£0.1
2013	£18.4	£18.5	£0.1

Table notes:

1. Labour productivity growth rate = 2%.
2. Discount rate = 3.5%.
3. Figures in 2013 prices.
4. Differences may not sum to revision total due to rounding.

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Background notes

1. The statistics presented in this release are experimental in nature.

2. Full information on data sources and methodology can be found in the measuring human capital methodology document (208.4 Kb Pdf).

3. The sources of data used in the analysis are the Annual Population Survey (APS), which is an annual version of the Labour Force Survey (LFS), and the longitudinal LFS. We conduct both surveys, collecting household and individual data from a nationally representative sample.

4. Annual Population Survey data and Longitudinal Labour Force Survey data used in this are 2011 Census consistent. Data on mortality rates and population estimates are 2011 Census consistent. This release incorporates the reweighting of the Annual Population Survey

data and Longitudinal Labour Force Survey data. Further information on the [impact assessment made for the Labour Market Statistics (124.5 Kb Pdf)](#) is available.

5. **Statistical contact**

    Lee Mallett

    Measuring National Well-being

    economic.wellbeing@ons.gsi.gov.uk

    Telephone: +44 (0)1633 45 5060

6. Details of the policy governing the release of new data are available by visiting [www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html](#) or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

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References

1. Fender V (2013) Human capital Estimates 2013

2. Jones R and Fender V (2011) Human capital Estimates 2010

3. Organization for Economic Cooperation and Development (OECD) (2001) The well-being of nations: the role of human and social capital OECD, Paris

4. ONS (2012) Consultation on the measures of Human capital

5. Income, Expenditure and Personal Well-being, 2011/12

6. ONS (2014) Has personal well-being improved for people in and out of work?

7. ONS (2015a) Labour Market Statistics – August 2015

8. ONS (2015b) Consumer Price Inflation – July 2015

9. Stiglitz et al. (2009) Report by the Commission on the Measurement of Economic Performance and Social Progress

Annex 1: Sensitivity analysis

Estimates of human capital are sensitive to a number of assumptions. Holding everything else constant, each assumption can be varied individually to show the impact. The 3 main assumptions analysed here are:

*   the discount rate
*   the labour productivity growth rate
*   the upper age boundary

The results are shown in Table A1.

Table A1: Employed and full human capital in 2014 (£ trillion, current prices)

United Kingdom, 2014

£ trillions

Labour Productivity Rate	Discount Rate	Age	Employed Human Capital	Full Human Capital
1	3.5	64	15.87	16.52
1.5	3.5	64	16.98	17.67
2	3.5	64	18.22	18.95
2.5	3.5	64	19.58	20.36
3	3.5	64	21.10	21.94
2	2	64	22.79	23.69
2	2.5	64	21.08	21.92
2	3	64	19.57	20.35
2	3.5	64	18.22	18.95
2	4	64	17.01	17.70
2	4.5	64	15.92	16.57
2	5	64	14.95	15.56
2	3.5	64	18.22	18.95
2	3.5	65	18.38	19.12
2	3.5	66	18.51	19.25
2	3.5	67	18.60	19.34
2	3.5	68	18.68	19.43
2	3.5	69	18.75	19.50

Table notes:
1. Labour productivity growth rate in main estimates = 2%.
2. Discount rate in main estimates = 3.5%.
3. Upper age limit in main estimates = 64 years old.

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Sensitivity analysis shows that increasing the discount rate by 1 percentage point, to 4.5%, reduces the estimated value of the employed human capital stock by £2.29 trillion. Conversely, reducing the discount rate to 2.5% increases the value of the employed human capital stock by £2.87 trillion. Changing the labour productivity growth rate by 1 percentage point, leads to changes of a similar magnitude but in the opposite direction in the estimates of the human capital stock.

Restricting the sample to individuals aged between 16 and 64 years is a somewhat arbitrary assumption particularly at the higher end of the age range. Table 1 illustrates the effects of changes in the upper age bound on estimates of the human capital with a discount rate of 3.5% and a labour productivity growth rate of 2%. As would be expected, increasing the upper age bound increases the estimates of the human capital stock since the human capital of additional workers is included in the estimate and the expected working lives of individuals already in the sample is extended, raising the value of their human capital. In general, the increases become smaller as the upper age bound is increased because the employment rate and total income is lower in each age-year cohort added to the sample.