



Employment and earnings outcomes of higher education graduates by subject and institution: *experimental statistics using the Longitudinal Education Outcomes (LEO) data*

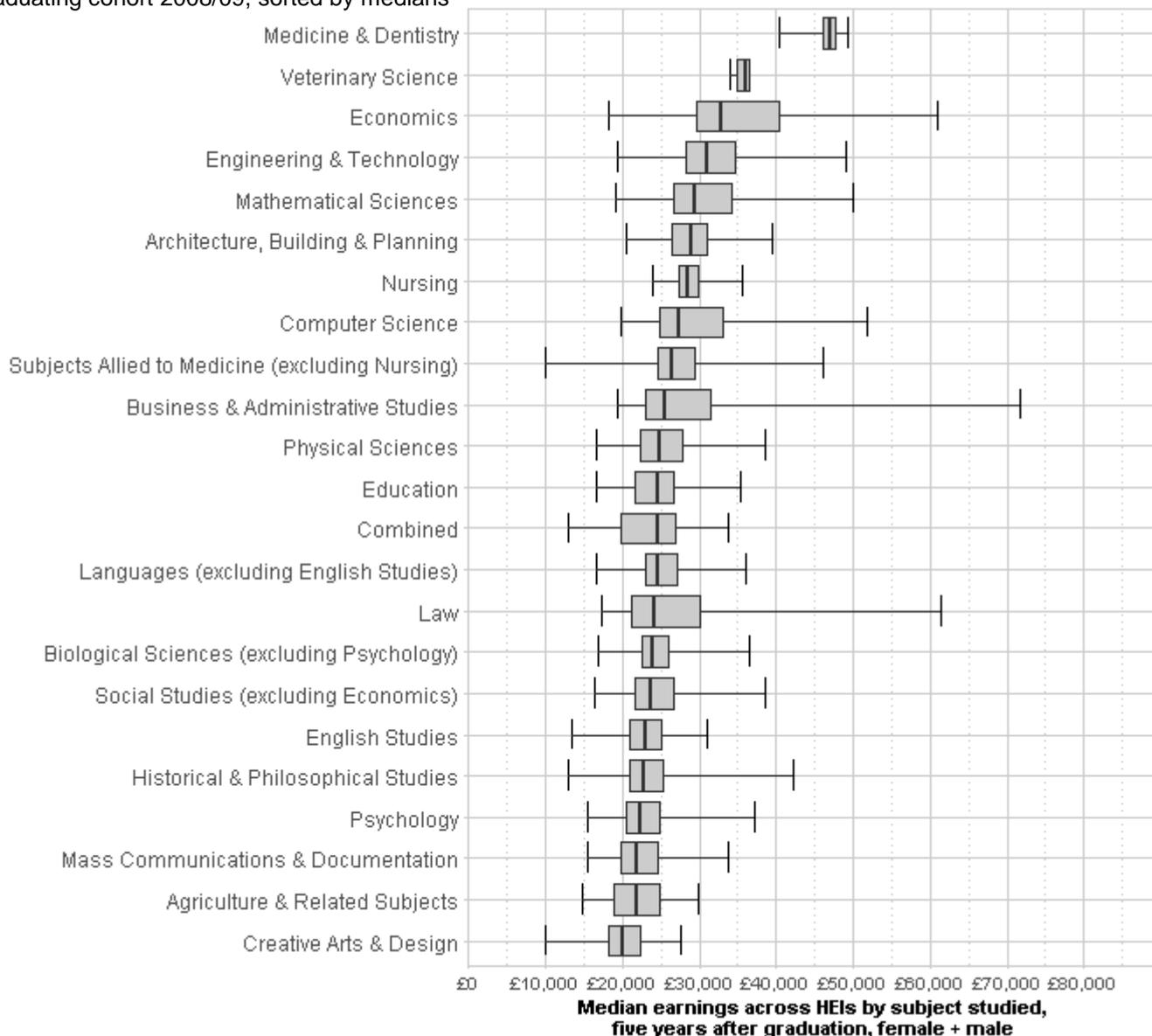
SFR 18/2017, 13 June 2017

This is the third in a series of higher education data releases from the Department for Education's new Longitudinal Education Outcomes dataset. It focuses on the employment and earnings outcomes in the tax year 2014/15 for those who graduated with an undergraduate degree in 2008/09, 2010/11 and 2012/13 from a higher education institution (HEI) in Great Britain. Data is presented for 23 subject areas and split by sex, subject studied and HEI. To provide context, splits by HEI are accompanied by information on graduates' average attainment prior to commencing their studies and, as an indicator of disadvantage, their Participation of Local Areas (POLAR) classification.

The figure below summarises the distribution of median earnings for all institutions across each subject. Some subjects show a wider range of median earnings than others. Section 1 discusses some of the factors that influence graduates' earnings outcomes. In particular, earnings figures used in this publication do not include earnings from self-employment. Users should take these factors into consideration when comparing outcomes for different institutions.

Distribution of median annualised earnings across HEIs for each subject area five years after graduation (minimum, lower quartile, median, upper quartile, maximum).

Graduating cohort 2008/09, sorted by medians



Contents

SFR 18/2017, 13 June 2017	1
1. Introduction.....	4
Background to the Longitudinal Education Outcomes (LEO) dataset.....	4
Coverage.....	4
Years after graduation.....	5
Subject areas	6
Employment outcomes.....	7
Contextual information.....	7
2. Results	8
Earnings outcomes across HEIs and subjects.....	8
Employment outcomes across HEIs and subjects	12
Median earnings and prior attainment by HEI.....	13
3. Data quality.....	21
Employment and earnings data	21
Coverage.....	21
Timeliness.....	23
Benefits data	24
Suppression and rounding.....	24
4. Methodology	24
Time period	24
Sustained employment.....	25
Sustained employment defined by self-assessment data	25
Further study	25
No sustained destination	26
Activity not captured	26
Unmatched.....	26
Annualised earnings.....	27
5. Contextual information.....	28
Prior attainment	28
Coverage.....	28
Banding.....	29

	Medicine & Dentistry and Veterinary Science	30
	POLAR	30
6.	Data matching and match rates	30
	Overall match rates	31
	Match rate by graduate characteristic.....	32
7.	Next steps.....	33
8.	Accompanying tables.....	33
9.	Feedback.....	33
10.	Glossary	33
11.	Experimental statistics	35
12.	Get in touch	35

1. Introduction

Background to the Longitudinal Education Outcomes (LEO) dataset

The Small Business, Employment and Enterprise Act 2015 enabled government, for the first time, to link higher education and tax data together to chart the transition of graduates from higher education into the workplace¹. One of the advantages of linking data from existing administrative sources is that it provides a unique insight into the destinations of graduates without imposing any additional data collection burdens on universities, employers or members of the public. Compared to existing sources of graduate outcomes data, it is also based on a considerably larger sample, does not rely on survey methodology, and can track outcomes across time to a greater extent than was previously possible.

The LEO dataset links information about students, including

- personal characteristics such as sex, ethnic group and age
- education, including schools, colleges and higher education institution attended, courses taken and qualifications achieved
- employment and income
- benefits claimed

It is created by combining data from the following sources:

- the National pupil database (NPD), held by the Department for Education (DfE)
- Higher Education Statistics Agency (HESA) data on students at UK publicly funded higher education institutions and some alternative providers, held by DfE
- Individualised Learner Record data (ILR) on students at further education colleges, held by DfE
- employment data (P45 and P14), held by Her Majesty's Revenue and Customs (HMRC)
- the National Benefit Database, Labour Market System and Juvos data, held by the Department for Work and Pensions (DWP)

By combining these sources, we can look at the progress of higher education leavers into the labour market. The focus of this release is on employment and earnings outcomes of leavers from higher education by subject and institution, using HESA records to link graduates to HMRC and DWP data. Please see [section 3: Data quality](#) for consideration of the strengths and weaknesses of the LEO dataset, [section 6: Data matching and match rates](#) for further information on matching processes, and the [glossary](#) for the definitions used throughout this publication.

The privacy notice explaining how personal data in this project is shared and used can be found [here](#).

This Statistical First Release presents data on graduate employment and earnings outcomes one, three and five years after graduation. Data is split by subject studied, sex and institution.

Employment, further study and earnings outcomes in this release are provided for each subject in each higher education institution. The tables look at those who graduated in 2008/09, 2010/11 and 2012/13, five years, three years and one year after graduation, respectively. This ensures that each cohort's outcomes are presented for the tax year 2014/15, the only tax year for which we currently have access to self-assessment employment data.

Coverage

This publication looks at those who graduated with a first degree qualification from higher education institutions (HEIs) in Great Britain. First degrees are also known as bachelor's degrees. We have only looked at those graduates classified as UK domiciled prior to entry to higher education. Figures are presented for all graduates and have not been split by full-time or part-time mode of study. On average, we have been able

¹ For more information on the legal powers governing the dataset please see section 78 of the Small Business, Enterprise and Employment Act 2015 and sections 87-91 of the Education and Skills Act 2008.

to link over 95% of each graduate cohort to tax and/or benefit data. Please see [section 6: Data matching and match rates](#) for more information.

Designated alternative providers are not included in this publication as they were not required to return complete student level data to HESA prior to the 2015/16 academic year. The University of Buckingham has historically returned HESA data so is included in the publication.

The **employment data** largely covers those with records submitted through the Pay As You Earn (PAYE) system. The core purpose of PAYE is to collect tax, and its coverage reflects this. Up until April 2013, employers were not required to supply information to HMRC for individuals who earned below the Lower Earnings Limit (LEL)² for National Insurance contributions, although for large employers these individuals were thought to be included due to the methods of data transfer. Since then, employers have been required to provide earnings information for all employees if even one employee of the company is paid above the LEL threshold. Please see [section 3: Data quality](#) for more information on this.

The PAYE system does not collect information on the number of hours worked; therefore, whether an individual is working full-time or part-time cannot be ascertained.

We have also obtained self-assessment data for the 2014/15 tax year and have selected the graduate cohorts included in our publication to make the most use of self-employment data. We currently have no access to self-assessment earnings, and earnings outcomes in this publication are therefore not fully representative of graduates in self-employment as only their PAYE earnings will be included. Self-employment rates vary between subject and university. Please see [section 3: Data quality](#) for more information on the impact of including self-employment data.

All figures are based on UK tax, benefit and student records only: activity of those who move abroad to work or study after graduating is not reflected in the employment or further study figures. Instead, these individuals are included in the 'activity not captured' category.

The methodology for defining employment and earnings outcomes is set out in [section 4: Methodology](#).

Years after graduation

The time periods used in this publication are one, three and five years after graduation, which refers to the first, third and fifth full tax year after graduation, respectively. For instance, for the 2012/13 graduation cohort, the figures one year after graduation refer to employment and earnings outcomes in the 2014/15 tax year. This time period was picked as graduates are unlikely to have been engaged in economic activity for the whole tax year that overlaps with the graduation date. This is displayed graphically in Figure 1 below.

Figure 1: Relationship between academic year, tax year and definitions of 'years after graduation' used in this publication

		Tax year				
		2010/11	2011/12	2012/13	2013/14	2014/15
Academic year of graduation	2008/09	1 year	2 years	3 years	4 years	5 years
	2009/10		1 year	2 years	3 years	4 years
	2010/11			1 year	2 years	3 years
	2011/12				1 year	2 years
	2012/13					1 year

Cohorts in **bold** are covered in this publication

² The threshold for the 2014/15 tax year was £112 per week.

Subject areas

The subjects covered by this publication are based on version 3.0 of the Joint Academic Coding System (JACS). In previous publications, we presented results for Economics separately from the other subjects in Social Studies. Following consultation on the subject splits, we are additionally extracting Nursing from the other Subjects Allied to Medicine, Psychology from the Biological Sciences and English Studies from the other Languages. We therefore cover the following 23 subjects:

JACS code	Subject
1	Medicine & Dentistry
2	Subjects Allied to Medicine (excluding Nursing)
B7	Nursing
3	Biological Sciences (excluding Psychology)
C8	Psychology
4	Veterinary Science
5	Agriculture & Related Subjects
6	Physical Sciences
7	Mathematical Sciences
8	Computer Science
9	Engineering & Technology
A	Architecture, Building & Planning
B	Social Studies (excluding Economics)
L1	Economics
C	Law
D	Business & Administrative Studies
E	Mass Communications & Documentation
F	Languages (excluding English Studies)
Q3	English Studies
G	Historical & Philosophical Studies
H	Creative Arts & Design
I	Education
J	Combined

It is important to note that, even with these additional splits, each JACS subject area can still include a diverse range of subjects, some of which will lead to significantly different employment and earnings outcomes. For example, 'Physical Sciences' contains courses ranging from Physics to Forensic & archaeological sciences. We have not attempted to split the JACS codes down further, as the resulting cohorts would be smaller, and more data would therefore need to be suppressed to protect individual graduates' confidentiality.

Employment outcomes

Outcomes are presented for graduates who have been successfully matched to the Department for Work and Pensions' Customer Information System (CIS) or if they have been matched to a further study instance on the HESA Student Record. In this publication, these individuals are referred to as **matched**. Graduates who have not been matched to CIS or a further study record are referred to as **unmatched**.

Graduates who have been **matched** are then placed in one of five outcomes categories. These are:

Activity not captured: graduates who have been successfully matched to CIS but do not have any employment, out-of-work benefits or further study records in the tax year of interest. Reasons for appearing in this category include: moving out of the UK after graduation for either work or study, earning below the Lower Earnings Limit or voluntarily leaving the labour force.

No sustained destination: graduates who have an employment or out-of-work benefits record in the tax year in question but were not classified as being in 'sustained employment' and do not have a further study record.

Sustained employment only: graduates are considered to be in sustained employment if they were employed for at least one day for five out of the six months between October and March of the tax year in question or if they had a self-employment record in that tax year. To be in the sustained employment **only** category, graduates must not have a record of further study in the tax year in question.

Sustained employment with or without further study: includes **all** graduates with a record of sustained employment, regardless of whether they also have a record of further study. A graduate is defined as being in further study if they have a valid higher education study record at any UK HEI on the HESA database in the relevant tax year. The further study does not have to be at postgraduate level to be counted. Further study undertaken at further education colleges is not reflected in these figures as this information is not collected by HESA.

Sustained employment, further study or both: includes all graduates with a record of sustained employment **or** further study. This category includes all graduates in the 'sustained employment with or without further study' category as well as those with a further study record **only**.

It is important to note that our definition of sustained employment does not distinguish between the different types of work that graduates are engaged in and so cannot provide an indication of the proportion of graduates who are employed in graduate occupations. Furthermore, we do not distinguish between full-time and part-time employment.

Contextual information

There are a number of factors that can influence the employment and earnings outcomes of graduates beyond the subject and institution attended. The outcomes presented in this release are 'raw' outcomes, they **do not control for differences in the characteristics of students** studying different subjects or attending different institutions that might influence graduate employment outcomes. This should be borne in mind when making comparisons across subjects and institutions. However, in order to aid comparisons between similar universities, we have provided additional data about the characteristics of the students graduating. We have included data on prior attainment using qualifications obtained from the NPD and on disadvantage using the participation of local areas (POLAR) classification, which groups areas across the UK based on the proportion of the young population that participates in higher education. We use this information in the following forms:

Prior attainment band: institutions in England are ranked by the median UCAS points of the graduates in a given subject and cohort; the upper quartile of HEIs forms band 1, the middle 50% form band 2, and the bottom quartile band 3. We have not placed Scottish or Welsh institutions into prior attainment bands.

Proportion in POLAR3 quintile 1: graduates in quintile 1 (most disadvantaged) of POLAR3 as a proportion of those non-mature students for whom we have this information (graduates from English and Welsh HEIs only).

The contextual data provides useful information where universities have a reasonable proportion of their students included in the measures. For some universities, the contextual data only covers a small proportion of their graduates. We have therefore provided the following coverage indicators alongside the contextual measures.

Included in prior attainment band: this column shows the proportion of matched graduates who are included in our calculation of the prior attainment band. As the NPD only contains data on the key stage 5 qualifications obtained by 16–18 year olds in England since 2002, not all graduates will be included in the prior attainment band for each university. Since this information is limited to England, we have not placed Scottish or Welsh institutions into prior attainment bands.

Included in POLAR3 quintile 1: graduates from English and Welsh HEIs for whom we have POLAR3 information on the HESA student record and who were non-mature when entering higher education, as a proportion of matched graduates.

We are continuing to investigate how best to compare employment and earnings outcomes for universities that have a low proportion of students covered by the contextual data (mainly universities with a high proportion of mature and/or part-time students, where employment and earnings trajectories may differ when compared to young full-time students).

There are also well-documented regional difference in pay across the UK. We have published the **region** that each university is located in. However, we do not have the current address of the graduates, so we do not know whether they have stayed within the region where they went to university or have moved to a different region to access a job with higher pay.

2. Results

The main output of this publication is the table 'Activity of graduates by subject and institution one, three and five years after graduation' that accompanies this document.

Earnings outcomes across HEIs and subjects

In Figure 2, we present the distribution of median earnings across institutions for each subject five years after graduation. These charts show the spread of median earnings across institutions offering a given subject. They are not to be confused with the earnings distributions of graduates of a given subject. Figure 3 provides guidance on how to interpret the chart in Figure 2.

Figure 2: Distribution of median annualised earnings across HEIs for each subject area five years after graduation (minimum, lower quartile, median, upper quartile, maximum). 'University A' represents an example institution.

Female + male graduates, graduating cohort 2008/09, sorted by medians

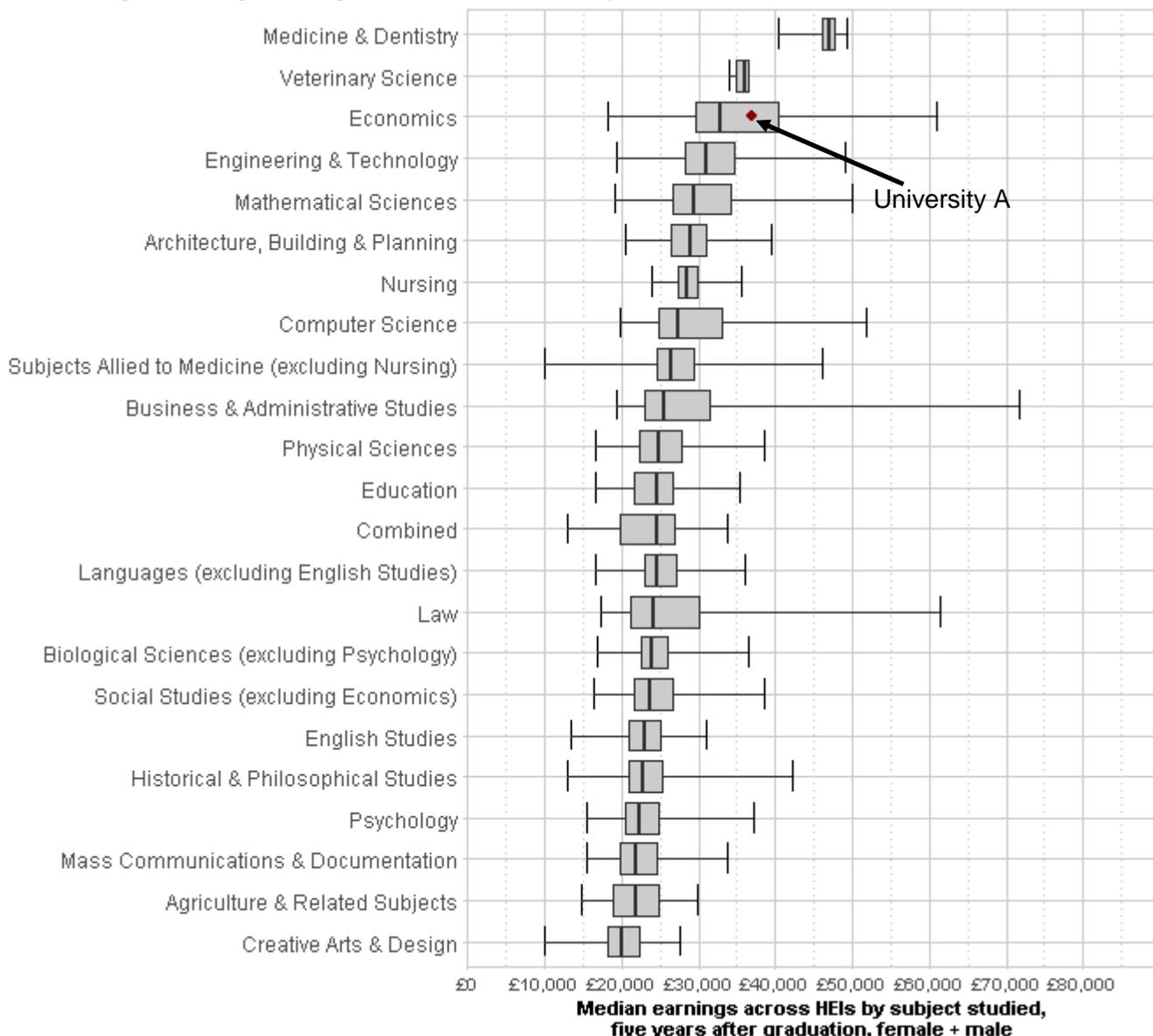
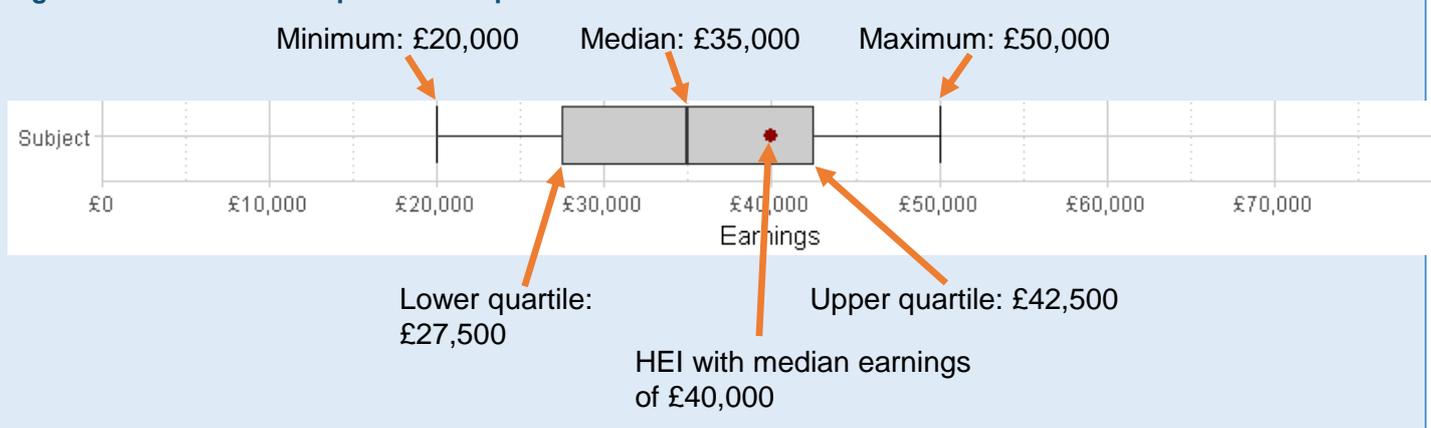


Figure 3: How to read boxplots in this publication



The median earnings are calculated by ranking all HEIs' median annualised earnings and taking the value at which half of providers fall above and half fall below.

The lower quartile earnings is calculated by ranking all providers' median annualised earnings and taking the value at which three quarters of providers fall above and one quarter fall below.

The upper quartile earnings is calculated by ranking all providers' annualised earnings and taking the value at which one quarter of providers fall above and three quarters fall below.

Figure 2 shows that some subjects have a wider range of median earnings among institutions than others. For example, all institutions offering Medicine and dentistry had median earnings 5 years after graduation of between £40,300 and £49,200. By contrast, the median earnings for institutions offering Business and administration degrees showed wider variation, ranging from £19,400 to £71,700. Half of the providers had median earnings between £23,100 and £31,300.

As mentioned in [section 1](#), there are a number of factors that influence the earnings outcomes of graduates and comparisons should be made between similar institutions. When looking at universities offering Business and administration degrees, the median earnings for those in prior attainment group 1 ranges from £28,500 to £71,700, with half of these institutions falling between £33,200 and £41,200. The median earnings for institutions in prior attainment group 3 range from £19,400 to £25,500, with half of these institutions falling between £21,350 to £23,750.

Figure 4: Distribution of difference between male and female median earnings across HEIs for each subject area, five years after graduation.
 Graduating cohort 2008/09

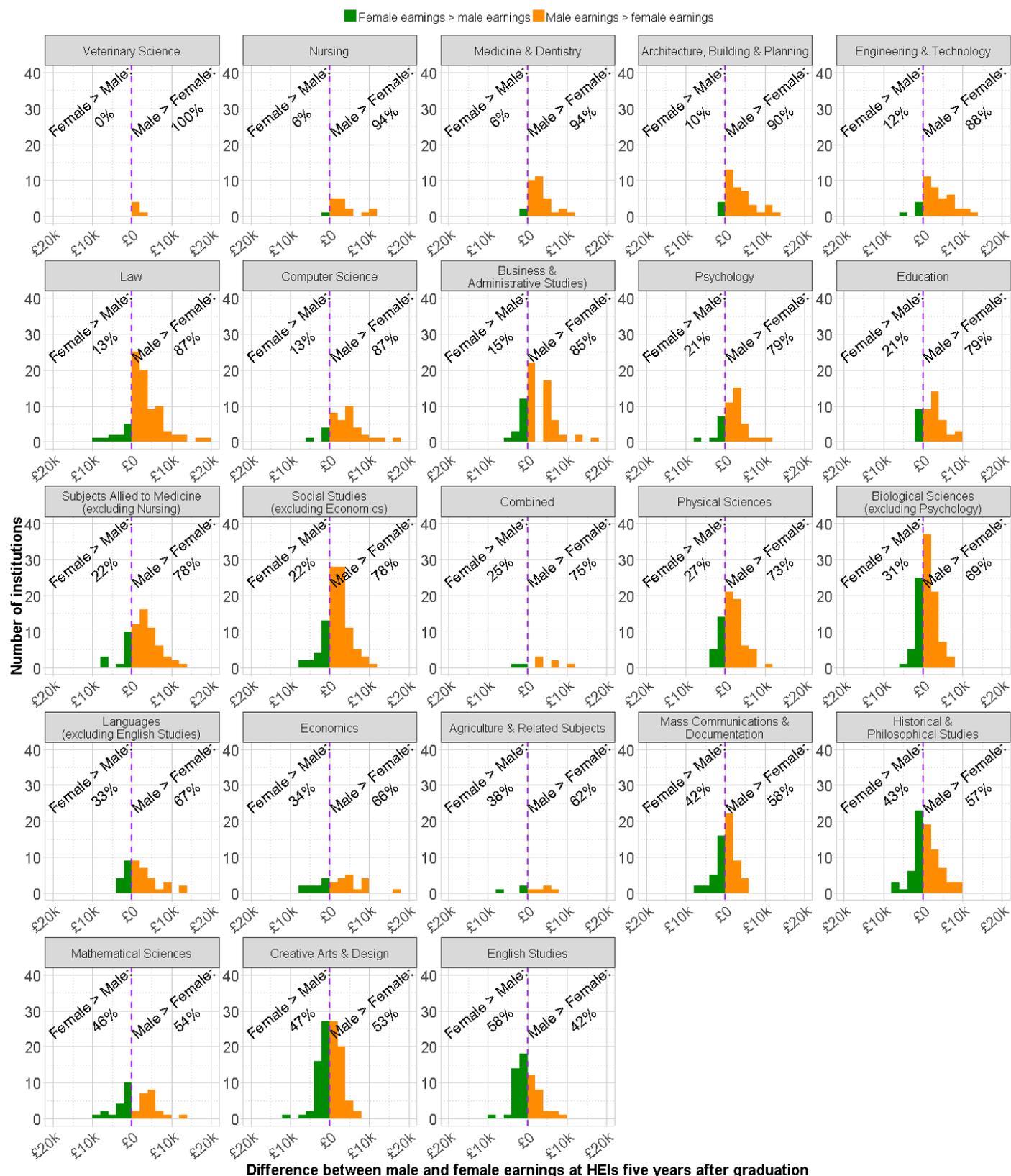


Figure 4 shows the difference between male and female median earnings across institutions five years after graduation. For all subjects except English Studies, male median earnings exceed female median earnings

at more than 50% of institutions offering that subject. In 12 subjects, male earnings are greater than female earnings at more than 75% of institutions.

Employment outcomes across HEIs and subjects

Figure 5: Distribution of proportion in sustained employment, further study or both across HEIs for each subject area five years after graduation (minimum, lower quartile, median, upper quartile, maximum).

Female + male graduates, graduating cohort 2008/09

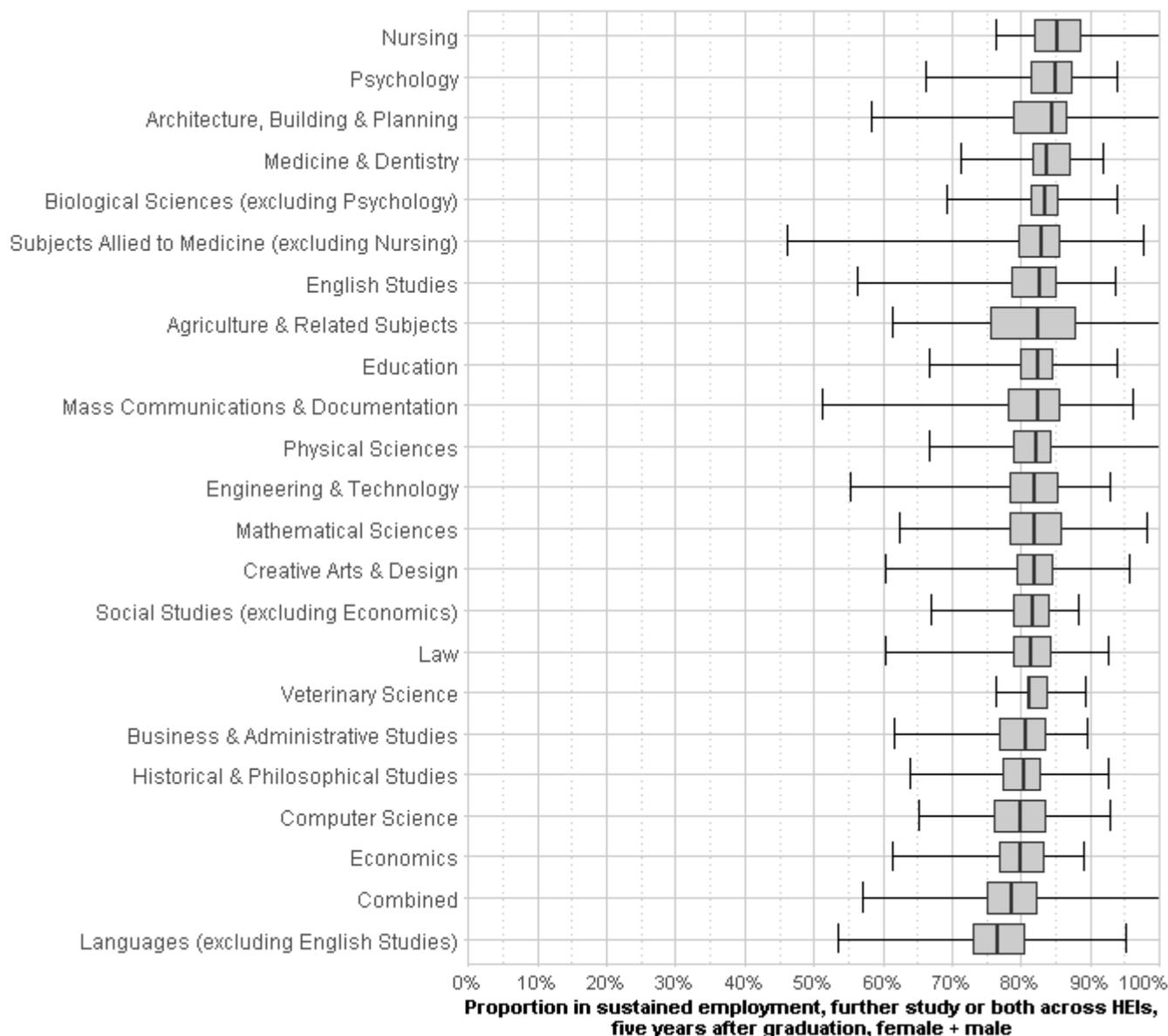


Figure 5 shows the distribution of each institution's proportion of graduates in sustained employment, further study or both five years after graduation. While median proportions lie consistently between 75% and 85% across subjects, there is significant variation within subjects. For Subjects Allied to Medicine (excluding Nursing), for example, the difference between the highest and lowest proportion reaches 51 percentage points. The lowest median proportion is for those who studied languages. It is possible, however, that graduates of such courses are more likely to be living (and working) abroad five years after graduation. If so, they would be more likely to appear in the 'activity not known' category.

Median earnings and prior attainment by HEI

In Figures 6 to 28, we show the median earnings and prior attainment of graduates from each institution for each subject. For the majority of subjects, institutions in prior-attainment band 1 (highest prior attainment) tend to have higher median earnings five years after graduation than those in bands 2 or 3. This relationship between prior attainment and median earnings is clearer in some subjects than in others. Note that only institutions with at least 11 graduates are included; see [section 3](#) for details.

Figure 6: Median earnings across HEIs five years after graduation for Agriculture & Related Subjects.
Female + male graduates, graduating cohort 2008/09

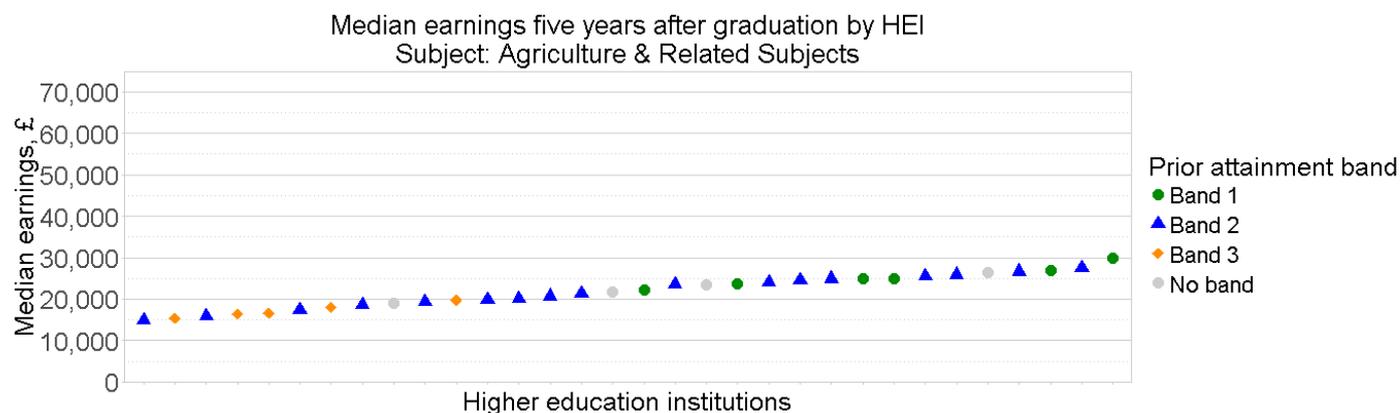


Figure 7: Median earnings across HEIs five years after graduation for Architecture, Building & Planning.
Female + male graduates, graduating cohort 2008/09

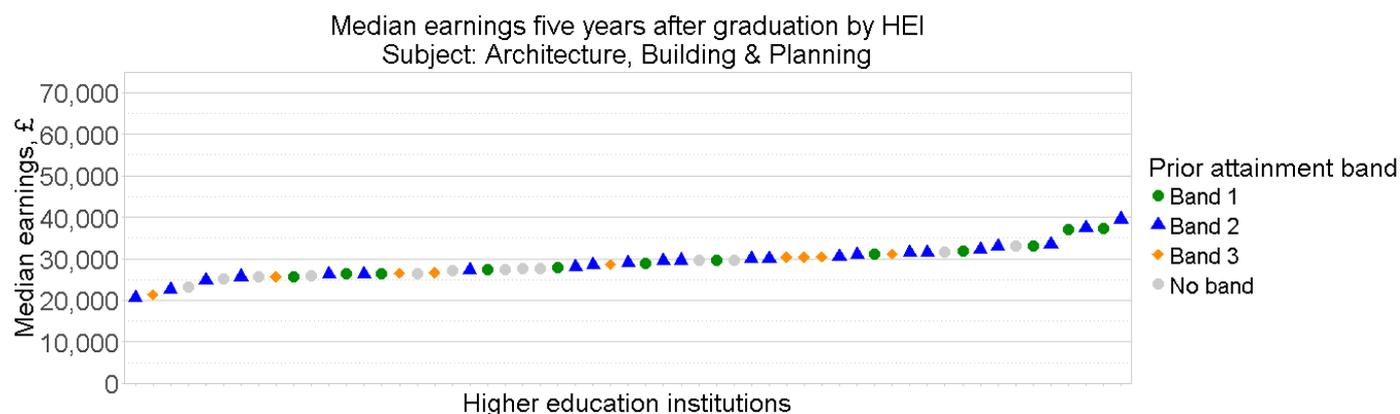


Figure 8: Median earnings across HEIs five years after graduation for Biological Sciences (excluding Psychology).

Female + male graduates, graduating cohort 2008/09

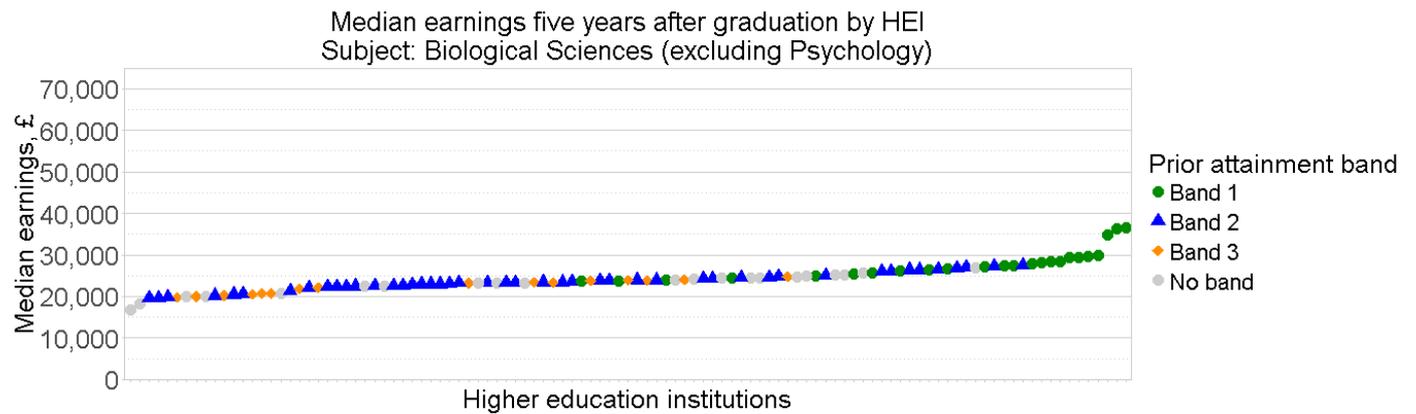


Figure 9: Median earnings across HEIs five years after graduation for Business & Administrative Studies.

Female + male graduates, graduating cohort 2008/09

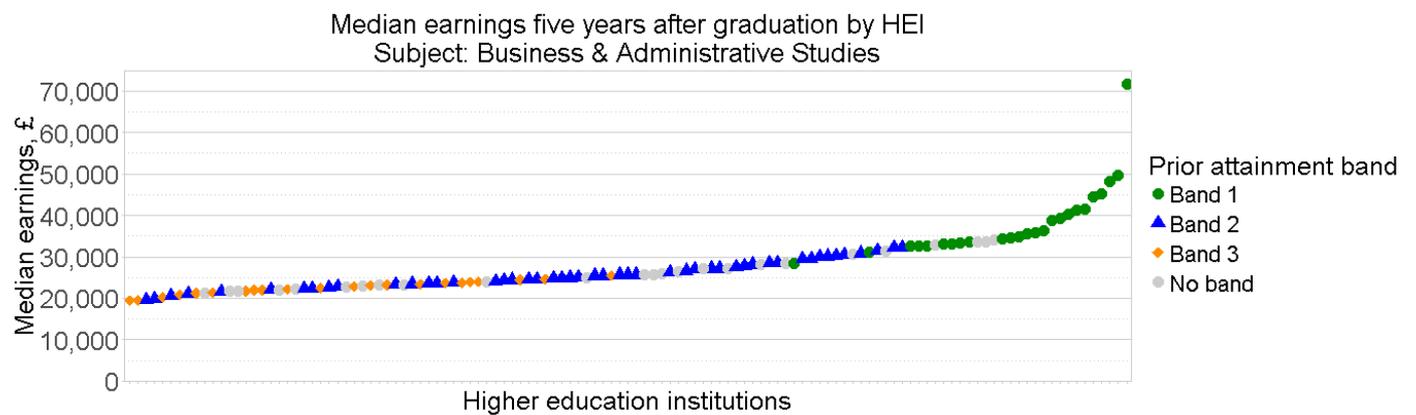


Figure 10: Median earnings across HEIs five years after graduation for Combined.

Female + male graduates, graduating cohort 2008/09

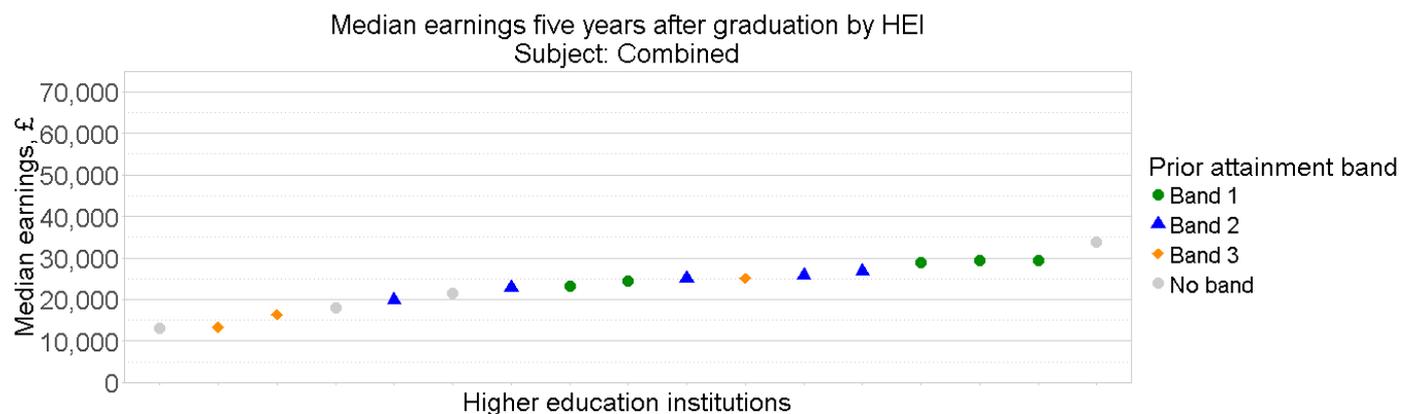


Figure 11: Median earnings across HEIs five years after graduation for Computer Science.
 Female + male graduates, graduating cohort 2008/09

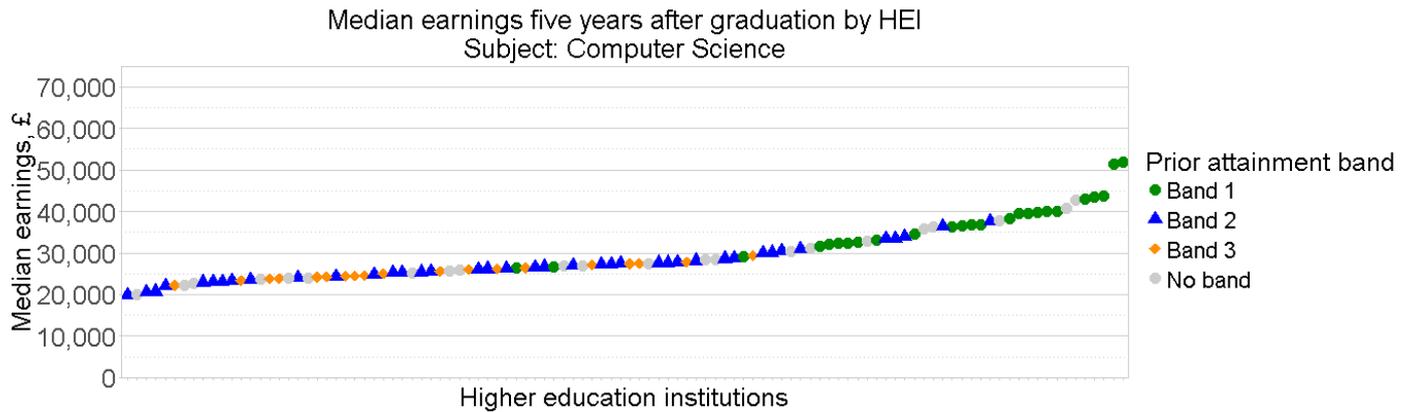


Figure 12: Median earnings across HEIs five years after graduation for Creative Arts & Design.
 Female + male graduates, graduating cohort 2008/09

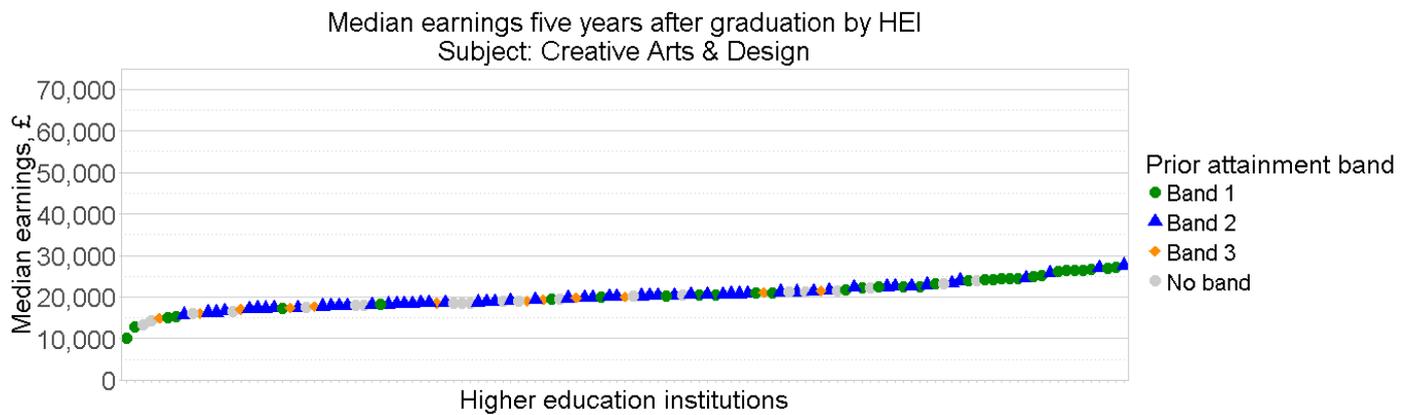


Figure 13: Median earnings across HEIs five years after graduation for Economics.
 Female + male graduates, graduating cohort 2008/09

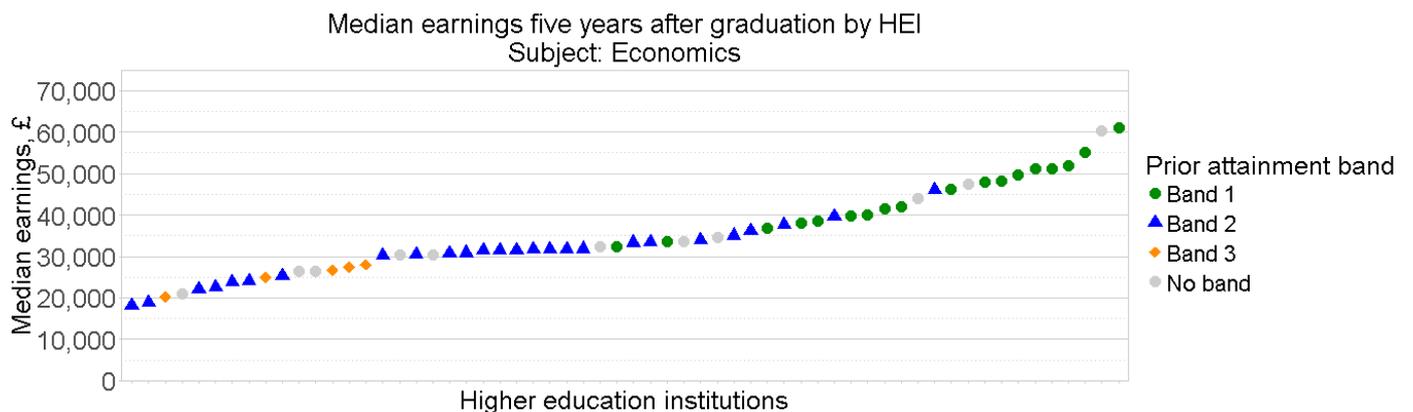


Figure 14: Median earnings across HEIs five years after graduation for Education.

Female + male graduates, graduating cohort 2008/09

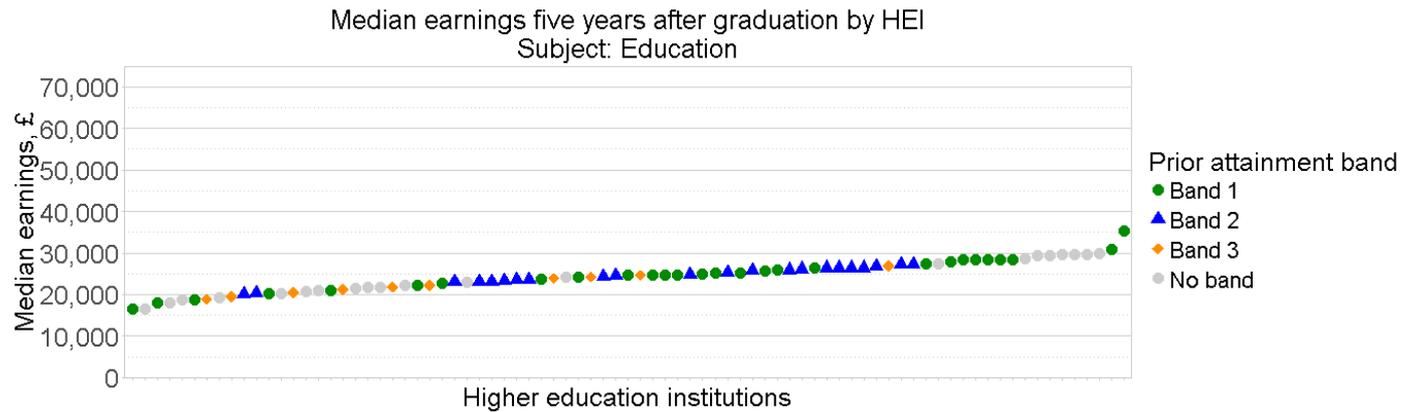


Figure 15: Median earnings across HEIs five years after graduation for Engineering & Technology.

Female + male graduates, graduating cohort 2008/09

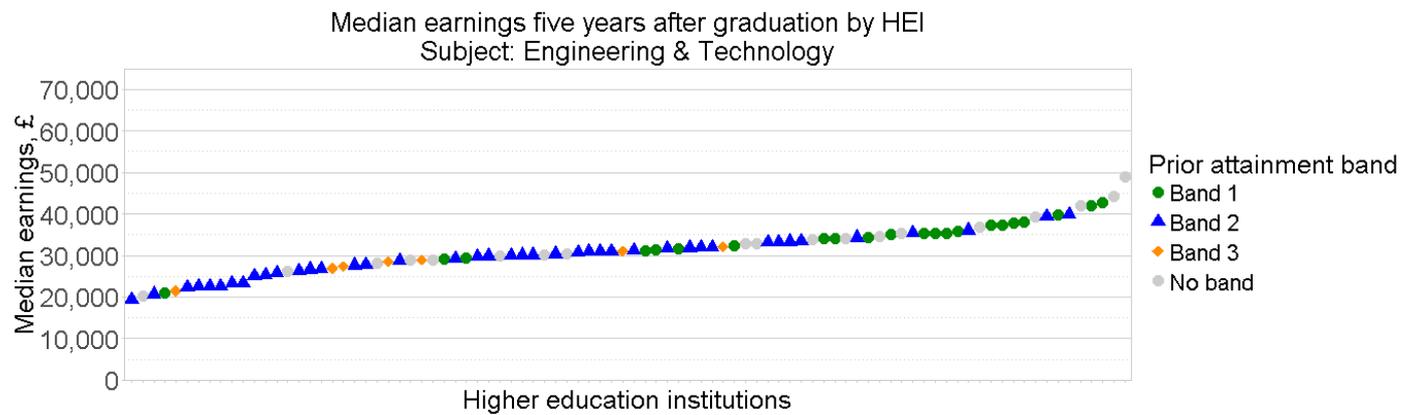


Figure 16: Median earnings across HEIs five years after graduation for English Studies.

Female + male graduates, graduating cohort 2008/09

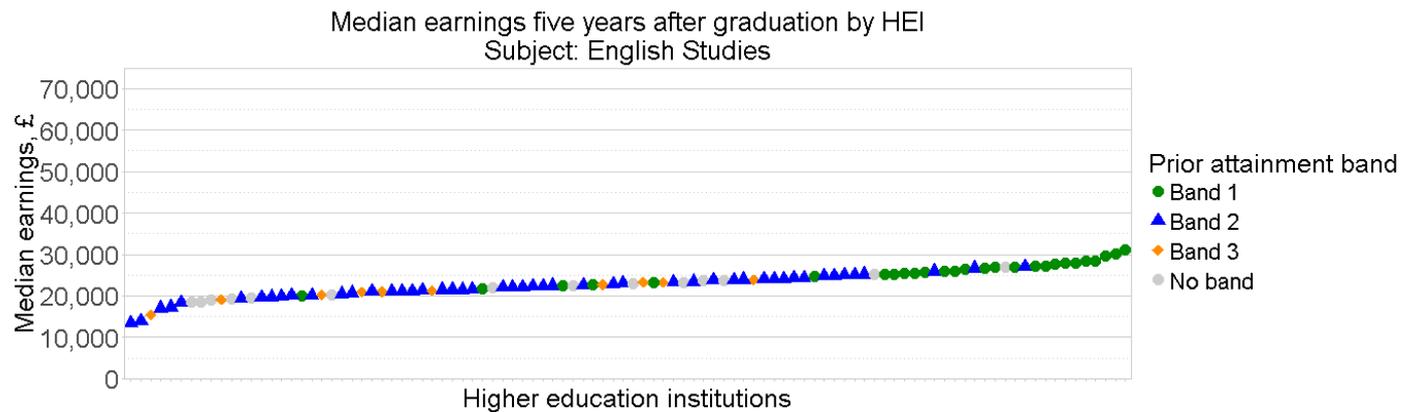


Figure 17: Median earnings across HEIs five years after graduation for Historical & Philosophical Studies.
 Female + male graduates, graduating cohort 2008/09

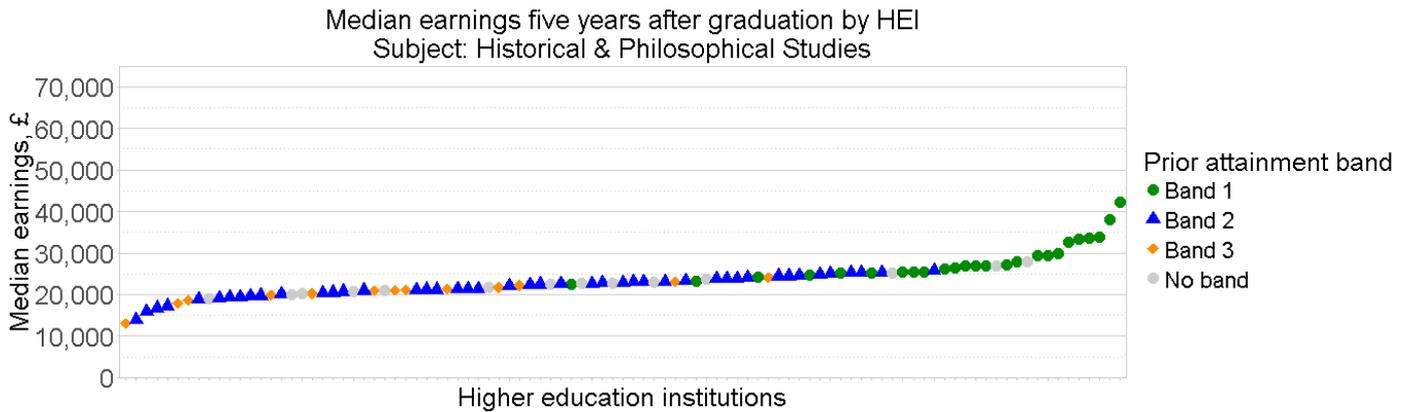


Figure 18: Median earnings across HEIs five years after graduation for Languages (excluding English Studies).
 Female + male graduates, graduating cohort 2008/09

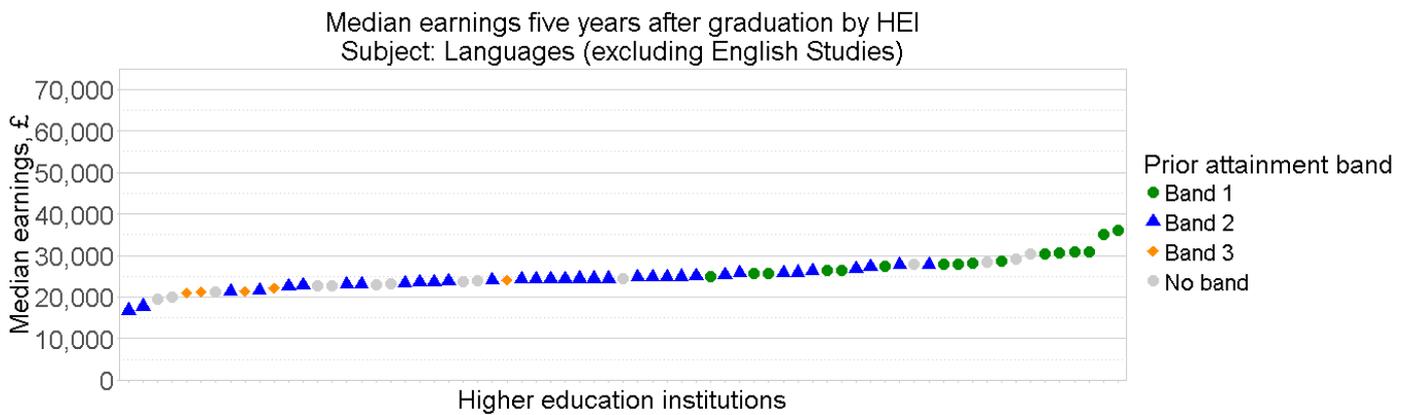


Figure 19: Median earnings across HEIs five years after graduation for Law.
 Female + male graduates, graduating cohort 2008/09

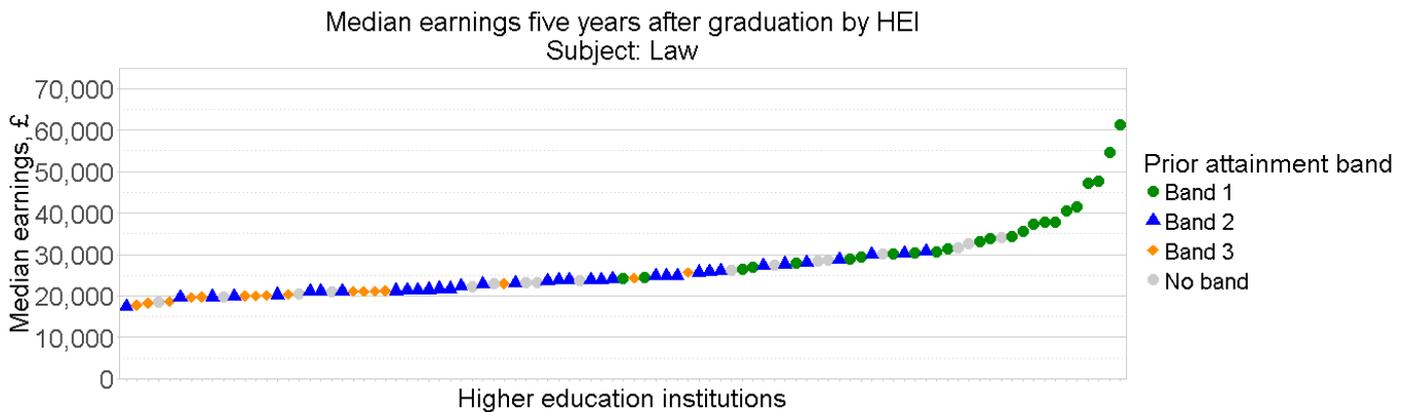


Figure 20: Median earnings across HEIs five years after graduation for Mass Communication & Documentation.
 Female + male graduates, graduating cohort 2008/09

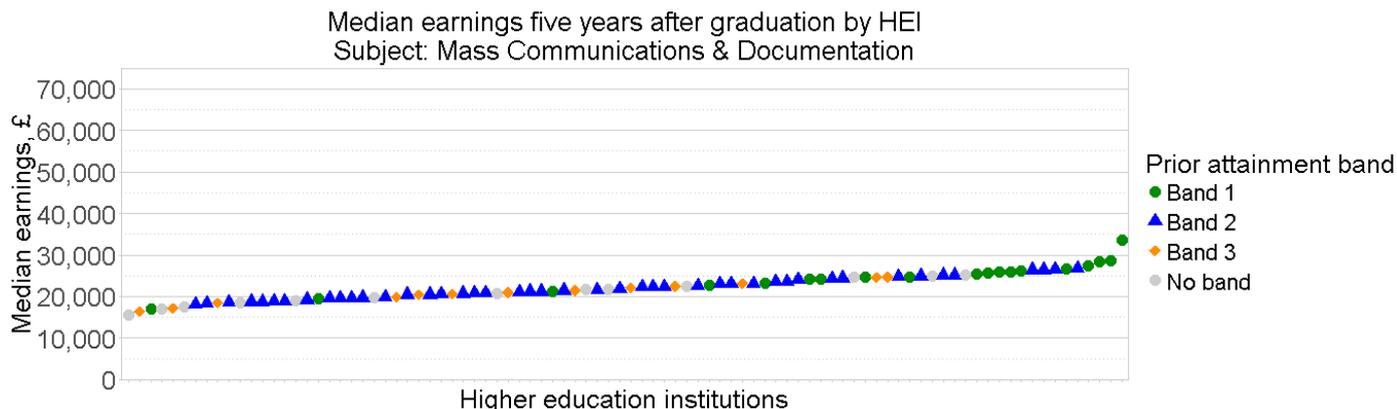


Figure 21: Median earnings across HEIs five years after graduation for Mathematical Sciences.
 Female + male graduates, graduating cohort 2008/09

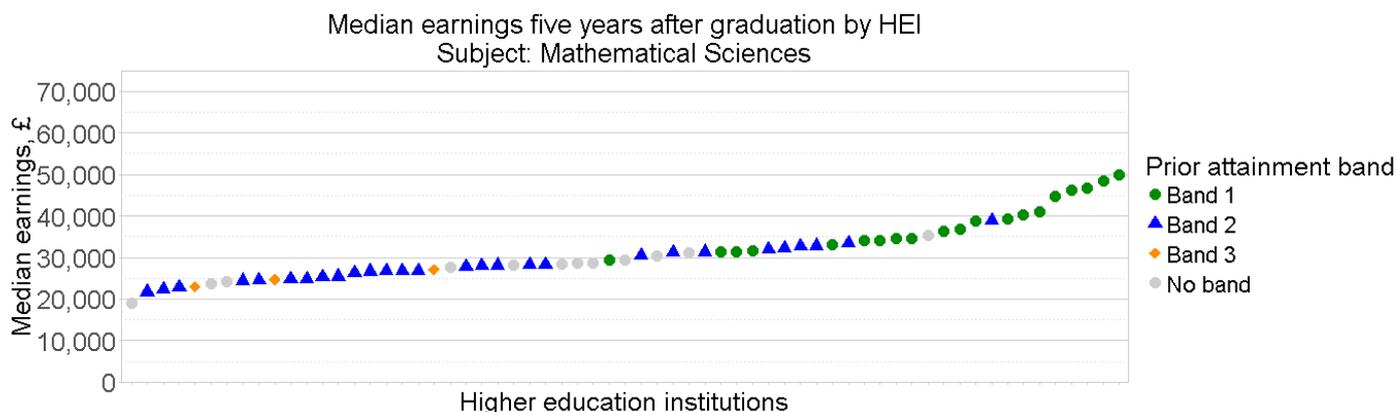


Figure 22: Median earnings across HEIs five years after graduation for Medicine & Dentistry.

Female + male graduates, graduating cohort 2008/09. Prior attainment bands are not included for Medicine & dentistry; see [section 5](#) for details.

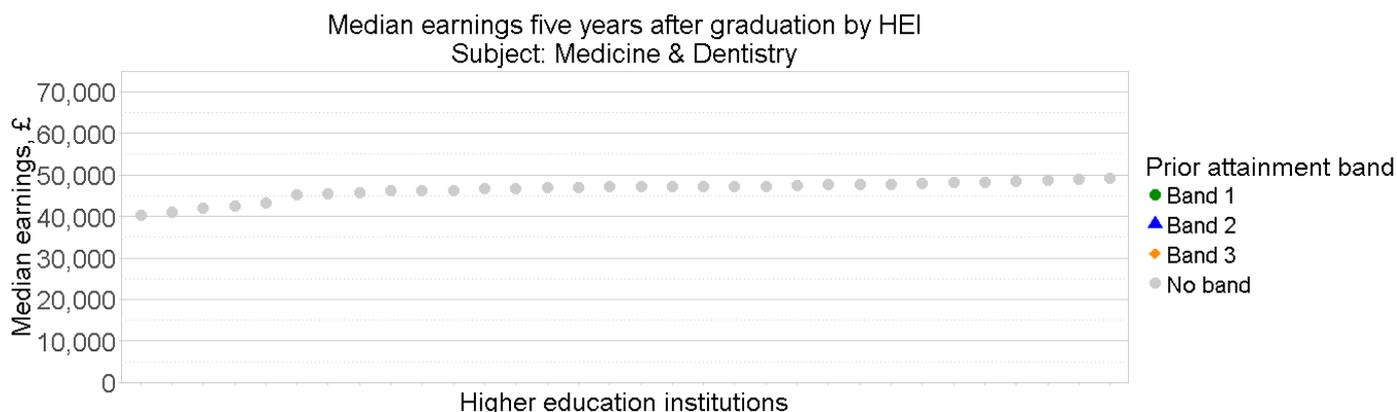


Figure 23: Median earnings across HEIs five years after graduation for Nursing.
 Female + male graduates, graduating cohort 2008/09

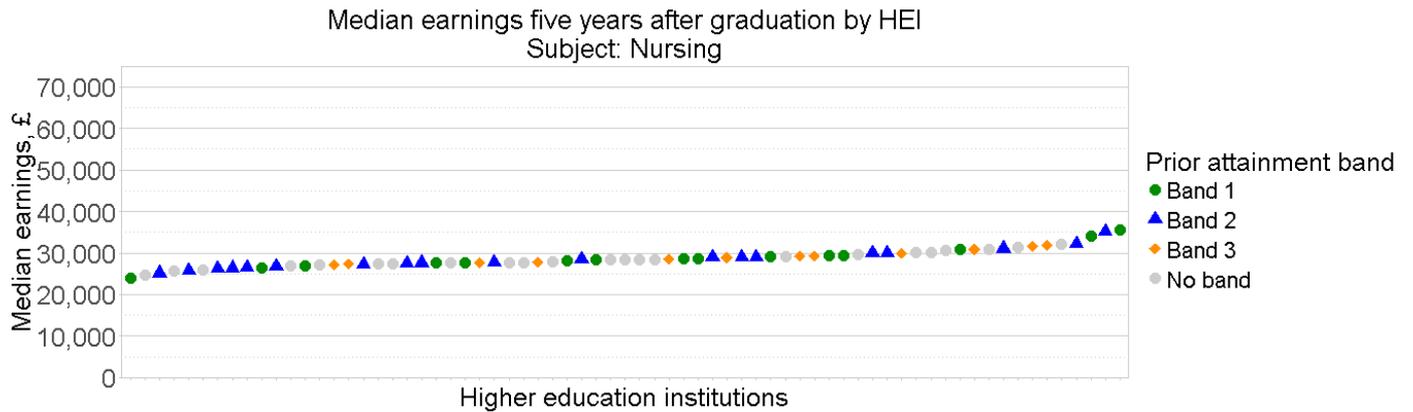


Figure 24: Median earnings across HEIs five years after graduation for Physical Sciences.
 Female + male graduates, graduating cohort 2008/09

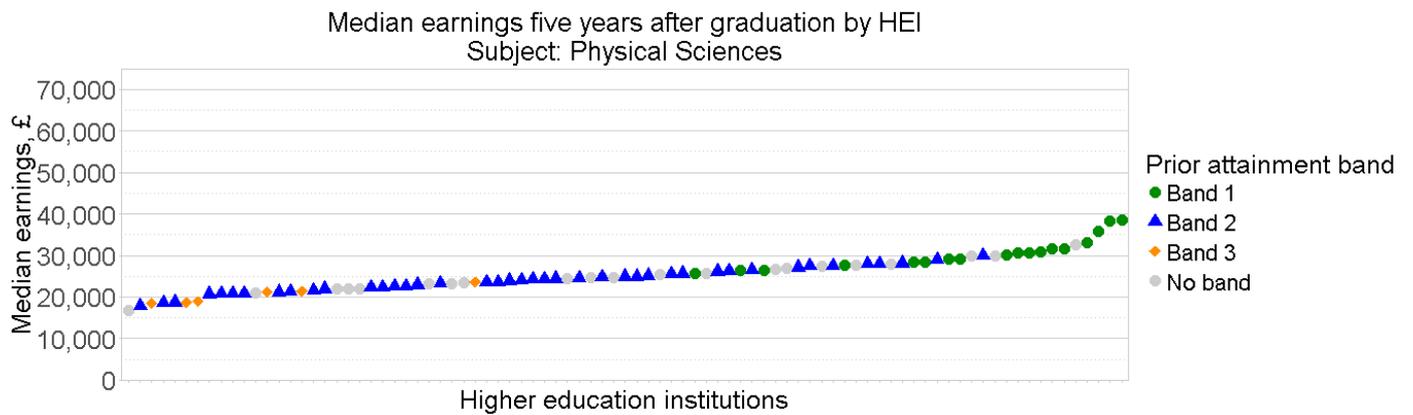


Figure 25: Median earnings across HEIs five years after graduation for Psychology.
 Female + male graduates, graduating cohort 2008/09

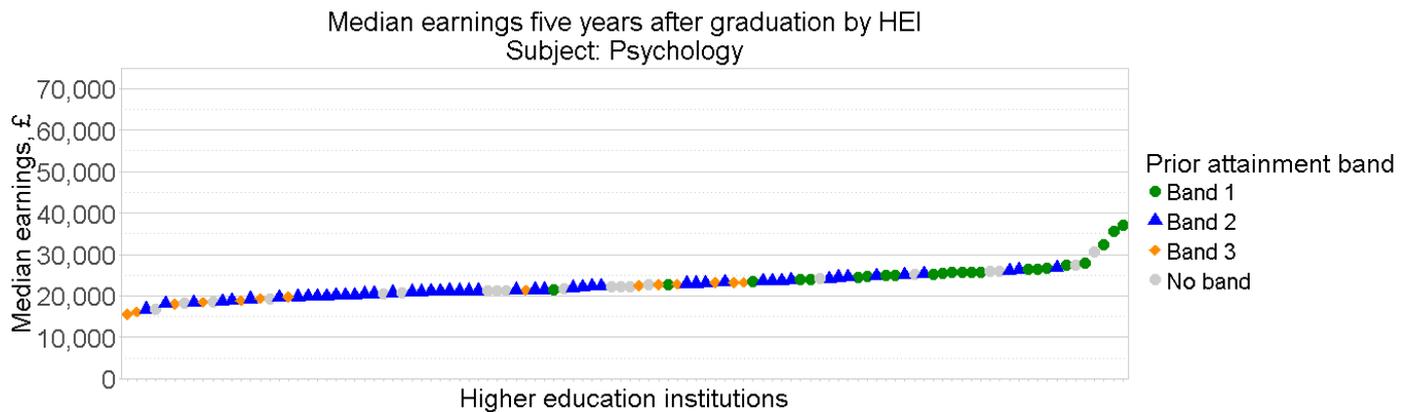


Figure 26: Median earnings across HEIs five years after graduation for Social Studies (excluding Economics).
 Female + male graduates, graduating cohort 2008/09

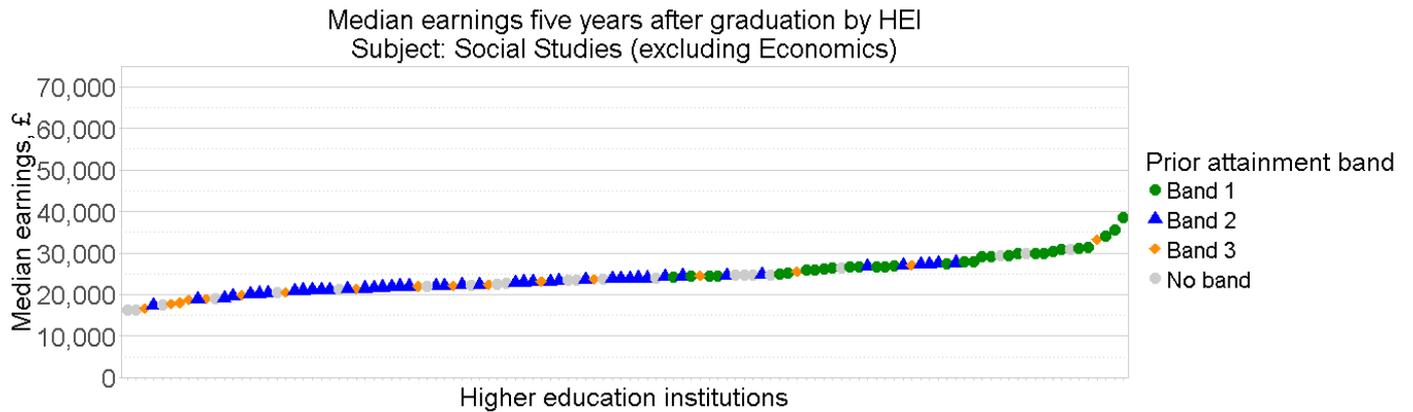


Figure 27: Median earnings across HEIs five years after graduation for Subjects Allied to Medicine (excluding Nursing).

Female + male graduates, graduating cohort 2008/09

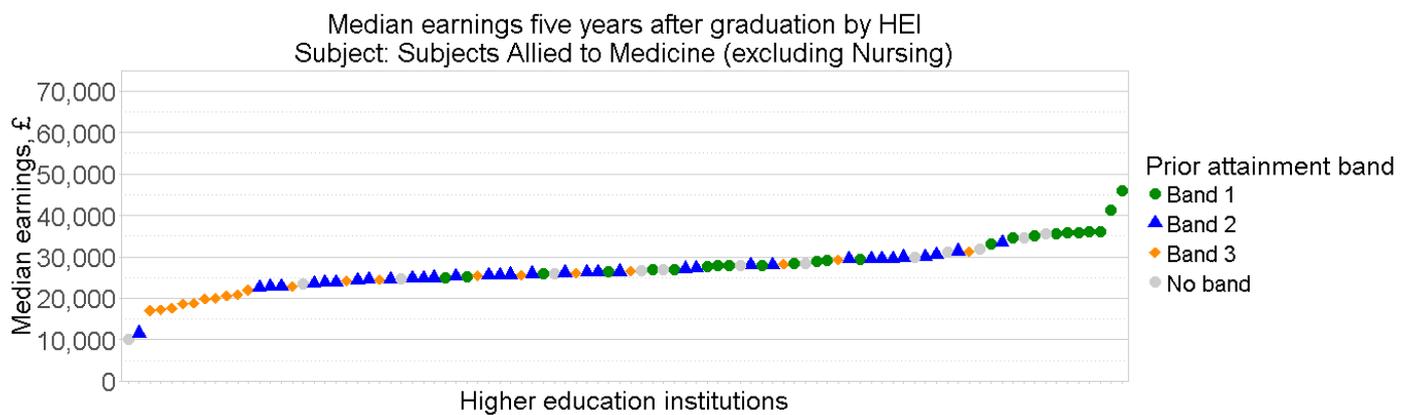
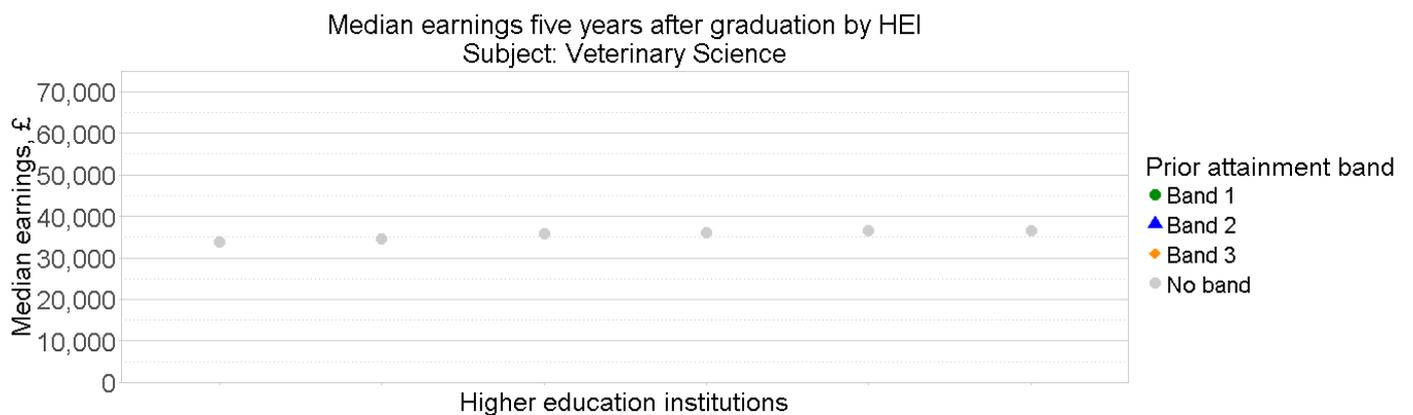


Figure 28: Median earnings across HEIs five years after graduation for Veterinary Science.

Female + male graduates, graduating cohort 2008/09. Prior attainment bands are not included for Veterinary Science; see [section 5](#) for details.



3. Data quality

Employment and earnings data

The **employment data** covers those with P45 and P14 records submitted through the Pay As You Earn (PAYE) system. These figures have been derived from administrative IT systems that, as with any large-scale recording system, are subject to possible errors with data entry and processing. While some data cleaning was necessary, the resulting data looks to provide a good reflection of an individual's employment and earnings for the year.

Issues encountered with the employment data included duplicate records and invalid records (for example, where an employment start date occurred after the end date).

Additionally, for the purposes of collecting taxes, accurate start dates are not required, just the tax year and earnings. Therefore, a number of returns are found to have missing start dates due to the employer not forwarding a timely P45. The default dates recorded in the dataset are either 6 April (the first day of the tax year) or, where only an end date is known, the day before that end date. Similarly, for records where the employment is known to have come to an end within a tax year but the end date is not known, the record is given a default 5 April end date, the last day of the tax year.

Individuals can also have overlapping spells of employment. Before carrying out analysis, the P45 and P14 records for each individual were cleaned and then merged into a single record to give a longitudinal picture of their employment and a total sum of their earnings in each tax year.

Before cleaning, the dataset contained just under 73 million P45 records. Of these, just over 6.5 million invalid records were removed (the majority were duplicate records). Of the remaining records, around 20% had an uncertain start date and around 20% an uncertain end date. For each uncertain date, we used dates from other employment or benefits records for that individual to create a merged employment spell with a known start and end date.

Example 1: Two employment spells



In example 1, the start date of spell B is uncertain with its possible range shown in blue. In this instance we can merge the two records resulting in an employment spell with the start date of spell A and an end date from spell B.

Any remaining uncertain dates were imputed through random sampling of gap lengths from a frequency distribution that was constructed from gaps with a known length.

Coverage

The employment data largely covers those who pay tax through PAYE. The core purpose of this process is to collect tax from those who are eligible to pay it through this mechanism, as such there is not complete coverage due to the taxation system. Employers are not required to supply information to HMRC for individuals who earn below the tax threshold, although for large employers, these individuals are thought to be included due to the methods of data transfer.

In June 2009, HMRC introduced a new computer system, the new National Insurance and PAYE System (NPS). This is able to bring information about each taxpayer together into a single record reducing the need for the manual intervention often needed under the previous COP system (Computerisation of PAYE). NPS replaced COP between 2007/08 and 2008/09, so from this point onwards we have better coverage of earnings data.

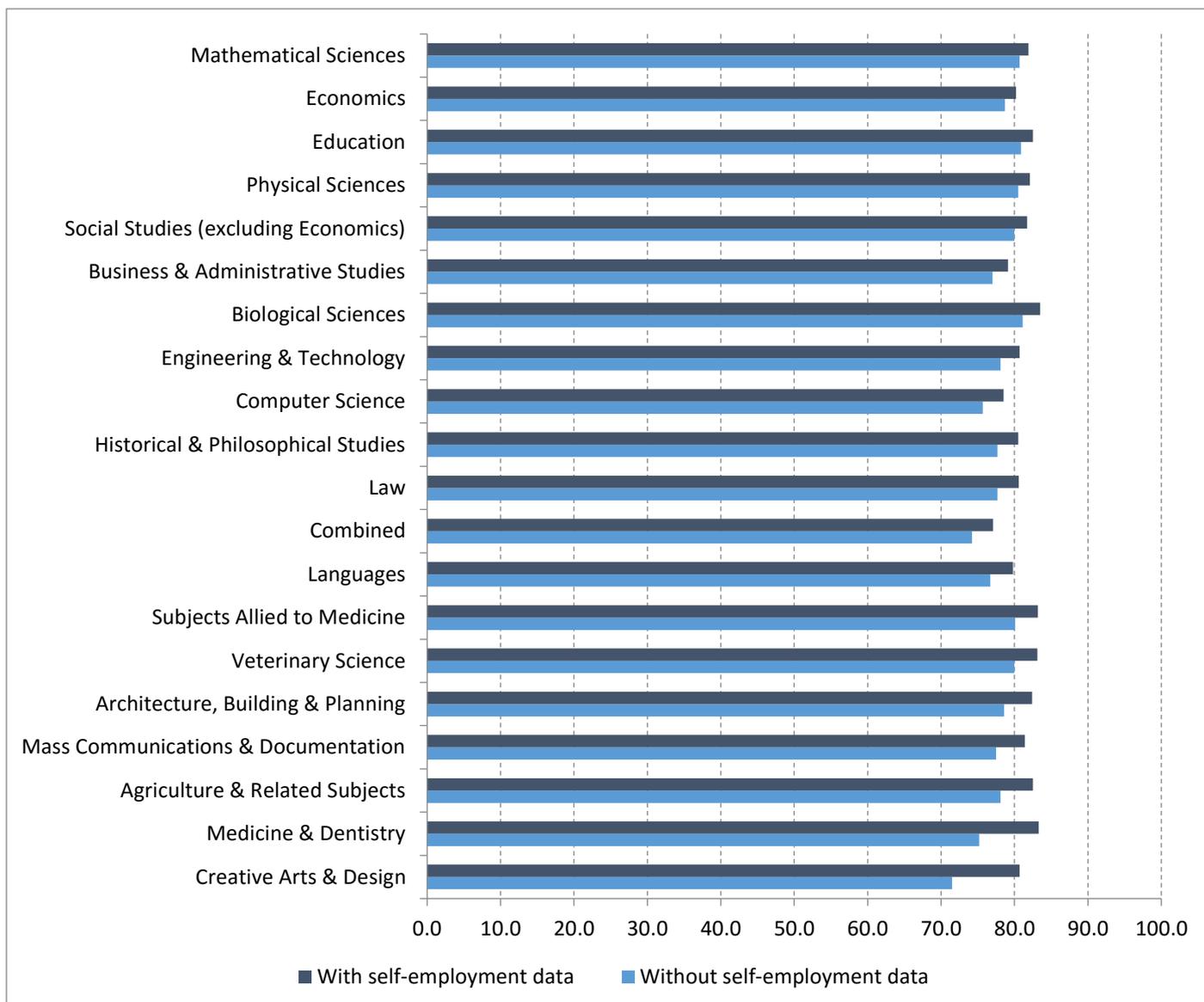
Beginning in April 2013, the P45 reporting system was phased out in favour of the Real Time Information (RTI) system, which requires employers to submit information to HMRC each time an employee is paid. This system has now reached full deployment. RTI offers substantial improvements to the P45 system in terms of data coverage, since employers must now provide information on all their employees if even one employee of the company is paid above the Lower Earnings Limit. The move to RTI will mean that data coverage is higher for the most recent tax years.

We have obtained self-assessment data for the 2014/15 tax year and have selected the graduate cohorts included in our publication to make the most use of this data. An analysis of how self-assessment data affects outcomes for different subjects and at different points after graduation can be found in our previous publication³.

We currently have no access to self-assessment earnings. Earnings outcomes in this publication are therefore not fully representative of graduates in self-employment. Figure 29 shows the effect of self-assessment data on the proportion in sustained employment, further study or both. This effect varies between subjects, and we would equally expect the effect of self-assessment earnings on overall earnings outcomes to vary between subjects and institutions. We are in the process of obtaining more self-assessment data (including earnings) so it can be included more fully in the future.

³ <https://www.gov.uk/government/statistics/graduate-outcomes-by-degree-subject-and-university>

Figure 29: Proportion of 2008/09 graduates in sustained employment, further study or both five years after graduation: comparison with and without self-assessment data



Timeliness

All data used in this process is drawn from administrative sources, which take time to process and collate. There are therefore lags between the reference period and availability of the dataset for analysis. Employment data is matched to DWP data on a regular basis. There are cleaning rules applied to this data, which identify old records when updated with new information. As new information can come through about a job after it has ended this is a source of constant change, analysis suggests that the data is about 90% complete 6 months after the end of the tax year. Self-assessment data takes longer to collect and is finalised by HMRC 16 months after the end of the tax year. The data used in this publication was received just before the cut-off point and should therefore be treated as provisional.

Benefits data

Benefits data is taken from the underlying payments systems and supplemented by the information entered by Jobcentre advisers. The data therefore captures basic information accurately, but non-compulsory fields in either the labour market system or the payment system may be incomplete. Due to the size and technical complexity, these systems are not accessed directly, but at regular intervals, scans are taken that build up a longitudinal picture from repeated snapshots of the data.

Start dates are entered on to the system and are accurate dates of benefit payment, thus providing precise timing and duration for benefit claims. However, while Job Seekers Allowance (JSA) dates have very few discrepancies due to the way the data is scanned, the end dates recorded for other benefits may diverge to some extent from the events they are recording. The potential discrepancy varies from up to two weeks for Employment Support Allowance (ESA) to up to six weeks for Incapacity Benefit (IB).

The National Benefits Database (NBD) does not currently include any information relating to claims to Universal Credit. Further work is being undertaken to assess whether Universal Credit claims can be brought into the matching database.

Graduates are considered to be in receipt of an out-of-work benefit if they have a record at any point in the tax year for: Job Seekers Allowance (JSA), Incapacity Benefit (IB), Income Support (IS), Permanent Injury Benefit (PIB), Severe Disablement Allowance (SDA), Pension Credit (PC), Employment and Support Allowance (ESA).

Suppression and rounding

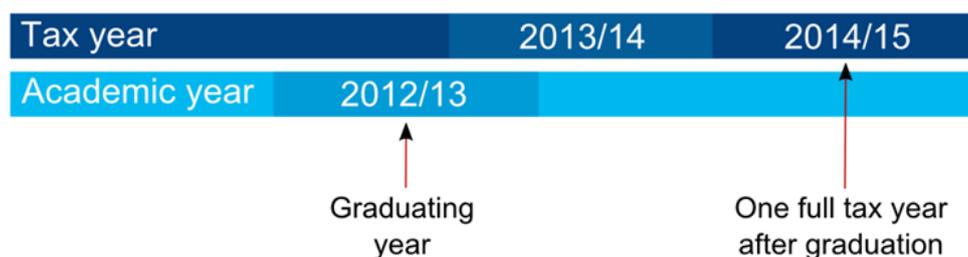
In line with our disclosure control rules, we have suppressed information based on cohorts with fewer than 11 graduates (matched or total).

We have rounded all counts to the nearest five, percentages to one decimal place, and earnings to the nearest £100.

4. Methodology

Time period

The earliest time period for which employment and earnings data is reported is one year after graduation. This refers to the first full tax year after graduation. So, for the 2012/13 graduation cohort the figures one year after graduation refer to employment and earnings outcomes in the 2014/15 tax year. This time period was picked as using the tax year that overlaps with the graduation date would mean that graduates are unlikely to have been engaged in economic activity for the whole tax year.



Sustained employment

The 'sustained employment' measure aims to count the proportion of graduates in sustained employment following the completion of their course. The definition of sustained employment is consistent with the definition used for 16-19 accountability and the outcome based success measures published for adult further education⁴. This definition looks at employment activity in the six month October to March period starting from the first tax year after graduation. A graduate needs to be in paid employment for five out of six months between October and March to be classified as being in 'sustained employment'.

For example, those who graduated in the 2012/13 academic year would be counted as being in sustained employment one year after graduation if they were in paid employment for at least one day a month in the five out of six months between October 2014 and March 2015. If they are employed in all five months from October to February, but do not have an employment record for March, then they must have an additional employment record in April to be considered as being in sustained employment.

Sustained employment defined by self-assessment data

This publication incorporates self-assessment data into measures of sustained employment. Self-assessment data captures the activity of individuals with income that is not taxed through PAYE, such as income from self-employment, savings and investments, property rental, and shares⁵. Currently, only data for the 2014/15 tax year is available for inclusion in LEO. For this reason, we have included the graduating cohorts of academic years 2008/09, 2010/11 and 2012/13 in this publication, since for these cohorts, the tax year 2014/15 corresponds to five years, three years and one year after graduation, respectively.

For the purposes of this publication, individuals are classed as being in sustained employment in the 2014/15 tax year if they meet our definition of sustained employment based on PAYE **or** have returned a self-assessment form stating that they have received income from self-employment. These individuals may or may not have an additional PAYE record. Individuals who have received income through self-assessed means other than self-employment, such as through rental of property, and do not have a PAYE record, are not classed as being in employment (either sustained or unsustainable).

Further study

A graduate is defined as being in further study if they have a valid higher education study record at any UK HEI on the HESA Student Record in the relevant tax year. Further study undertaken at further education colleges is not reflected in these figures as this information is not collected by HESA. The further study does not have to be at postgraduate level to be counted. The purpose of this category is to identify how students spent their time in the relevant tax year and as such cannot be used to calculate the proportion of graduates who go on to postgraduate study. Students enrolled on further education courses, on some initial teacher training enhancement, booster and extension courses, whose study status is dormant or who were on sabbatical are excluded from this indicator.

As a tax year overlaps with two academic years, some students would be coming to the end of their further study in the tax year in question and some would be starting their further study. For example, those who graduated in the 2012/13 academic year and went straight on to a one-year masters course would be counted as being in further study in the 2014/15 tax year (one year after graduation) as their course would finish in September 2014. If a graduate from 2012/13 waited a year before starting their one-year masters course then they would be counted as being in further study in the 2014/15 tax year (one year after graduation) as their course would start in September 2014.

⁴ <https://www.gov.uk/government/statistics/adult-further-education-outcome-based-success-measures>

⁵ A full list of income sources that must be declared through a self-assessment return can be found here, <https://www.gov.uk/self-assessment-tax-returns/who-must-send-a-tax-return>

We have not used a sustained definition when defining further study. The majority of higher education courses last longer than 6 months and dropout rates tend to be low, especially at postgraduate level.

No sustained destination

This category consists of graduates who have an employment or out-of-work benefits record in the tax year in question but were not classified as being in 'sustained employment' (and do not have a further study record as defined above).

Activity not captured

These graduates are successfully matched to DWP's Customer Information System (CIS) but do not have any employment or 'out of work' benefits records. Reasons for appearing in this category include: being employed outside of the UK after graduation, being self-employed in the relevant tax year or earning below the Lower Earnings Limit.

Unmatched

These graduates were not found on DWP's Customer information System (CIS), either because they had never been issued with a National Insurance number or because the personal details provided from the HESA data did not fulfil the matching criteria. **These graduates are excluded from any calculations.** More information on match rates is given in section 6: Data matching and match rates. If a graduate is unmatched on the CIS but has a further study record for the tax year in question then they will be moved out of the 'unmatched' category and into the 'further study' category.

Table A: Classification of LEO graduate outcomes based on underlying further study, employment and benefits records. ✓ = graduate has record of this outcome, ✗ = graduate does not have record of this outcome.

	Graduate has a record of:			
	Further study	Sustained employment	Any employment	Out-of-work Benefits
Graduated classed as being 'unmatched'	✗	✗ (and unmatched to CIS)	✗ (and unmatched to CIS)	✗ (and unmatched to CIS)
Graduated classed as 'activity not captured'	✗	✗	✗	✗
Graduated classed as being in 'no sustained destination'	✗	✗	✓	✗
	✗	✗	✗	✓
	✗	✗	✓	✓
Graduated classed as being in 'sustained employment only'	✗	✓	✓	✗
	✗	✓	✓	✓
Graduated classed as being in 'sustained employment (with or without further study)'	✓	✓	✓	✗
	✓	✓	✓	✓
	✗	✓	✓	✗
	✗	✓	✓	✓
Graduated classed as being in 'sustained employment, further study or both'	✓	✗ (and unmatched to CIS)	✗ (and unmatched to CIS)	✗ (and unmatched to CIS)
	✓	✗	✗	✗
	✓	✗	✓	✗
	✓	✗	✗	✓
	✓	✗	✓	✓
	✓	✓	✓	✗
	✓	✓	✓	✓
	✗	✓	✓	✗
	✗	✓	✓	✓

Annualised earnings

Earnings figures are only reported for those classified as being in sustained employment and where we have a valid earnings record from the P14. Those in further study are excluded, as their earnings would be more likely to relate to part-time jobs. **Earnings from self-assessment are not included.**

For each graduate, the earnings reported on the HMRC P14 data for a given tax year are divided by the number of days recorded in employment across that same tax year. This provides an average daily wage that is then multiplied by the number of days in the tax year to calculate their annualised earnings.

This calculation has been used to maintain consistency with figures reported for further education learners after study. It provides students with an indication of the earnings they might receive once in stable and sustained employment.

The annualised earnings calculated are slightly higher than the raw earnings reported in the tax year. This is because the earnings of those who did not work for the entire tax year will be higher when annualised. The difference between the annualised and raw figures decreases as time elapses after graduation. Median annualised earnings one year after graduation are around £1,000 higher than the median raw earnings reported in the P14 data. Five years after graduation, the median annualised earnings are less than £500 higher than the median raw earnings.

All earnings presented are nominal. They represent the cash amount an individual was paid and are not adjusted for inflation (the general increase in the price of goods and services).

5. Contextual information

Prior attainment

Information on prior attainment was obtained from the national pupil database (NPD). The NPD contains data on the key stage 5 qualifications obtained by 16–18 year olds in England since 2002. Both the NPD and the HESA data have been matched to DWP's Customer Information System (CIS) through the process set out in [section 6: Data matching and match rates](#); this enables HESA and NPD records to be linked through matches to a common CIS record. This publication uses A levels only to assess attainment prior to entering higher education.

Coverage

For the cohorts in this publication, at least 64% of graduates could be matched to a key stage 5 NPD record and at least 59% could be matched to an A level record through this method.

When we restrict the cohorts to those graduates we could reasonably expect to find an NPD record for (that is, those whose domicile was classified as 'English' and who were not classified as a 'mature' student), we match at least 94% to an NPD record and at least 84% to an A level record. Figures for each of our graduating cohorts are listed in Table B, below.

Reasons why a graduate could not be matched to an A level record include:

- they took an alternative key stage 5 level qualification (for example, a BTEC, the International Baccalaureate)
- they took their A levels prior to the 2001/02 academic year or when they were aged above 18
- they took their key stage 5 qualifications outside of England
- the HESA record we have for them could not be matched to DWP's CIS spine and therefore could not be matched back to an NPD record using this method

Table B: Proportion of graduates matched to a prior attainment records

Graduating cohort	All matched graduates		English-domiciled, non-mature matched graduates	
	Matched to key stage 5 NPD record	Matched to A level record	Matched to key stage 5 NPD record	Matched to A level record
2008/2009	63%	58%	94%	88%
2010/2011	66%	59%	96%	86%
2012/2013	68%	58%	96%	84%

The following scores were assigned for each grade: A*=140 points; A=120 points; B=100 points; C=80 points; D=60 points; and E=40 points.

Each graduate's total points were calculated from their best three A levels as recorded on the NPD. If the student took more than three A levels, only their best three were included in the total. If they received an E grade or higher in fewer than three A levels, only those A levels they did pass were included: scores were not adjusted for the number of A levels taken. Note that A* grades have only been awarded since 2010 and would not have been available to the majority of graduates from the cohorts in this publication.

Where this methodology produced the same score for multiple institutions, we have assigned all such institutions to the same band, including all in the higher-attaining band if they lay on the boundary between quartiles.

Since we are relying on the NPD, only graduates who completed their A levels at an English school are included in our prior-attainment data. Coverage at HEIs in Scotland, Wales or Northern Ireland would therefore be limited to graduates who completed their A levels in England before pursuing higher education in one of the other countries. **Given this limitation, we are not publishing prior-attainment information for HEIs in Scotland, Wales or Northern Ireland.**

Equally, as the NPD only covers qualifications obtained since 2002, the majority of mature students are not expected to have an A level record on the NPD. We therefore do not include mature students in our prior-attainment calculations.

Banding

We calculate each graduate's point score from their top three A levels and use this to compute a weighted median point score for each institution, split by subject, gender and year after graduation. As weights, we use Full Person Equivalent (FPE), which takes account of graduates who spent, for example, 50% of their studying time studying French and 50% on philosophy. FPE does not, however, distinguish between full-time and part-time study.

We then rank HEIs by their median point scores and place them into one of three bands:

- Band 1: top 25%, greater than 75th percentile
- Band 2: middle 50%, between 25th and 75th percentiles
- Band 3: bottom 25%, less than 25th percentile

The intention of this method is to allow for comparison of institutions within the same subject area. Since the rankings used are based on single subjects only, it could be misleading to compare an institution's prior-attainment bands between different subjects.

It is recognised that the prior attainment bandings can be expanded further to include the points for those who took other key stage 5 qualifications.

Medicine & Dentistry and Veterinary Science

We found that our prior-attainment methodology would lead to misleading results for two of the subjects we cover, Medicine & Dentistry and Veterinary Science. For those subjects, all institutions for which prior attainment would not be suppressed show very similar median UCAS point scores, so bands based on percentiles would give the appearance of differentiation where there is none.

POLAR

The Participation of Local Areas (POLAR) classification places local areas into five groups, based on the proportion of 18 year olds who enter higher education at age 18 or 19. The most recent iteration of this classification is POLAR3, which we use in this publication. Detailed information about the POLAR methodology is available from HEFCE⁶.

Here, we publish the proportion of non-mature matched graduates whose postcode on the student record placed them in quintile 1 (the most disadvantaged group) of POLAR3 before applying for or entering higher education. This information is split by subject studied, institution, gender and year after graduation.

For mature students, their postcode immediately before entering higher education is less likely to be indicative of the environment they grew up in, and hence their POLAR classification would have to be interpreted differently from that of non-mature students. We therefore exclude mature students from our POLAR measure.

HESA do not publish POLAR figures for Scotland, as Scotland's relatively high participation rate and the high proportion of higher education students in further education colleges could misrepresent Scottish contributions to widening participation. Following that line of reasoning, this publication does not include POLAR figures for Scottish HEIs either.

6. Data matching and match rates

The HESA student records are matched to DWP's Customer Information System (CIS)⁷ using an established matching algorithm based on the following personal characteristics: National Insurance Number (NINO), forename, surname, date of birth, postcode and sex. Some of these characteristics are simplified to make the matching process less time-intensive and allow more matches. Only the first initial of the forename is used, the surname is encoded using an English sound-based algorithm called SOUNDEX⁸, and for most matches only the sector of the postcode is used.

All records accessed for analysis are anonymous so that individuals cannot be identified. The personal identifying records used in the actual matching process are accessed under strict security controls.

There are five match processes carried out, ranging from the highest quality and most likely to be accurate (Green) to the lowest quality and most likely to be a false match (Red-Amber). Table C shows the criteria for each match type.

⁶ <http://www.hefce.ac.uk/analysis/yp/POLAR/>

⁷ The CIS is a computer system used by the Department for Work and Pensions to store basic identifying information about customers and provides information on all individuals who have ever had a national insurance number.

⁸ SAS function that turns a surname into a code representing what it sounds like, which allows some flexibility for different spellings. For example Wilson=Willson

Once the HESA records have been matched to the CIS the corresponding tax and benefits records for that individual can then be linked to their HESA record.

All match rate analysis in this chapter is restricted to the HESA population covered in this publication, that is, UK domiciled, first degree graduates from UK Higher Education Institutions.

Table C: Criteria for each type of match

Match quality	NINO (National Insurance number)	Forename (initial)	Surname (soundex)	Date of birth	Sex	Postcode (sector)
1. Green	✓	4 or 5 ✓✓✓✓✓				
2. Amber	✓	3 ✓✓✓				
3. Green-Amber	x	✓	✓	✓	✓	✓
4. Amber-Red	x	✓	✓	✓	1 ✓	
5. Red-Amber	x	x	x	✓	✓	✓ (full postcode)

Overall match rates

Table D shows the overall CIS match rates for graduates who studied full-time as well as the proportion with a tax or benefit record. Potential reasons for not being able to find a P45 record, despite having a match to the CIS spine, include: earning below the Lower Earnings Limit (LEL), self-employment, moving abroad and death.

Table D: Match rates for UK domiciled first degree graduates at English HEI's, by year of graduation

Academic year	Matched to tax/ benefit record (%)	Matched to CIS spine (%)
2003/04	94	94
2004/05	94	95
2005/06	95	95
2006/07	95	96
2007/08	96	97
2008/09	96	97
2009/10	97	97
2010/11	96	96
2011/12	96	97
2012/13	98	99

Table D shows that the match rate was very high for the most recent cohorts: 99% of full-time graduates in 2012/13 were matched using the CIS, and almost all of these had at least one tax or out-of-work benefit record. This compares to a match rate of 94% of graduates in 2003/04. The higher match rates for more recent cohorts is at least partly explained because the CIS holds the most recent names and addresses for individuals, and so if the details change after someone graduates there is less chance that they will be matched.

Due to improvements in the matching process since our first publication, our match rates increased slightly from our first to our second publication. This is particularly apparent for the 2010/11 and 2011/12 cohorts, which had a dip in the match rate in our first publication compared to other cohorts. Match rates for these cohorts are now more comparable with other cohorts. The dataset used for this publication is identical to that in our second publication.

Match rate by graduate characteristic

Table E shows match rates by sex. The match rate for females is slightly lower in the earlier years than for males, but this difference is negligible or non-existent in recent cohorts. As the CIS holds the latest information about an individual, anyone that has changed their name since graduation will have a different name on the CIS compared to their HESA record. This particularly affects females, due to a higher likelihood than males of changing their name upon marriage.

Table E: CIS match rate by sex

Academic year	Female (%)	Male (%)
2003/04	92	97
2004/05	93	97
2005/06	93	98
2006/07	95	98
2007/08	96	98
2008/09	96	98
2009/10	97	98
2010/11	96	97
2011/12	96	97
2012/13	99	99
2013/14	99	99

The match rates were also compared for different ethnic groups out of the UK-domiciled students. There was little consistent difference between the groups, the only exception being graduates whose self-declared ethnicity was Chinese, where the match rate was 91% in 2012/13. Further investigation showed that this was most likely due to the ethnically Chinese forenames and surnames being switched on one of the databases. This is more common for Chinese names, because the family name traditionally comes before the individual name. This hypothesis is further corroborated by the fact that ethnically Chinese students with common English names have match rates that are very similar to graduates from other ethnic groups.

The number of forenames or surnames an individual has can affect the match rate, because with multiple names it is more likely that they will not all be recorded, or there may be forenames recorded as surnames or vice versa. Analysis of the match rates showed that those with at least two surnames had a slightly lower match rate than those with only one.

7. Next steps

We welcome user feedback on the data contained in this release, and those wishing to provide comments should send them to he.statistics@education.gov.uk. As we develop the LEO data further, we will look to publish further experimental statistical releases as well as establish a regular cycle of publications covering graduate outcomes to inform public understanding of the higher education system and improve the information available to students when deciding on higher education institutions and subjects.

8. Accompanying tables

The following table is available in Excel format on the department's statistics website.

Subject by institution table (Excel .xls)

Table 1: Activity of graduates by subject and institution one, three and five years after graduation

9. Feedback

We welcome feedback on this publication. Contact details can be found in [section 12: Get in touch](#).

10. Glossary

Academic year: Runs from 1 August to 31 July. For example, the 2012/13 academic year ran from 1 August 2012 to 31 July 2013.

Customer Information System (CIS): A computer system used by the Department for Work and Pensions that contains a record for all individuals that have been issued with a National Insurance (NINO) number. It contains basic identifying information such as name, address, date of birth and NINO.

First degree qualification: This covers qualifications commonly known as bachelor's degrees and includes postgraduate bachelor's degrees at H level. Not all undergraduate courses are included: for example, the Professional Graduate Certificate in Education (PGCE), foundation degrees and Higher National Diplomas (HND) are excluded. For further information on this classification, please refer to the Higher Education Statistics Agency at the link referenced below.⁹ Note that it does not necessarily mean that the degree is the first higher education qualification undertaken by the student.

Further study: The HESA Student Record is used to identify instances of further study in higher education. Students enrolled on further education courses, on some initial teacher training enhancement, booster and extension courses, whose study status is dormant or who were on sabbatical are excluded from this indicator. Each tax year spans two academic years; therefore, graduates will be flagged as being in further study if they have a HESA record in one of these two academic years.

HEI: Higher Education Institution.

Higher Education Statistics Agency (HESA): collects data from universities, higher education colleges and other specialist providers of higher education. In this publication, we have used the HESA Student Record to identify our graduate base population and higher education further study instances.

Individualised Learner Record (ILR): used by the further education (FE) and skills sector in England to collect data about learners in the system and the learning undertaken by each of them.

Joint Academic Coding System (JACS): a standardised way of classifying academic subjects and modules, maintained by HESA and the Universities and Colleges Admissions Service (UCAS). In this

⁹ Under 'Field Explanations': <https://www.hesa.ac.uk/support/definitions/students#level-study-qualification-obtained>

publication, we group subjects using JACS high-level subject groupings. Previous research has shown that the earnings profile of economics graduates differs substantially from graduates of other social sciences; therefore, in this publication we have presented Nursing separately from other Subjects Allied to Medicine, Psychology separately from other Biological Sciences, economics separately from other social sciences, and English Studies separately from other Language.

JACS code	Subject
1	Medicine & Dentistry
2	Subjects Allied to Medicine (excluding Nursing)
B7	Nursing
3	Biological Sciences (excluding Psychology)
C8	Psychology
4	Veterinary Science
5	Agriculture & Related Subjects
6	Physical Sciences
7	Mathematical Sciences
8	Computer Science
9	Engineering & Technology
A	Architecture, Building & Planning
B	Social Studies (excluding Economics)
L1	Economics
C	Law
D	Business & Administrative Studies
E	Mass Communications & Documentation
F	Languages (excluding English Studies)
Q3	English Studies
G	Historical & Philosophical Studies
H	Creative Arts & Design
I	Education
J	Combined

Mature students: We define mature students as those who were 21 or above on the 30 September of the academic year in which they commenced their studies and young students to be those who were below 21 on that date. 72.8% of matched 2008/09 graduates are classed as young students and 27.2% as mature.

National pupil database (NPD): contains information about pupils in schools and colleges in England. It includes information on test and exam results, prior attainment and pupil progress, as well as pupil characteristics such as sex, ethnicity and eligibility for free school meals.

Nominal earnings: Nominal earnings represent the cash amount an individual was paid. They are not adjusted for inflation (the general increase in the price of goods and services).

PAYE: HMRC's system to collect Income Tax and National Insurance from employment. The LEO project uses information from the **P45** to ascertain employment spell length and from the **P14 (P60)** to determine annual earnings. See [section 3: Data quality](#) for a discussion of how PAYE data has been used in LEO.

Self-assessment: Self-assessment data captures the activity of individuals with income that is not taxed through PAYE, such as income from self-employment, savings and investments, property rental, and shares.

Sustained employment: A learner is counted in sustained employment if they were recorded as being employed in 5 out of the 6 months between October and March in the tax year, for example, 5 out of 6 months between October 2010 and March 2011 for the 2010/11 tax year. Additionally, graduates are counted in sustained employment if they have returned a self-assessment form for the relevant tax year stating that they have received income from self-employment.

Sustained annualised earnings: The calculated average daily wage across the tax year grossed up to the equivalent annual figure. This is only calculated where the learner was in sustained employment. Earnings figures in this publication are **nominal**. Self-assessed earnings data is not available.

Tax year: Runs from 6 April to 5 April the following year. For example, the reference period covered by the 2014/15 tax year runs from 6 April 2014 to 5 April 2015.

UK Domiciled: indicates that the student was domiciled in England, Scotland, Wales or Northern Ireland prior to entry of the course. Students who were domiciled in the Channel Islands or the Isle of Man are not considered to be UK domiciled in this publication.

11. Experimental statistics

Experimental statistics are new official statistics that are undergoing evaluation. These statistics are being published as experimental statistics in order to involve users and stakeholders in their development and as a means to further improve the use of the data in the future.

The Department has a set of statistical policies in line with the Code of Practice for Official Statistics.

12. Get in touch

Media enquiries

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