

# Understanding the career paths of AHSS graduates in the UK and their contribution to the economy

Final Report for the British Academy



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## Table of Contents

Page

Executive summary	ii
1 Introduction	6
2 Data	9
3 Descriptive analysis	12
4 How resilient are AHSS graduates to changes in the economy?	38
5 Are there regional differences in the employment of AHSS graduates?	41
6 What are the main differences in employment outcomes between different subjects within AHSS?	44
7 Are AHSS graduates better equipped than non-AHSS graduates or non-graduates for moving between employment sectors or making major career changes?	47
8 Conclusions	52
Index of Tables, Figures and Boxes	54
ANNEXES	57
Annex 1 Data and sample selection	58
Annex 2 Descriptive analysis (non-graduate counterfactual)	60
Annex 3 Econometric analysis – Methodology	67
Annex 4 Econometric analysis – Full regression outputs	70

## Executive summary

Comprising approximately **46%** of the **2.32 million** university students in the United Kingdom<sup>1</sup>, **55%** of global leaders and **58%** of FTSE Executives<sup>2</sup>, AHSS graduates are a **core focus for the British Academy's objective of promoting the public value of the humanities and social sciences**. To this end, the **Flagship Skills Project (FSP)**, which began in January 2017, aims to articulate the skills that are inherent to the study of AHSS.

In order to broaden the Academy's understanding of the outcomes achieved by graduates in the Arts, Humanities and Social Sciences (AHSS), London Economics were commissioned to undertake a detailed analysis **of the patterns and trends in the sectoral and occupational destinations of AHSS undergraduates and postgraduates over the last 20 years** using information from the **UK Labour Force Survey (LFS)**. In addition, **an assessment** was undertaken of the **relative importance of holding an AHSS qualification for an individual's labour market outcomes** (particularly in relation to **career progression, security and flexibility**).

This report aims to provide independent and rigorously estimated evidence for just some of the employment and skills outcomes associated with pursuing different subjects at the graduate level, and relies on information collected as part of the **UK Labour Force Survey (LFS)**. A number of important research questions could not be addressed as part of this stream of work, including:

- The real nature of roles and the actual skills being used in employment.
- The relevance of AHSS education and training to jobs.
- Wellbeing, satisfaction and other non-monetary employment outcomes.

### Key findings

There has been a notable change in the **incidence of AHSS graduates** over time, as well as the underlying **subject composition**:

- **AHSS degree holders** represent **43%** of **male undergraduates** and **48%** of **female undergraduates** in **2017** (compared to **32%** and **39%** respectively since **1997**).
- The AHSS share of **male postgraduates** has increased from **31%** in **1997** to **40%** in **2017**. For females, the corresponding estimates were **43%** and **49%** in **1997** and **2017** respectively.
- Within AHSS itself, the incidence of **Social Sciences** has declined by approximately **5 percentage points** (from **25%** to **20%**) alongside a reduction in the popularity of **Law, Linguistics**, other **Languages** and **Humanities**.
- Conversely, there seems to be **an increase** in the share of AHSS undergraduates possessing a degree in **Business & Finance, Arts** and **Information Studies**. Similar results (especially in relation to Business & Finance) have been identified for postgraduate students.

**AHSS graduates account for an increasing share of all graduates at both the undergraduate and postgraduate level.**

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<sup>1</sup> Higher Education Student Statistics: UK, 2016/17 - Subjects studied. See: <https://www.hesa.ac.uk/news/11-01-2018/sfr247-higher-education-student-statistics/subjects>

<sup>2</sup> British Council (2015). THE EDUCATIONAL PATHWAYS OF LEADERS: AN INTERNATIONAL COMPARISON. British Council and IPSOS. See: [https://www.britishcouncil.org/sites/default/files/edupathwaysofleadersreport\\_final.pdf](https://www.britishcouncil.org/sites/default/files/edupathwaysofleadersreport_final.pdf)

With respect to the **personal characteristics** of AHSS learners between 1997 and 2017:

- **At undergraduate level**, there has been a general **increase in the average age of survey respondents**<sup>3</sup> (from **35** to **37**), although the average age of AHSS postgraduate degree holders has remained broadly unchanged at approximately **40**.
- There has also been an **increasing share of women in possession AHSS degrees** at both the undergraduate and postgraduate level (by **5 percentage points** and **11 percentage points** respectively).
- The share of individuals from BAME backgrounds in possession of AHSS qualifications has risen by **7 percentage points** at the undergraduate level, and a **15 percentage point** increase at postgraduate level.

Turning to **labour market outcomes**, our analysis identified that:

**AHSS graduates at both levels seem to be as employable as STEM graduates.**

- AHSS and STEM graduates have **very similar employment rates** at both undergraduate and postgraduate level, indicating that both types of graduates are **as employable** as each other.
- The gender employment gap amongst AHSS graduates has remained relatively persistent over time (standing at approximately **4-5 percentage points**). Although the gender employment gap in STEM subjects has declined over time, the gap was larger in STEM subjects initially, and has now converged to the level that is associated with AHSS subjects.

There were several noteworthy patterns in terms of both the **sector of employment** and the **occupations** of AHSS graduates. In particular, we found:

- There has been a clear shift over time in the **sector of employment**. The proportion of AHSS undergraduates employed in **Manufacturing, Banking, and Finance & Insurance** has declined. At the same time, there has been an increase in employment in **Public Administration, Education & Health** and **Distribution, Hotel & Restaurant** sectors. These trends have been mirrored at the postgraduate level.
- Our analysis identifies **some significant differences** in terms of the **occupations of AHSS and STEM graduates**, particularly amongst undergraduate degree holders. The decline in **Managerial and Senior Official roles** amongst STEM and AHSS undergraduates has resulted in a shift towards **Professional occupations** for **STEM undergraduates** but only to **Associate Professional & Technical roles** for **AHSS undergraduates**.

**AHSS graduates at both levels comprise a decreasing proportion of the most senior roles.**

Finally, regarding the **wages** of both AHSS and STEM graduates at both the undergraduate and postgraduate level:

- The trend in the **average gross hourly pay** of graduates at each qualification level has tracked that of the economic cycle over the time period; however, more generally, the **average gross hourly pay** earned by **AHSS graduates** is **consistently below that of STEM**

<sup>3</sup> Age refers to the age of the respondent at the time of answering the survey, not at the time that the qualification was achieved.

**graduates** for all years at undergraduate level and for the majority of years at postgraduate level.

- At the postgraduate level, the **wage distribution** of **AHSS degree holders** has **more variation** compared to the STEM postgraduate wage distribution.

## Wider findings

Considering the relationship between the employment outcomes achieved by AHSS graduates following **changes in economic growth**, the analysis suggests that:

- In general, the results were not statistically significant, meaning that **AHSS graduates** (at both the undergraduate and postgraduate level) **did not have significantly different outcomes to STEM graduates** as the economy expanded or contracted. Furthermore, neither AHSS nor STEM graduates were found to be particularly responsive to changes in the economy in terms of their employment outcomes.

**AHSS graduates appear to be no less resilient to economic shocks than STEM graduates.**

In relation to **region of employment**, the econometric analysis found that:

- Although there were some effects at the undergraduate level, region of residence has a **more identifiable** impact on employment **for individuals with an AHSS postgraduate** qualification. Male AHSS postgraduates were more likely to be employed in London and the South East (compared to the North West), while the North West offered the strongest employment outcomes to female AHSS postgraduates.

When disaggregating AHSS into its component **subjects** of arts, humanities, and social sciences separately:

- At the undergraduate level, **social sciences degree holders are more likely to be employed** than other AHSS undergraduates: the probability of employment is **1.2** percentage points **higher for females** and **0.7** percentage points **higher for male undergraduates**.
- **Social science graduates** are not only more likely to be employed than arts and humanities graduates, but they also **earn significantly more**. At the undergraduate level, males in possession of undergraduate degrees in social sciences register a **22%** per hour wage premium compared to all other AHSS degree holders, while the corresponding estimate for females stands at approximately **12%**. A similar phenomenon is identified at the postgraduate level.

Finally, in terms of **job separations**:

**AHSS graduates are slower to find employment after having been made redundant than STEM graduates.**

- There is **little, if any, difference in the probability of being made redundant** by subject area; however AHSS graduates are more likely to change sector and role voluntarily, and without wage penalty, suggesting greater flexibility and choice than STEM graduates experience.
- Despite this, **AHSS graduates are less likely to have taken up employment** within the three months **after**

having been made redundant compared to STEM graduates.

- After leaving their job voluntarily, **male AHSS postgraduates** are approximately **13 percentage points more likely to change occupation** than male STEM postgraduates.
- For male undergraduates, the change in **wages associated with changing jobs is 2.3% higher for AHSS graduates** than for STEM graduates, although pay is consistently lower for AHSS graduates at both the undergraduate and postgraduate level.

**AHSS graduates are more likely to change sector and role voluntarily than STEM graduates, and the change in wage associated with moving jobs is higher for AHSS graduates.**

## Conclusions and recommendations

The analysis presented illustrates that the labour market outcomes achieved by AHSS graduates are broadly similar to those achieved by STEM graduates – both in terms of employment and earnings. However, importantly, the analysis appears to indicate that the **choices** and **opportunities** available to AHSS qualifications holders (as a result of the wider set of skills that might have been developed as part of the qualification) might offer greater **flexibility** over the longer term compared to STEM graduates – in terms of occupation, role and industry.

The United Kingdom is facing **unparalleled economic uncertainty**. The short-term consequences of the decision of the United Kingdom to leave the European Union will result in an **economic slowdown** compared to what otherwise might have happened, and which might be expected to last at least a decade. With this in mind, it is imperative that the UK labour market is **sufficiently agile** to face the challenges presented. In this sense, agility means both being **resilient to changing economic circumstances**, but also **sufficiently adaptable to profit from new and emerging opportunities** that may present themselves. The availability of a highly qualified and versatile labour force should not be underestimated, and AHSS graduates are central to this ongoing and long-term requirement.

However, to understand the labour market success of AHSS graduates, there are still many questions that require further research. In particular, what are the **inherent characteristics** of AHSS graduates and what are the **core skills** that AHSS graduates acquire as part of their degrees that result in these identified labour market outcomes? Furthermore, what skills do AHSS graduates possess, and make use of as part of their jobs, that are **most valued by employers**? Finally, given the positive outcomes achieved by AHSS graduates in the labour market, what might be the impact on AHSS **higher education enrolments** if there are changes to the **higher education tuition fees** and **student support arrangements**, and what might be the impact on the **versatility** and **responsiveness** of the UK economy?

# 1 Introduction

**Arts, Humanities and Social Science (AHSS) graduates** are collectively categorised and defined as individuals who have completed higher education in one of the following subject areas:

- Social studies,
- Law,
- Business & administration,
- Mass communication & documentation,
- Languages,
- Historical & philosophical studies and
- Creative arts & design<sup>4</sup>.

Comprising approximately **46%** of the **2.32 million** university students in the United Kingdom<sup>5</sup>, **55%** of global leaders and **58%** of FTSE Executives<sup>6</sup>, AHSS graduates are a **core focus for the British Academy's objective of promoting the public value of the humanities and social sciences**.

Championing the humanities and social sciences, advancing excellent research, and shaping policy and public understanding (outlined in the Academy's Strategic Plan 2018-22), the current programme of work on **Skills to 2022** is the British Academy's initiative to facilitate debate about the **nature** and the **value** of the skills of AHSS graduates.

To this end, the **Flagship Skills Project (FSP)**, which began in January 2017, aims to articulate the skills that are inherent to the study of AHSS. The project's principal publication, *The Right Skills*, outlines **core skill categories**, the **contribution** of AHSS graduates, and their **fitness for the future**. The report recommends that further research be carried out to *"build a collective strategy for collecting evidence about the career paths of AHSS students, so that the contribution they make to society and the economy can be properly measured"*<sup>7</sup>.

In this context, the importance of the provision of a **more comprehensive evidence base** for the project is clearly recognised. Previously, the British Academy commissioned the University of Warwick to analyse data from the two **Destinations of Leavers from Higher Education (DLHE) surveys** and from the **FutureTrack surveys** on the employment outcomes, occupations and skills of AHSS graduates and post-graduates. The report by the University of Warwick provides a snapshot of AHSS graduates (using data relating to leavers from higher education in 2010/11 and 2014/15), and analyses the **employment outcomes** of these graduates **3.5 years** and **6-months after graduation**, respectively<sup>8</sup>. The analysis across AHSS, STEM and Education/Combined graduates revealed important differences in the destinations of graduates, particularly in relation to the

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<sup>4</sup> Higher Education Statistics Agency (2018). JACS 3.0: Principal subject codes | HESA. See:

<https://www.hesa.ac.uk/support/documentation/jacs/jacs3-principal>

<sup>5</sup> Higher Education Student Statistics: UK, 2016/17 - Subjects studied. See: <https://www.hesa.ac.uk/news/11-01-2018/sfr247-higher-education-student-statistics/subjects>

<sup>6</sup> British Council (2015). THE EDUCATIONAL PATHWAYS OF LEADERS: AN INTERNATIONAL COMPARISON. British Council and IPSOS. See: [https://www.britishcouncil.org/sites/default/files/edupathwaysofleadersreport\\_final.pdf](https://www.britishcouncil.org/sites/default/files/edupathwaysofleadersreport_final.pdf)

<sup>7</sup> The British Academy (2017). The Right Skills: Celebrating Skills in the Arts, Humanities and Social Sciences. The Flagship Skills Project. See: <https://www.britac.ac.uk/publications/right-skills-celebrating-skills-arts-humanities-and-social-sciences-ahss>

<sup>8</sup> Lyonette, C., Hunt, W. and Baldauf, B. (2017). Occupations and Skills of Arts, Humanities and Social Sciences Graduates and Postgraduates. Warwick Institute for Employment Research. See: <https://www.britac.ac.uk/sites/default/files/AHSS-graduate-employment-outcomes.pdf>.



industry and occupational ‘location’ of AHSS graduates, as well as their economic contribution and contractual terms of employment.

In order to broaden this study by including non-graduates and the entire life cycle and to meet the recommendations of the Skills Steering Group of the **Flagship Skills Project**, this study presents a detailed analysis **of the patterns and trends in the sectoral and occupational destinations of AHSS graduates and postgraduates over the last 20 years**, as well as **a quantification of the relative importance of holding an AHSS qualification to an individual’s labour market outcomes** (particularly in relation to **career progression, security and flexibility**).

### Scope of the research

This objective of the study have been achieved through a combination of descriptive statistics and econometric analysis that controls for other key variables affecting these graduates, based on data collected through the **UK Labour Force Survey (LFS)**. More specifically, the econometric analysis addresses the following questions:

- How resilient are AHSS graduates to changes in the business cycle?
- Are AHSS graduates better equipped than non-AHSS graduates or non-graduates for moving between employment sectors or making major career changes?
- What are the main differences in employment outcomes between different subjects within the arts, humanities and social sciences?
- Are there regional differences in the employment of AHSS graduates?

Each of the above strands of analysis considered the labour market performance of **two different qualifications: AHSS undergraduate degrees and AHSS postgraduate degrees**. Throughout the study, these qualifications were always analysed separately, and their performance assessed against two different and alternative **counterfactual groups**:

- Individuals who attained (as their highest qualification) a **STEM qualification at the same level** as the AHSS qualification under consideration.
- Individuals who have attained a qualification immediately below that under consideration as their highest qualification (**irrespective of the subject**)<sup>9</sup>.

In addition, in order to account for potential differences in labour market outcomes by gender, all econometric results have been produced for **males and females separately**.

### Scope for future research

This report aims to provide independent and rigorously estimated evidence for just some of the employment and skills outcomes associated with pursuing different subjects at the graduate level, and relies on information collected as part of the **UK Labour Force Survey (LFS)**. However, because of evidence gaps, a number of important research questions could not be addressed as part of this stream of work and would benefit from investigation in the future. These include, but are not limited to:

- The real nature of roles and the actual skills being used in employment.

<sup>9</sup> A detailed definition of treatment and counterfactual groups is provided in Appendix A1.1.

- The relevance of AHSS education and training to jobs.
- Wellbeing, satisfaction and other non-monetary employment outcomes.

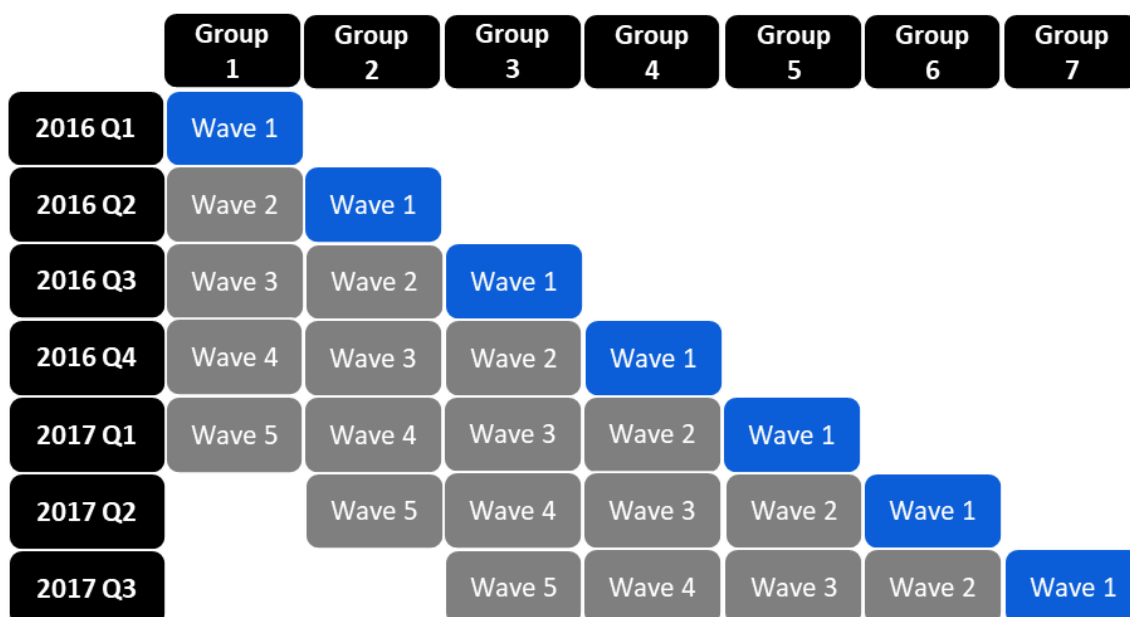
### Structure of the report

In Section 2, we provide a **detailed description of the data** used throughout the analysis, while in Section 3, we provide a range of **descriptive statistics** outlining the demographic, subject and labour market characteristics of the different groups of graduates. In Section 4, we provide an analysis of the **resilience** of AHSS graduates to the economic cycle, and in Section 5, we consider the extent to which the results might be affected by **regional differences**. Section 6 provides an assessment of whether there are different employment outcomes depending on the **subject** within AHSS, while in Section 7, the extent to which AHSS graduates are **better equipped to move between different sectors** of employment or make **major career moves** compared to non-AHSS graduates or non-graduates is addressed. Section 8 concludes.

## 2 Data

The study made use of information from the **UK Labour Force Survey (LFS)** for the period **1997-2017**. The LFS is the **official survey** in the UK recording **labour market outcomes, demographics** (e.g. age, gender and ethnicity) and **educational attainment** (e.g. degree and subject), with around 100,000 respondents per quarter. At most, respondents are tracked over **five consecutive quarters** using a rotating panel structure, so that in each quarter approximately one fifth of the respondents are replaced (as shown in Figure 1).

**Figure 1** Structure of the Labour Force Survey



Source: London Economics

The LFS is made available to researchers in **several different formats**. For the majority of this study, we used the **quarterly cross-sectional datasets** of the LFS; a repeated cross-section which does not provide the person identifier necessary to link an individual's responses with their responses in subsequent waves. This means that although respondents appear up to five times over the observation window, and a flag identifies which wave (from one to five) the response relates to, it is not possible to utilise the panel structure built into the survey. In order to account for this, all econometric analysis using this form of the data retains *only* Wave 1 observations (i.e. we only utilise responses from the first time that the individual appears in the LFS, highlighted in blue in Figure 1). The descriptive analysis retains *all five* waves, and is **weighted to be representative of the population**, such that although respondents appear multiple times, in each quarter the figures provided are representative of the overall stock of graduates.

For the section of the analysis looking at making major career changes (presented in Section 7), we utilised information on the same respondent at different points in time, thus linking respondents across waves by means of the LFS person identifier<sup>10</sup>. Given that the person identifier is not available in the public End of User Licence (EUL) LFS datasets after 2011, this part of the analysis was undertaken in the **ONS Secure Lab** where a more comprehensive version of the dataset is available.

<sup>10</sup> Variable *caseno* in the Labour Force Survey. The variable is not available for the period 1997-2000.

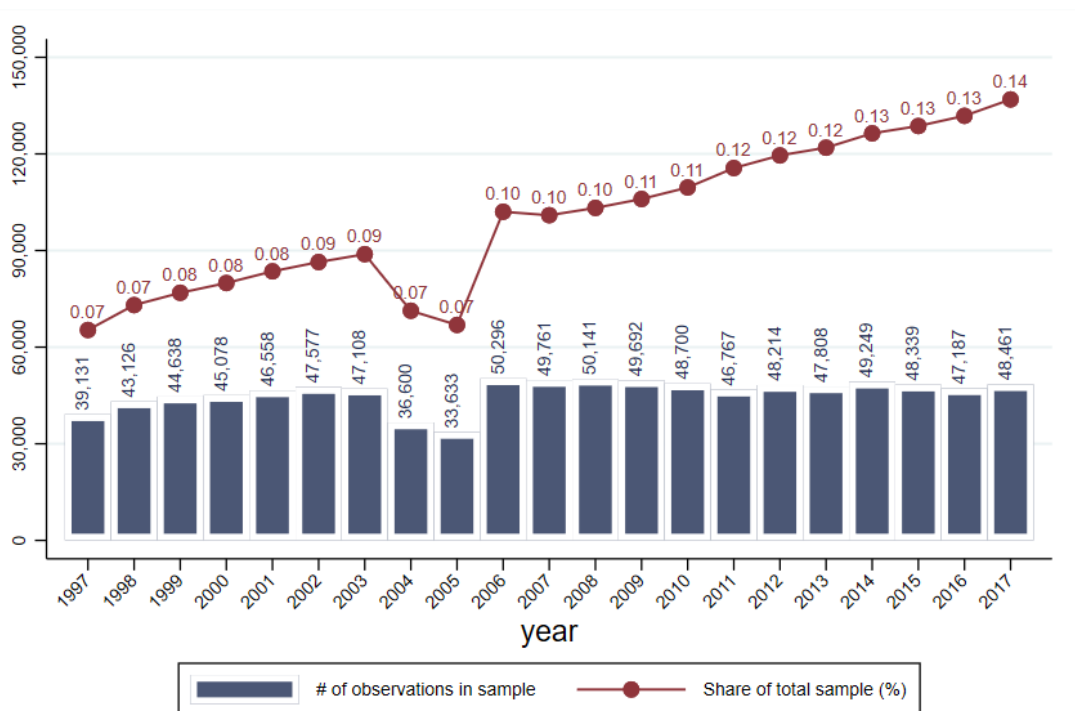
## 2.1 Sample selection

The following limitations were applied to the raw UK Labour Force Survey:

- **Educational attainment:** The sample only includes individuals holding an **undergraduate**<sup>11</sup> or **postgraduate** degree (with subject information) as their highest level of achievement, and individuals with 2 or more **A-levels (or equivalent)** as their highest formally recognised qualification<sup>12,13</sup>. For graduates only, we also distinguished between AHSS and STEM graduates on the basis of the subject of graduation.
- **Age:** Given the focus on the working-age population, the sample has been limited to individuals aged between **21** and **65** at the time of the survey.
- **Wages:** To avoid including extreme outliers, we have trimmed our sample to exclude observations with a reported **gross hourly pay of less than £1** or **more than £100**.

As a result of these restrictions, the number of observations (for all Waves) included in our sample ranged between **34,000** and **50,000** per year<sup>14</sup> (see Figure 2). Despite a decreasing trend in the total sample size contained within the LFS over the last 20 years, the total number of observations available as part of this analysis has remained relatively constant over time, such that it accounts for an **increasing share of the overall LFS sample** (from **7%** in 1997 up to **14%** in 2017).

**Figure 2 Sample size by year of the survey, total and as percentage of raw LFS**



Note: Sample consists of graduates with subject information and A-levels (and equivalent). Figures based on observations from all waves and all quarters of the UK Labour Force Survey. **Source London Economics' analysis of UK Labour Force Survey**

<sup>11</sup> Individuals in possession of more than one degree were excluded from the sample.

<sup>12</sup> Throughout this study, individuals are classified according to their highest *attained* qualification, irrespective of potential participation to higher education programmes when the survey was undertaken. To take an example, a respondent in possession of an undergraduate degree and studying at postgraduate level will be classified as undergraduate.

<sup>13</sup> For more details, please see Annex A1.1.

<sup>14</sup> There are fewer observations in 1997 due to questions on degree information being asked only from 1997 Q2 onwards. There are also fewer observations in 2004 and 2005 due to the need to omit the first quarter as a result of missing variables on individuals' type of qualification.

## 2.2 Definition of AHSS and STEM degrees

The definition of **AHSS** subjects throughout this study mirrors the classification used by the British Academy in **The Right Skills** publication (2017), whilst the grouping for **STEM** is in line with the definition adopted by the UK Parliament<sup>15</sup>. Degree holders in **Education-related** subjects and respondents in possession of a qualification in **combined subjects** are allocated to the residual category **'Other'**.

**Table 1** Classification of subjects

Classification	AHSS subject category	Subject	Examples of subcategories <sup>16</sup>
AHSS (Arts, Humanities & Social Sciences)	Social Sciences	Social Sciences	Economics, Sociology, Anthropology, Geography, Politics
		Law	Law
		Business & Finance	Business, Management, Finance, Accounting, Marketing
	Humanities	Information Studies	Information Services, Media Studies, Publishing, Journalism
		Linguistics	Linguistics, English Studies, Ancient Language Studies
		European Languages	French, German, Italian, Spanish, Portuguese, Russian, Scandinavian and East European Studies
		Other Languages	Chinese, Japanese, Other Asian, African, Modern Middle Eastern, American and Australian Studies
	Humanities	History, Archaeology, Philosophy, Theology, Religious Studies	
	Arts	Arts	Fine Art, Design, Music, Drama, Dance, Cinematics & Photography, Imaginative Writing
	STEM (Science, Technology, Engineering & Mathematics)	n/a	Medicine
Medical related subjects			Anatomy, Physiology & Pathology, Pharmacology, Toxicology & Pharmacy, Nutrition, Nursing
Biological Sciences			Biology, Botany, Zoology, Genetics, Sports Science, Biophysics & Biochemistry, Psychology
Veterinary Science			Veterinary Medicine and Dentistry, Animal Science, Forestry
Agriculture			Agriculture
Physical/Environmental Sciences			Chemistry, Physics, Astronomy, Geology, Environmental Sciences
Mathematics & Computing			Mathematics, Computer Science, Information Systems, Software Engineering, Artificial Intelligence
Engineering			Engineering, Naval architecture, Electrical Engineering
Technology			Minerals Technology, Ceramics and Glasses, Polymers and Textiles, Maritime Technology
Architecture			Architecture, Building, Landscape Design, Planning
Other	n/a	Education	Teacher Training, Research & Study Skills in Education, Academic Studies in Education
		Combined subjects	n/a

Source: London Economics and Labour Force Survey

<sup>15</sup> <https://publications.parliament.uk/pa/ld201213/ldselect/ldsctech/37/3705.htm>

<sup>16</sup> For a full breakdown of subcategories, see Labour Force Survey User Guide – Volume 5: LFS Classifications.

## 3 Descriptive analysis

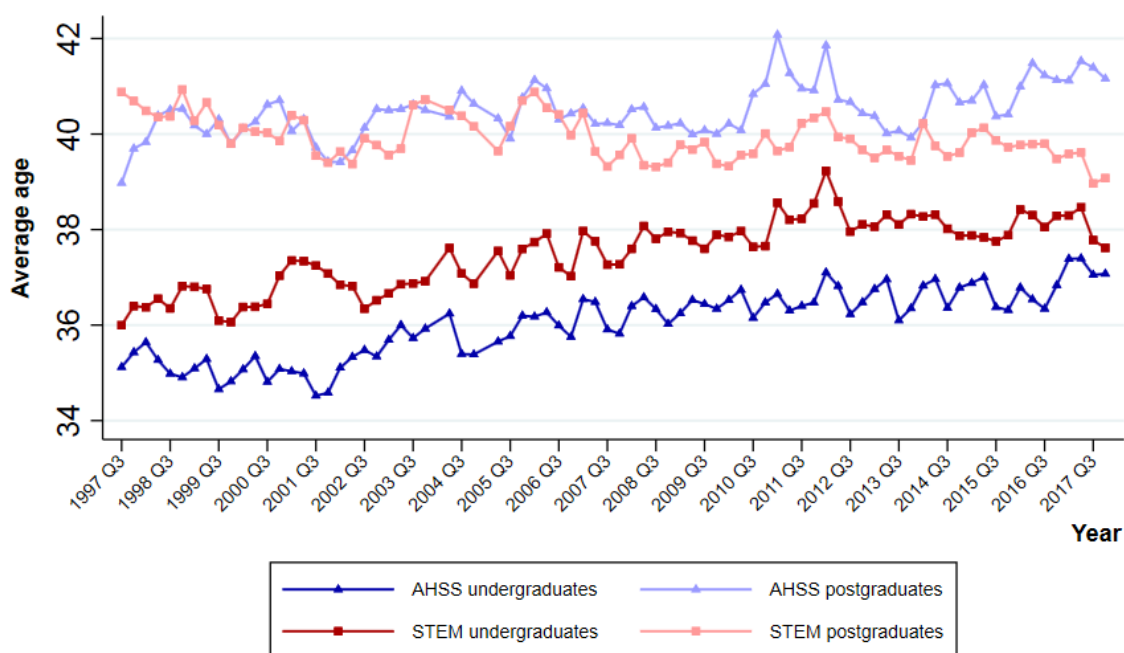
### 3.1 Demographic characteristics

In order to better understand how the composition of AHSS graduates has changed over time, in this section we describe patterns in the demographic characteristics of AHSS graduates over the course of the 20 years between 1997 and 2017. To put these figures into context, we also provide **analogous information** for **STEM graduates** (with comparable information for non-graduates provided in Annex 2). **All figures** presented in this section were weighted using **LFS weights** and, as such, they are **representative of the entire UK population**.

#### Age

As presented in Figure 3, despite restricting the sample to **individuals aged 21 to 65** at the time of answering the survey, the analysis identifies a general **increase in the average age<sup>17</sup> of respondents at the undergraduate level over time**. In particular, for AHSS undergraduates the average age of these degree holders increased from **35 to 37**, and from **36 to 38** for STEM undergraduate degree holders. Even though the average age is higher for postgraduate degree holders compared to undergraduates over the period, the trend has been relatively stable – standing at around the age of **40** - irrespective of subject.

**Figure 3 Average age of the sample, by year of the survey, qualification level and subject category (based on 499,240 observations)**



Note: Sample consists of graduates with a single subject degree. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figure based on observations from all quarters and all waves of the UK Labour Force survey in the reported years. Figure does not include observations from the first quarter in 1997, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

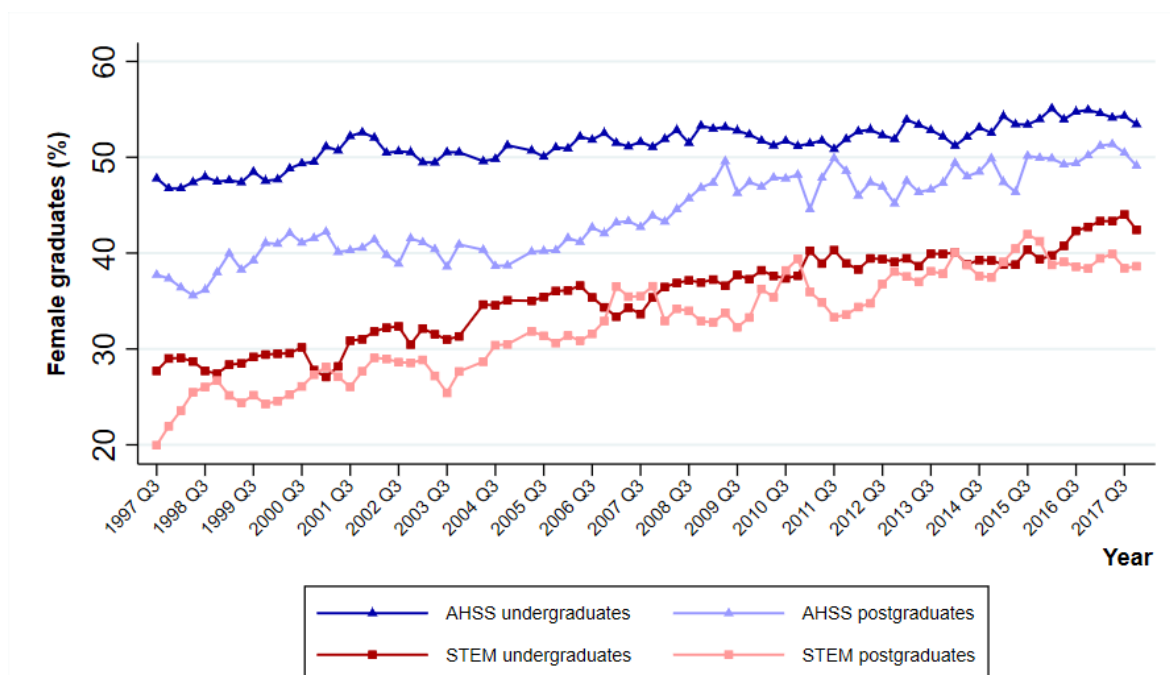
**Source: London Economics' analysis of UK Labour Force Survey (1997-2017)**

<sup>17</sup> Age refers to the age of the individual at the time that they were surveyed, and not to the age at which they attained her highest qualification.

## Gender

The gender composition of graduates has changed considerably over time, with females representing an increasing share of both undergraduates and postgraduates for both **AHSS** and **STEM degree holders** (Figure 4). Furthermore, although **the share of females is smaller for STEM graduates at both undergraduate and postgraduate level** compared to their AHSS counterparts, it has increased at a **faster rate for those in possession of STEM degrees**. More specifically, at the undergraduate level the proportion of female STEM graduates increased by **14 percentage points** (from **28% to 42%**), compared to a **5 percentage point** rise for AHSS graduates (from **48% to 53%**). The corresponding figures at the postgraduate level equate to a **19 percentage point** rise from **20% to 39%** for STEM, compared to **11 percentage points** from **38% to 49%** for AHSS.

**Figure 4 Gender of the sample, by year of the survey, qualification level and subject category (based on 499,240 observations)**



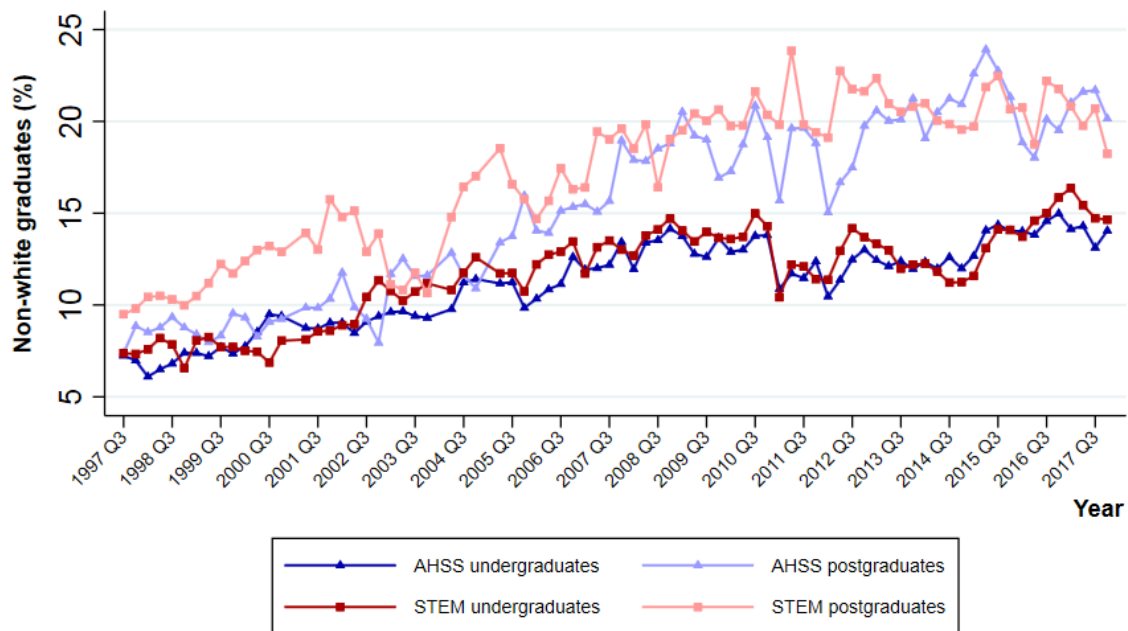
Note: Sample consists of graduates with a single subject degree. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figure based on observations from all quarters and all waves of the UK Labour Force survey in the reported years. Figure does not include observations from the first quarter in 1997, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

## Ethnicity

Turning to the ethnic origin of graduates, over the 20 year period there has been a steady increase in the share of individuals from BAME backgrounds among both AHSS and STEM graduates at both the undergraduate and postgraduate degree level (Figure 5). Among **undergraduates** only, the increasing proportion of **non-white individuals amongst AHSS degree holders** appears to be **closely mirrored by STEM degree holders** over the period, rising from **7% to 14%** for AHSS undergraduates and **7% to 15%** for STEM undergraduates. However, there is a clear difference in the ethnic breakdown between undergraduates and postgraduates: postgraduates (in both subject categories) appear to follow the same trend as undergraduates until approximately 2008, when the proportion of BAME undergraduate degree holders seem to plateau, while the non-white share of postgraduate degree holders continues to increase to **18-20%**.

**Figure 5 Ethnicity of the sample, by year of the survey, qualification level and subject category (based on 493,496 observations)**



Note: Sample consists of graduates with a single subject degree. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figure based on observations from all quarters and all waves of the UK Labour Force survey in the reported years. Figure does not include observations from the first quarter in 1997, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. In addition, figure does not include observations from the first quarter of 2001 due to ethnicity variables not appearing in the dataset.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

## 3.2 Employment status

In terms of the top-level trends, ONS official statistics report that the number of graduates in the UK has been rising steadily over time, from **25% of the population in 2002** to **40% of the population in 2017**<sup>18</sup>. This equates to **14 million graduates in the UK in 2017**, of which **82%** were employed, corresponding to **11.8 million graduates in the UK workforce**. The employment rate within our sample is slightly higher for the same period, ranging from **85-90%** (depending on gender, subject and level of study), most likely due to the sample restrictions outlined in Section 2.1.

Turning to the gender differences, our analysis identified (unsurprisingly) that the **employment rate for female graduates was lower compared to that for males** irrespective of the subject of study. The gender employment gap appeared to be marginally **more pronounced among undergraduates** compared to postgraduates. Although there does not appear to be substantial **differences across the subject categories**, the analysis does suggest that the extent of the gender employment gap amongst both STEM undergraduates and postgraduates appears to be *declining* marginally over time (by between **3 and 5 percentage points**), whereas the gender employment gap amongst AHSS graduates has remained relatively persistent (standing at approximately **4-5 percentage points**).

<sup>18</sup> ONS (2017) Graduates in the UK labour market: 2017. See:

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/graduatesintheuklabourmarket/2017>



**Table 2** Employment activity by qualification level, subject category, gender and quarter of the survey (1997q3, 2007q3, 2017q3)

		Undergraduates		Postgraduates	
		AHSS	STEM	AHSS	STEM
<b>Males</b>					
1997q3	Employed	86%	88%	89%	90%
	Inactive	8%	8%	7%	8%
	Unemployed	6%	4%	3%	2%
2007q3	Employed	88%	89%	90%	91%
	Inactive	8%	9%	7%	7%
	Unemployed	4%	3%	3%	2%
2017q3	Employed	89%	88%	90%	88%
	Inactive	8%	10%	8%	8%
	Unemployed	4%	2%	3%	3%
<b>Females</b>					
1997q3	Employed	81%	80%	89%	84%
	Inactive	14%	15%	8%	15%
	Unemployed	5%	5%	3%	1%
2007q3	Employed	82%	83%	84%	87%
	Inactive	15%	13%	13%	11%
	Unemployed	3%	3%	3%	3%
2017q3	Employed	85%	85%	85%	85%
	Inactive	13%	12%	12%	11%
	Unemployed	2%	3%	3%	3%

Source: London Economics' analysis of UK Labour Force Survey

## Undergraduates

As shown in Table 2, we observe very similar employment rates amongst AHSS and STEM undergraduates for both genders. More specifically, amongst **females**, approximately **85%** of both **AHSS** and **STEM undergraduates** were in employment in the third quarter of **2017**. For **males**, **89%** of **males** holding an undergraduate degree in an **AHSS** subject were in employment compared to **88%** of **STEM** graduates. This is broadly in line with **UK-wide trends**: in the 2017 calendar year, **87.5%** of undergraduates were employed<sup>19</sup>. This compares to **71.1%** of non-graduates.

In Figure 6 and Figure 7, we present an overview of the economic activity of AHSS and STEM **undergraduates** over time, for males and females separately. Our analysis indicates that the share of **female** undergraduates in **employment** was consistently **lower** and the **inactive share** was consistently **higher** in all years compared to **male undergraduates**. Differences between subject classifications are relatively small, although females in possession of AHSS undergraduate degrees appear less likely to be in employment compared to female STEM undergraduates. There appear to be only relatively limited fluctuation across time.

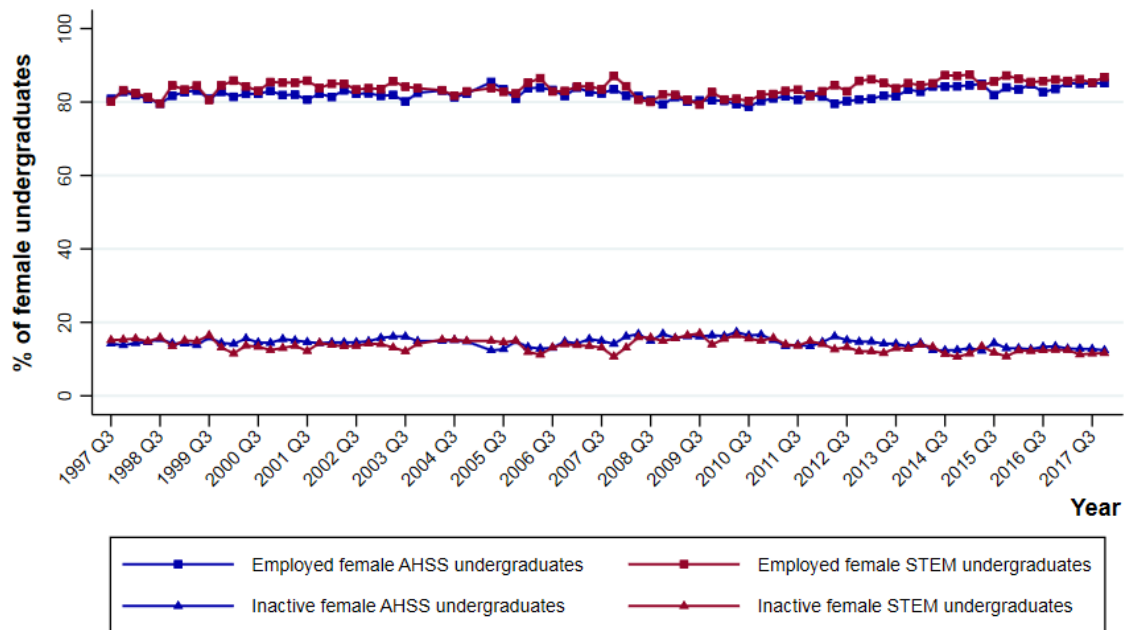
<sup>19</sup> Department for Education (2017) Graduate Labour Market Statistics 2017. See: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/701720/GLMS\\_2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/701720/GLMS_2017.pdf)

**Figure 6 Economic activity of undergraduates, by year of the survey, subject category and gender**

**a) Male undergraduates (based on 194,152 observations)**



**b) Female undergraduates (based on 166,676 observations)**



Note: Employment defined according to International Labour Organisation (ILO) standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. The remaining share of undergraduates is unemployed according to ILO definition.

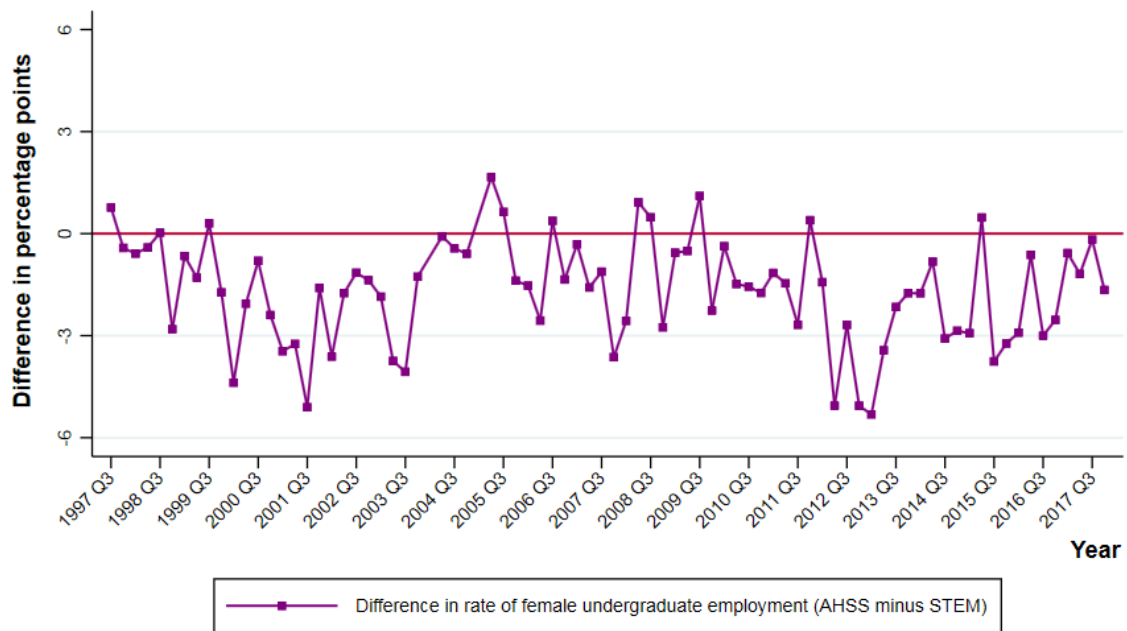
Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

**Figure 7** Difference in rate of employment (AHSS undergraduates minus STEM undergraduates), by year of the survey and gender

a) Male undergraduates (based on 194,152 observations)



b) Female undergraduates (based on 166,676 observations)



Note: Employment defined according to International Labour Organisation (ILO) standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

#### Postgraduates

Table 2 demonstrates that **postgraduates** posted **higher employment rates** than **undergraduates** (for any subject category and gender) in both the third quarter of **1997** and **2007**, however, the gap had narrowed by the most recent time period. In particular, in the third quarter of **2017**, approximately **90%** of **male AHSS postgraduates** were in employment compared to **89%** of **male AHSS undergraduates**. For females at the same point in time, the employment rate of AHSS graduates is **85%** at both the undergraduate and postgraduate level. Again this is broadly in line with **UK-wide trends**: in the 2017 calendar year, **87.7%** of postgraduates were employed<sup>20</sup>. Analogous to the employment status observed for undergraduates, the **share of inactive female postgraduates** is **consistently higher** in all years of the sample compared to **male postgraduates**, although the gap is narrower compared to undergraduates (Figure 8).

In terms of the **relative performance** of AHSS and STEM degree holders, although there is limited differences amongst male postgraduate degree holders, females in possession of AHSS postgraduate degrees appear less likely to be in employment compared to female STEM postgraduates.

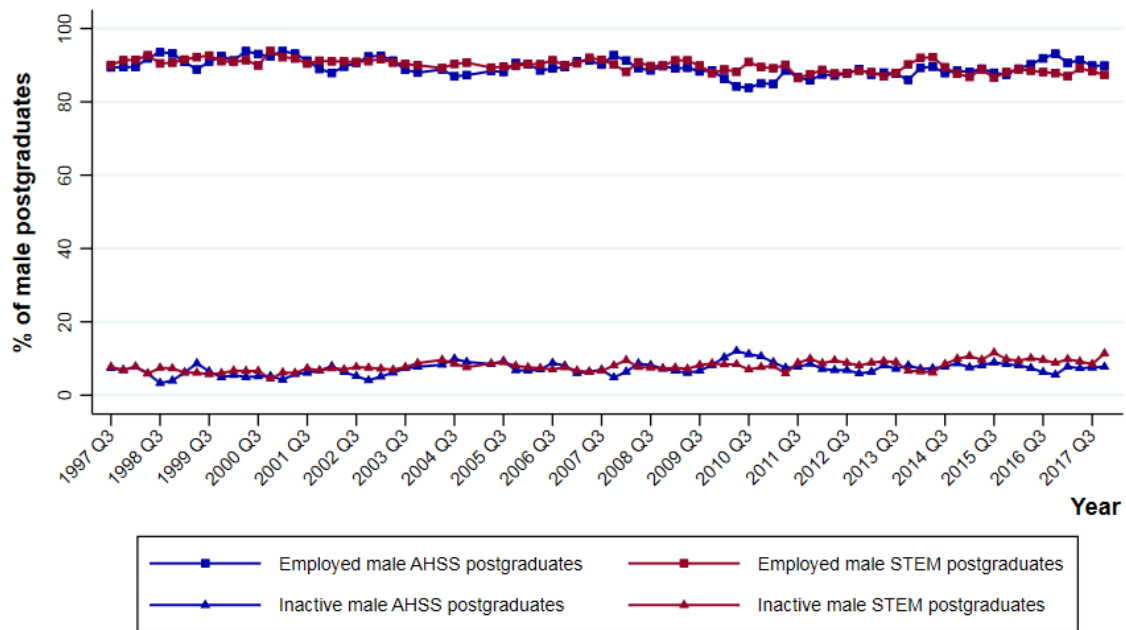
The difference between AHSS and STEM postgraduate employment rates has **fluctuated over time** for both genders (Figure 9). The fluctuations have **increased in magnitude** for males over the most recent years in the sample, while they have diminished for females. Furthermore, the volatility has been **more severe for postgraduates** (with differences in employment rates between the two subject groups ranging between **-6** and **+6** percentage points (Figure 9), compared to undergraduates where the relative employment gap has generally ranged between **-3** and **+3** percentage points (Figure 7)).

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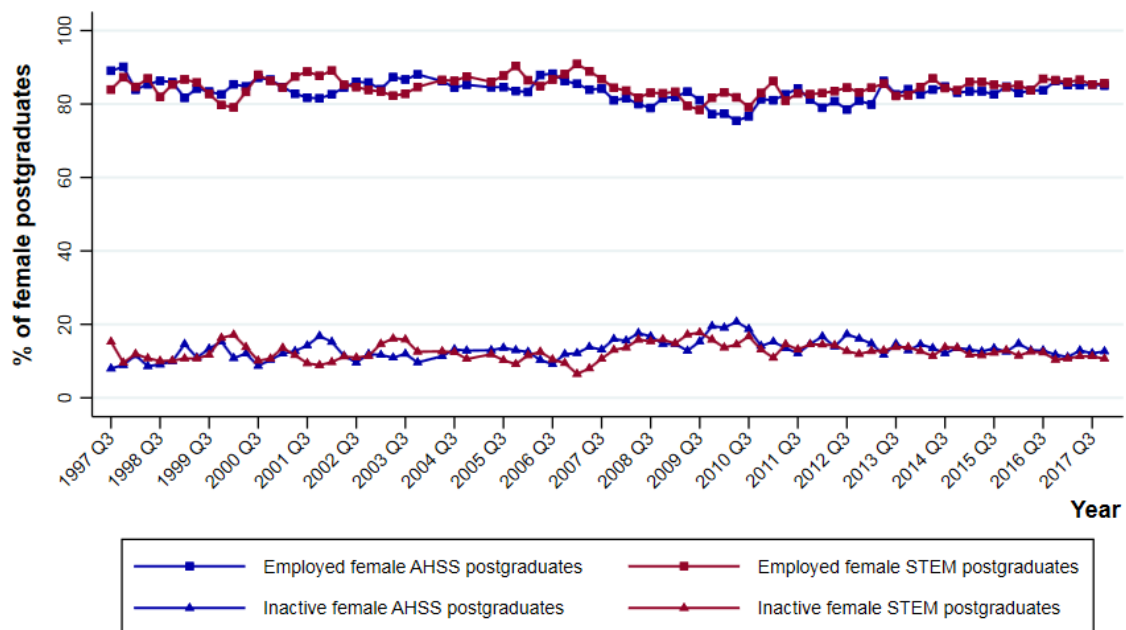
<sup>20</sup> Department for Education (2017) Graduate Labour Market Statistics 2017. See: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/701720/GLMS\\_2017.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/701720/GLMS_2017.pdf)

**Figure 8 Economic activity of postgraduates, by year of the survey, subject category and gender**

**a) Male postgraduates (based on 81,994 observations)**



**b) Female postgraduates (based on 56,363 observations)**

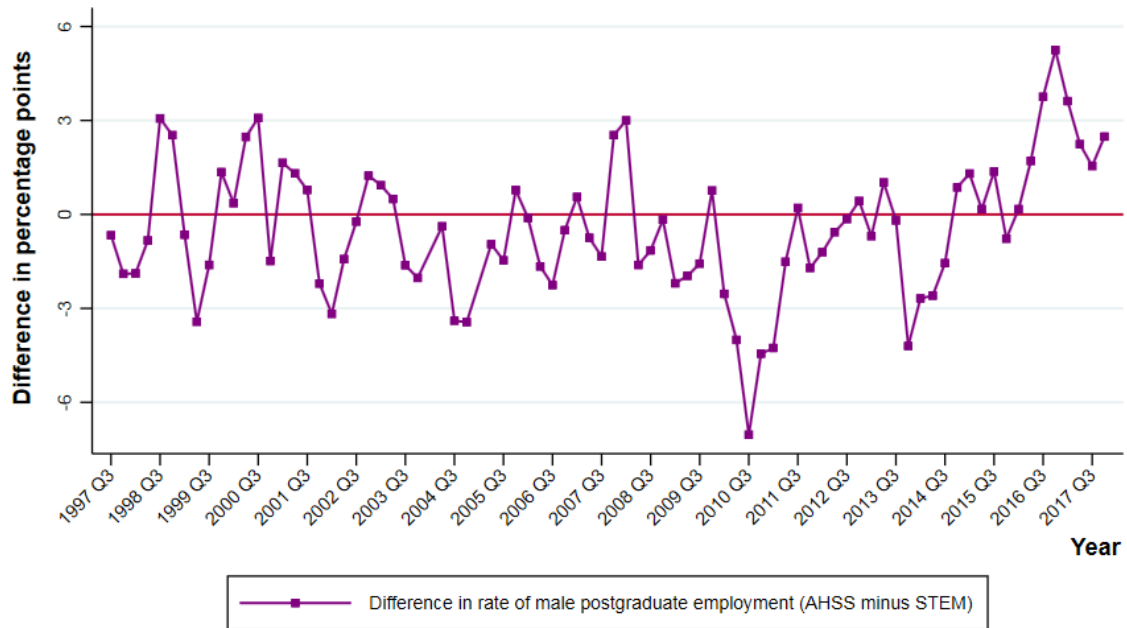


Note: Employment defined according to International Labour Organisation (ILO) standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. The remaining share of postgraduates is unemployed according to ILO definition.

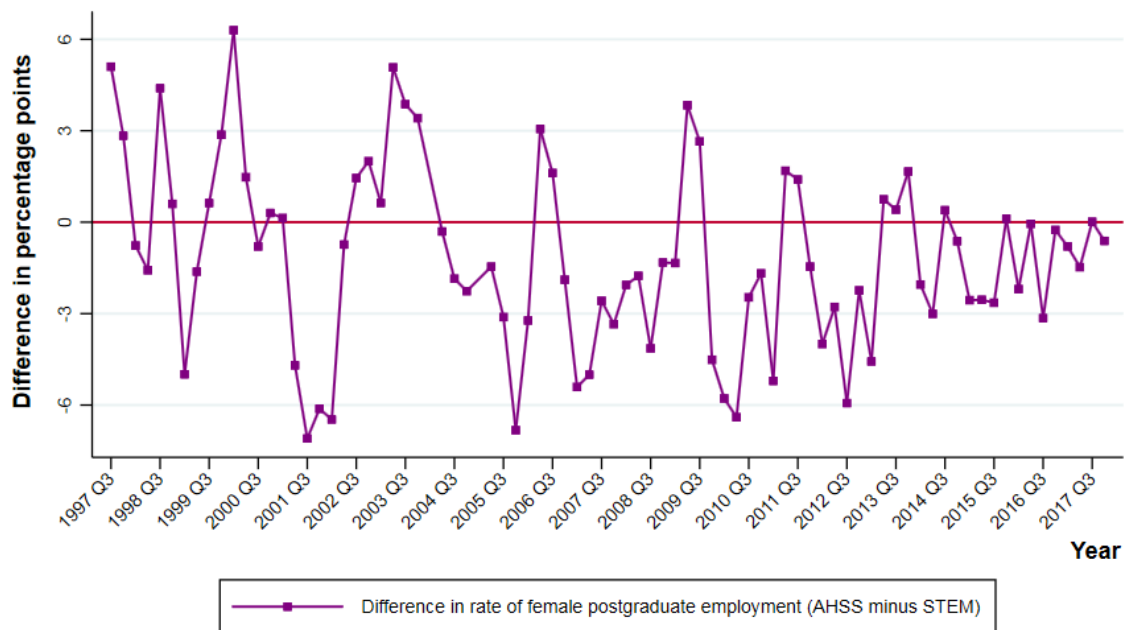
Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

**Figure 9 Difference in rate of employment (AHSS postgraduates minus STEM postgraduates), by year of the survey and gender**

**a) Male postgraduates (based on 81,994 observations)**



**b) Female postgraduates (based on 56,363 observations)**



Note: Employment defined according to International Labour Organisation (ILO) standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

### 3.3 Subject area

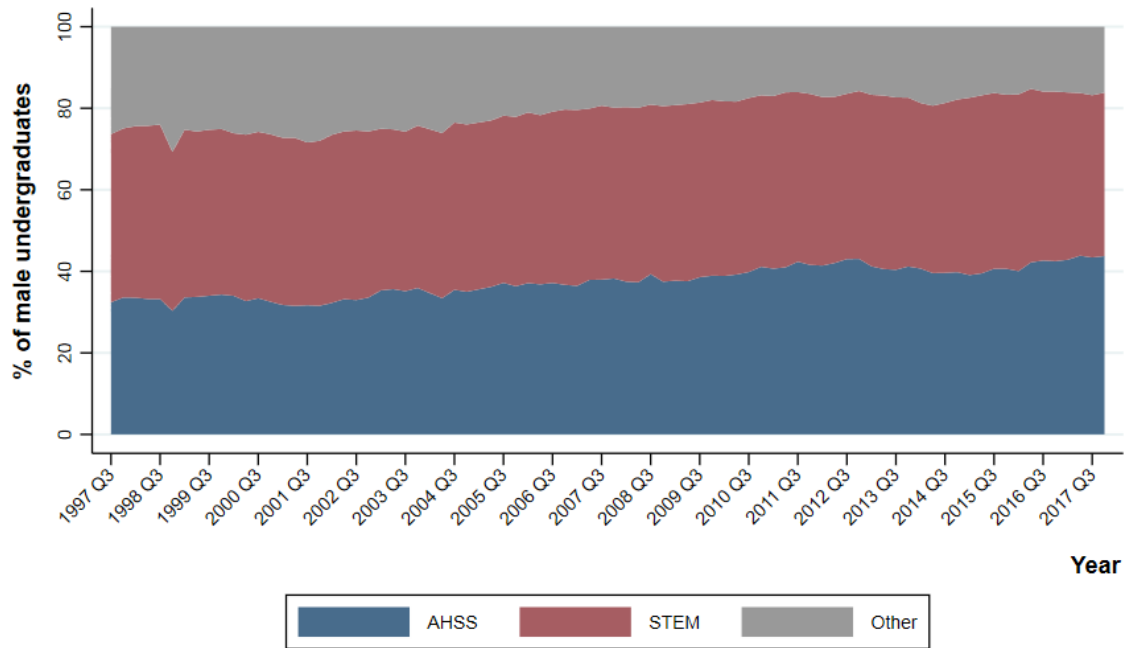
#### Undergraduates

As presented in Figure 10, **AHSS degree holders** represented approximately **43%** of the overall **male undergraduates** and approximately **48%** of **female undergraduates** in **2017**, with these proportions increasing steadily over the last 20 years (from **32%** for **males** and **39%** for **females** in **1997**).

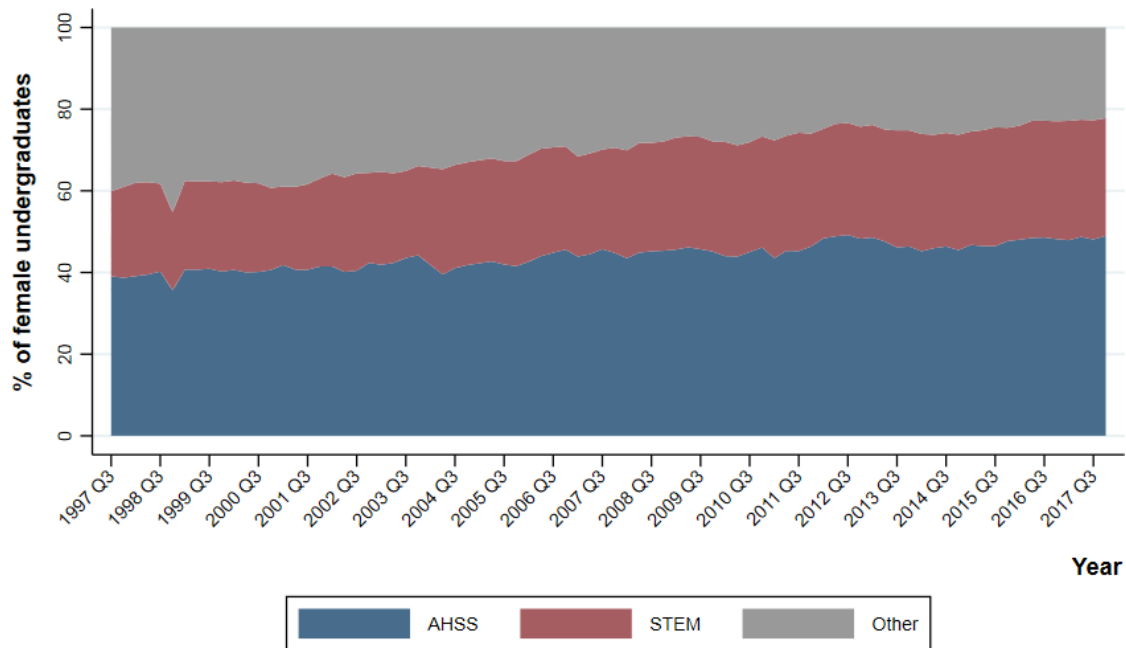
The rise in the proportion of AHSS undergraduates was also accompanied by a **change in the composition of subjects** undertaken by AHSS undergraduates for both genders between **1997** and **2017** (Figure 11). In particular, **Social Sciences** was the **most popular subject** among AHSS male undergraduates in **1997**, with **a quarter** of **AHSS undergraduates** obtaining a degree in Social Sciences (both **25%** of men and women respectively). However, by **2017**, Social Sciences was 'only' ranked second (behind **Business & Finance**), accounting for a smaller proportion of the overall **AHSS undergraduate degree holders** (**21%** and **20%** of men and women respectively). In terms of other subject areas, between 1997 and 2017 a **decline** in the proportion of AHSS undergraduates holding a degree in **Law** is also observed (with the decline being more severe for males than for females), **Linguistics** (more pronounced for females than for males), other **Languages** and **Humanities**. Conversely, for both males and females, there appears to be **an increase** in the share of individuals holding an undergraduate degree in **Arts** and **Information Studies** (along with **Business & Finance**).

**Figure 10 Proportion of undergraduates by year of the survey, subject category and gender**

**a) Male undergraduates (based on 245,652 observations)**



**b) Female undergraduates (based on 239,752 observations)**



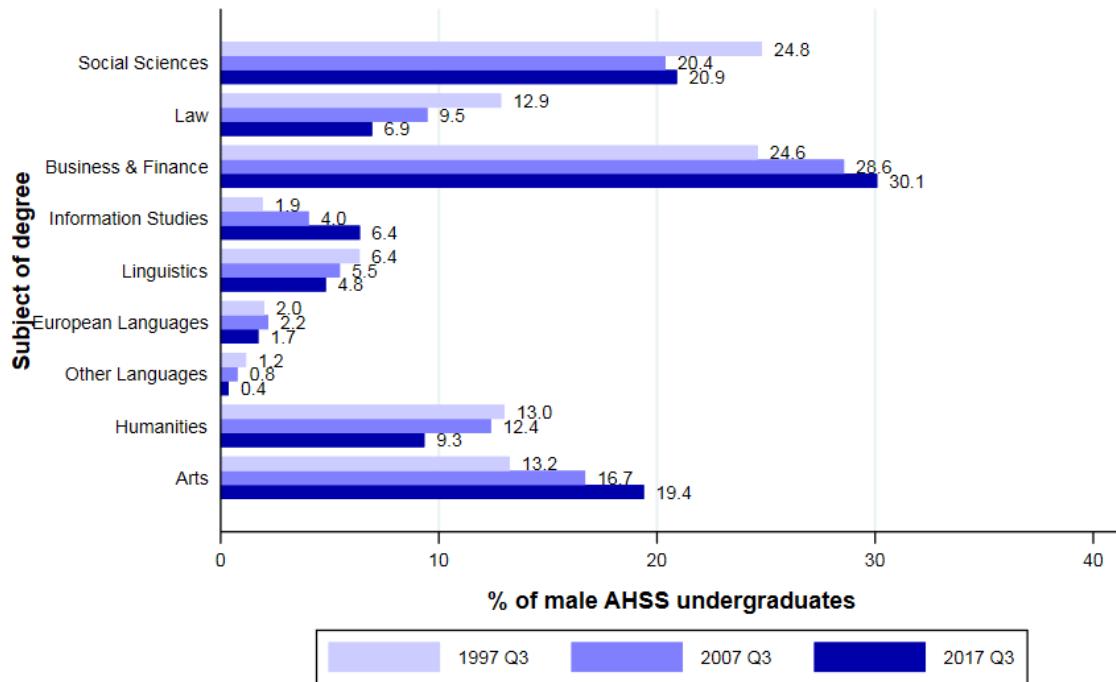
Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey from 1997 to 2017. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

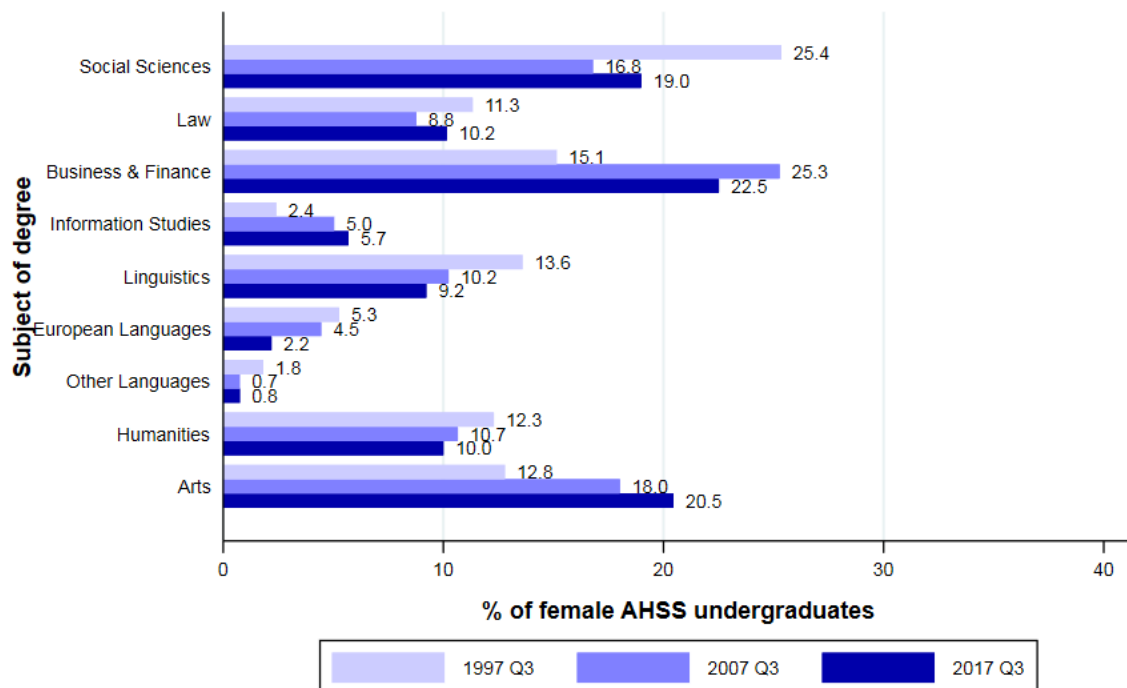


**Figure 11 Changes in the proportion of AHSS undergraduates by subject and gender (1997, 2007, 2017)**

**a) Male undergraduates (based on 2,586 observations)**



**b) Female undergraduates (based on 3,950 observations)**



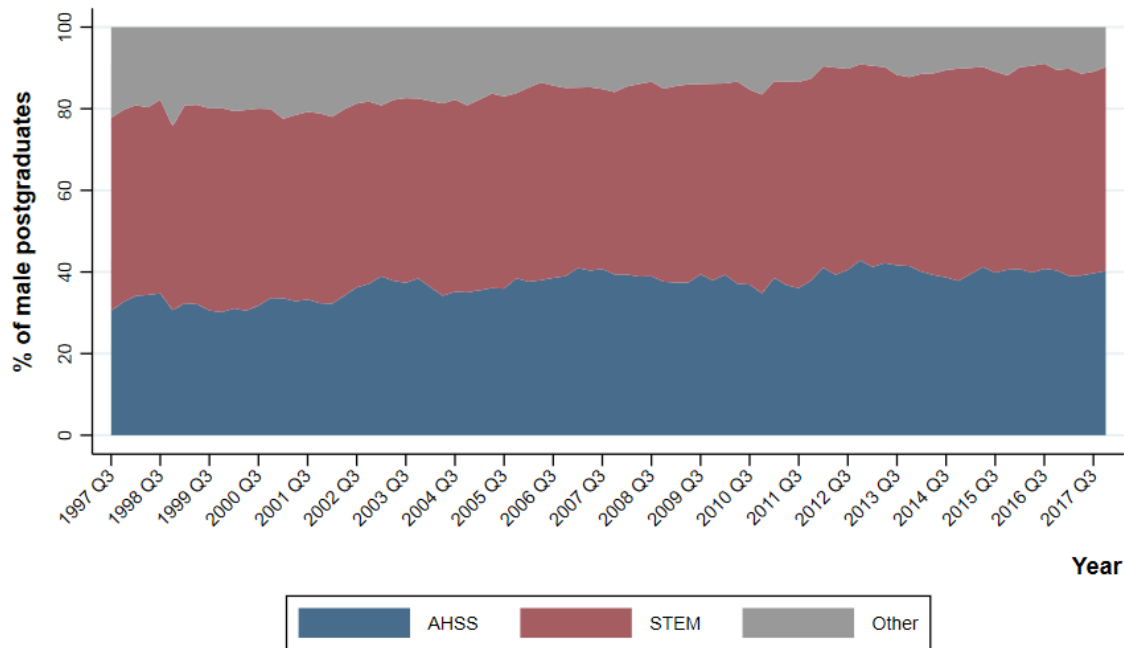
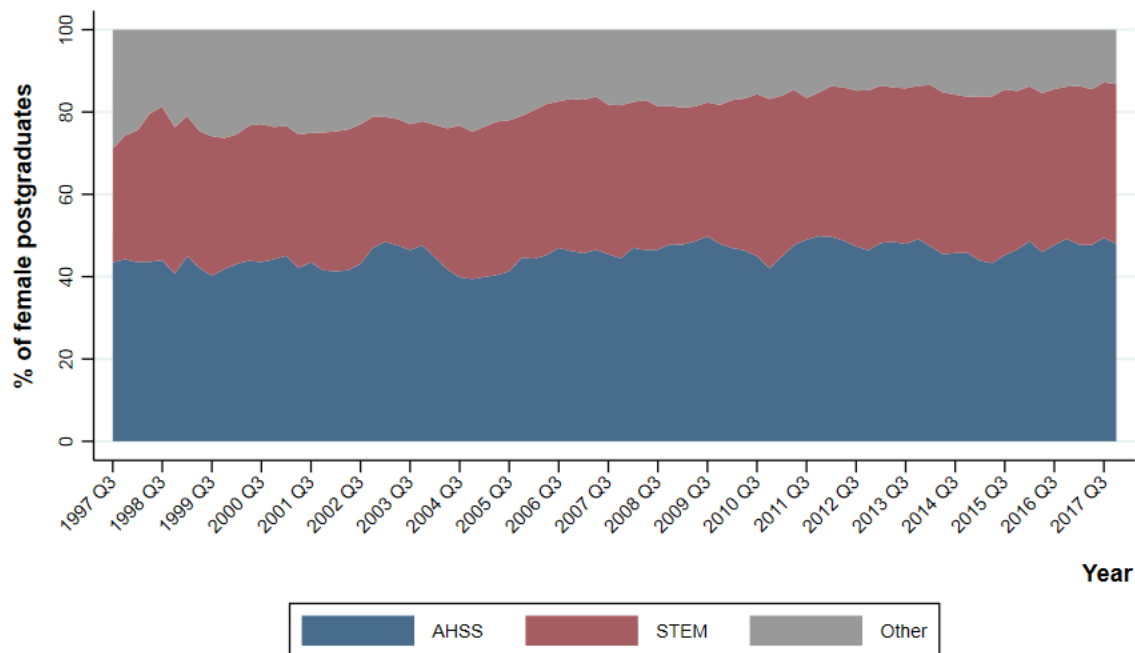
Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

#### Postgraduates

The **AHSS share of postgraduates** has **increased at a slower rate** compared to undergraduates for both genders (Figure 12). In particular, the share of **male AHSS postgraduates** has increased from **31%** in the third quarter of **1997** to **40%** in **2017**. Amongst females, AHSS postgraduates represented **43%** of **all postgraduates** in **1997** and **49%** in **2017**. Furthermore, across both males and females, a higher share of postgraduates had a STEM degree compared to undergraduates in all surveyed years.

Considering the breakdown by subject for AHSS postgraduates in Figure 13, the **vast majority of males** in **2017** held a degree in **Business & Finance (40%)**. Compared to **1997**, this represents an **increase of 9 percentage points** (from **31%**). Analogously, the share of **AHSS female postgraduates** with a degree in **Business & Finance** has **increased** between 1997 and 2017 by approximately **14 percentage points** (from **16%** to **30%**). For both males and females, the increase in the share of Business & Finance degree holders was accompanied by a **decrease** in the share of AHSS graduates holding a degree in **Social Sciences, Linguistics** and **Humanities**. Additionally, the proportion of **AHSS postgraduates** with a degree in **Arts** has **increased for females** (from **8%** to **13%**) and **decreased for males (13% to 9%)** between 1997 and 2017.

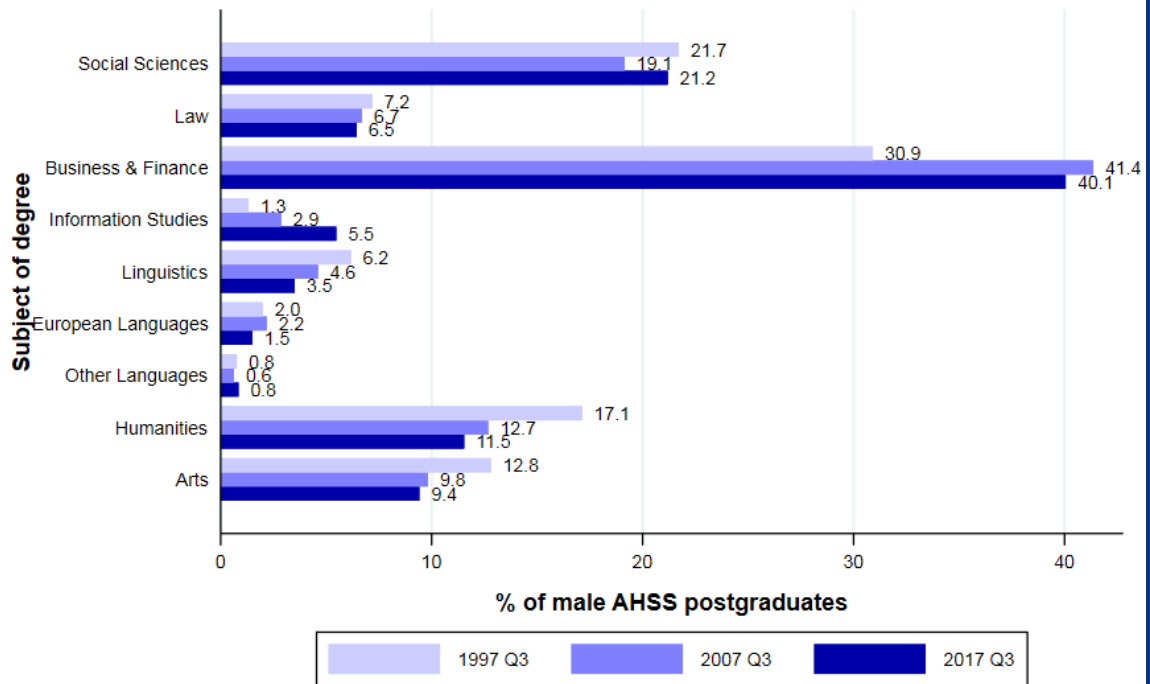
**Figure 12 Proportion of postgraduates by year of the survey, subject category and gender****a) Male postgraduates (based on 96,528 observations)****b) Female postgraduates (based on 68,844 observations)**

Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey from 1997 to 2017. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

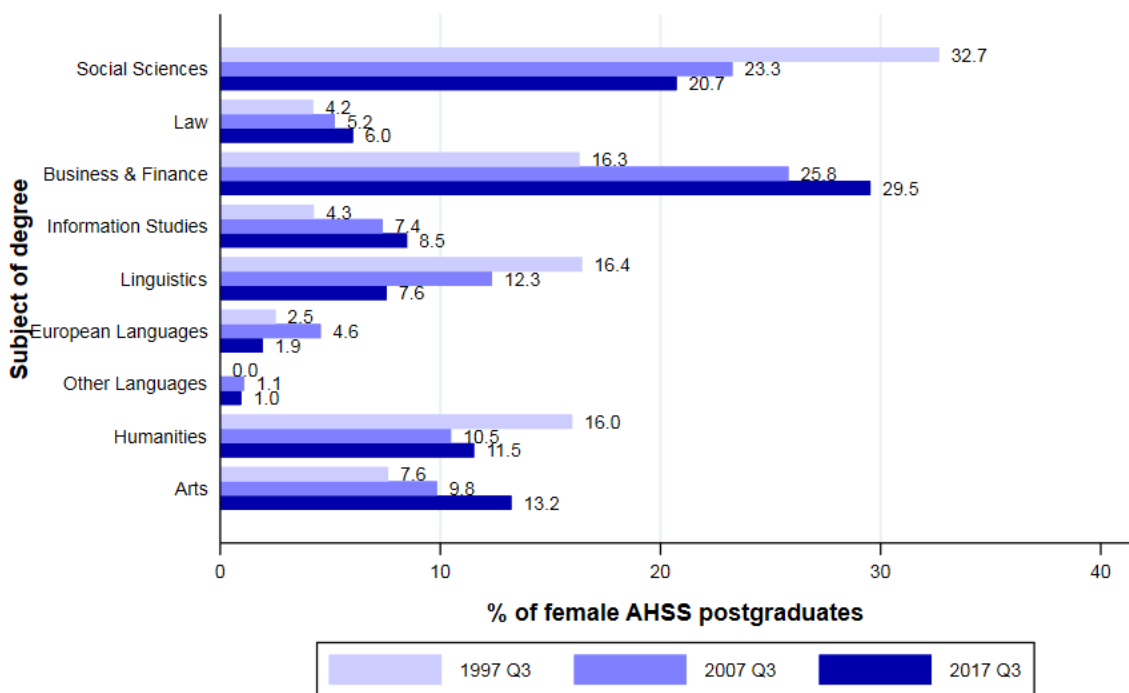
Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

**Figure 13 Changes in the proportion of AHSS postgraduates by subject and gender (1997, 2007, 2017)**

**a) Male postgraduates (based on 1,044 observations)**



**b) Female postgraduates (based on 1,179 observations)**



Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey.

Source: London Economics' analysis of UK Labour Force Survey (1997-2017)

### 3.4 Sector

Figure 14 and Figure 15 demonstrate that there has been a clear shift over time in the sectors in which graduates are employed. In particular, looking at Figure 14 (panel a), the proportion of AHSS undergraduates employed in **Manufacturing** occupations has declined from **12%** in 1997 to **8%** in 2017, and a decrease can also be observed in **Banking, Finance & Insurance** (from **35%** to **31%**). At the same time, the **Public Administration, Education & Health** and **Distribution, Hotel & Restaurant** occupations have experienced a rise in the share of AHSS undergraduates (from **27%** to **28%**, and **12%** to **14%** respectively). The pattern for STEM undergraduates is very similar but much more pronounced (panel b): there is a large decline between 1997 and 2017 in the proportion of STEM undergraduates employed in **Manufacturing** occupations (from **21%** to **9%**), with a corresponding increase in **Public Administration, Education & Health** (**27%** to **37%**). These trends are mirrored at the postgraduate level for both AHSS and STEM.

Comparing the 2017 Q3 results with the **UK-wide trends** for the same time period: the highest concentration (**40%**) of **employed graduates** were working in the **Public Administration, Education and Health** industries<sup>21</sup>, which is consistent with the proportion found in this sector for both AHSS and STEM postgraduates, and for STEM undergraduates. As shown in Figure 14 (panel a)1)a), AHSS undergraduates represented a smaller proportion than this (**27.7%**), but this remains above the UK-wide average for **employed non-graduates** (**21%**). This pattern of sector of employment has **not changed over the past five years**: in July 2013 the concentration of employed graduates working in the Public Administration, Education and Health sectors stood at **41%** (and **22%** of non-graduates), with the breakdown among the other sectors approximately mirroring the 2017 breakdown<sup>22</sup>.

<sup>21</sup> ONS (2017) Graduates in the UK labour market: 2017. See:

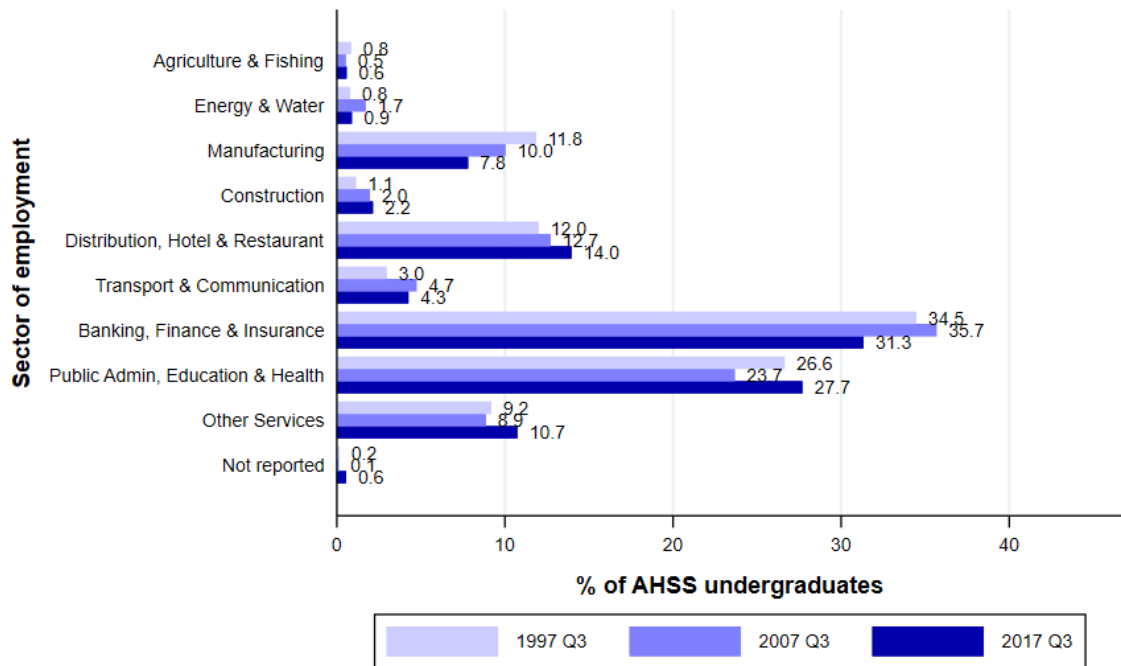
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/graduatesintheuklabourmarket/2017>

<sup>22</sup> ONS (2013) Graduates in the UK Labour Market: 2013. See:

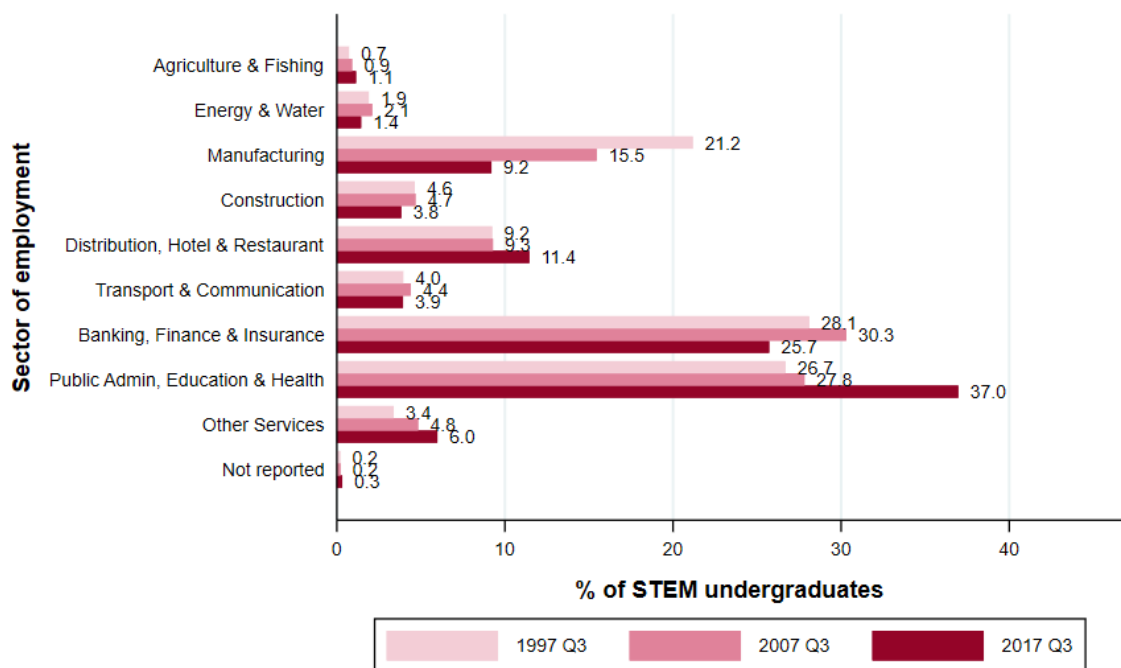
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/graduatesintheuklabourmarket/2013-11-19>

**Figure 14 Sector of employment of undergraduates by subject area (1997, 2007, 2017)**

**a) AHSS undergraduates (based on 6,199 observations)**

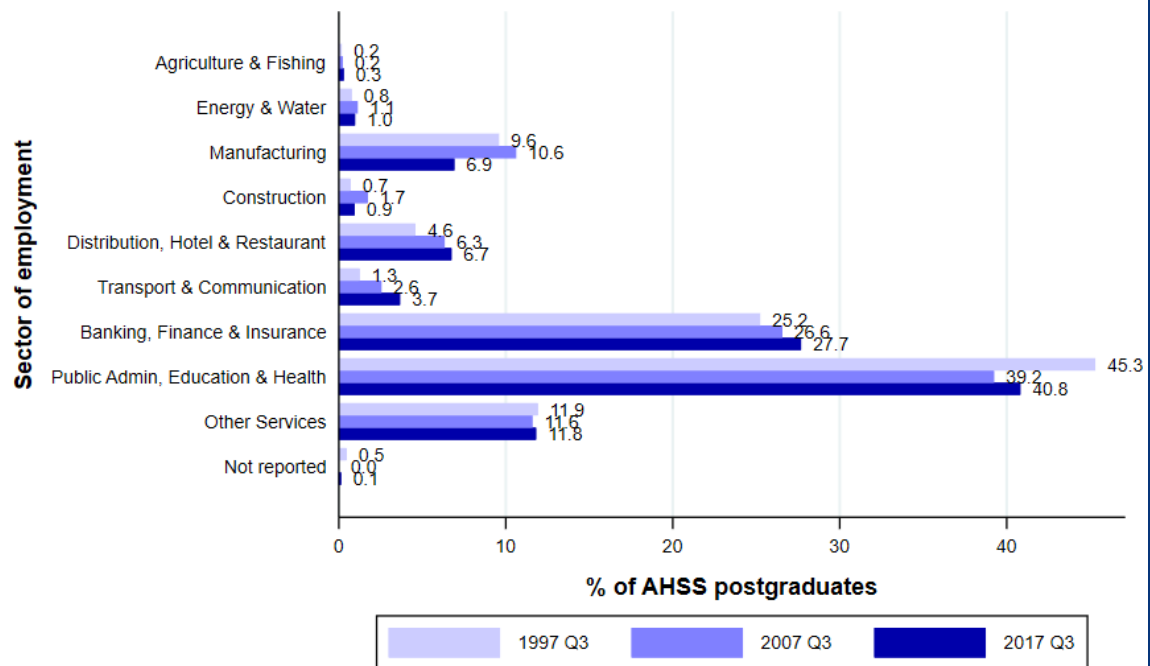
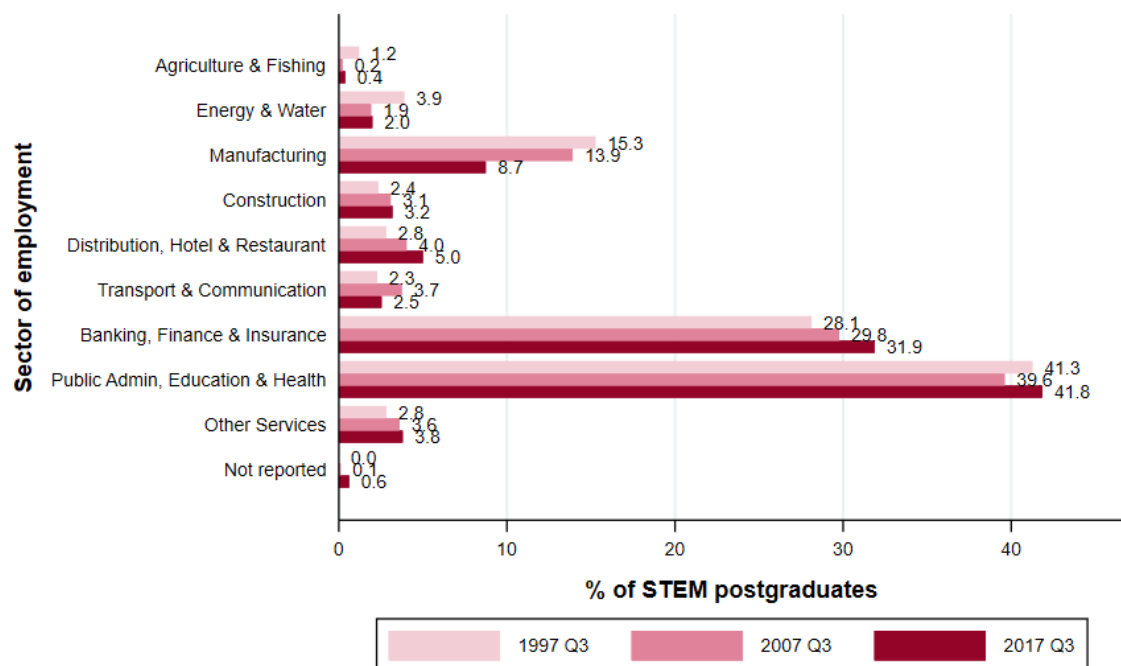


**b) STEM undergraduates (based on 5,315 observations)**



Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Industry breakdowns correspond to SIC92 & SIC2007. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey.

Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)

**Figure 15 Sector of employment of postgraduates by subject area (1997, 2007, 2017)****a) AHSS postgraduates (based on 2,189 observations)****b) STEM postgraduates (based on 2,296 observations)**

Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Industry breakdowns correspond to SIC92 & SIC2007. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey.

Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)

### 3.5 Occupation

Unlike the sector of employment, our analysis identifies **some significant differences** in terms of the **occupational destinations of AHSS and STEM graduates**, in particular amongst undergraduates (Figure 16). More specifically, even though we observe a **decline** in the share of **undergraduates** employed in **Manager and Senior Official roles** for both subject categories of between **10** and **14** percentage points, this fall resulted in a shift towards **Professional occupations** for **STEM undergraduates** (from **42%** in 1997 to **48%** in 2017) as opposed to **Associate Professional & Technical roles** for **AHSS undergraduates** (from **21%** to **30%**)<sup>23</sup>. In comparison, results from the Destination of Leavers from Higher Education 2016/17 survey indicate that **42%-48%** (depending on gender) of undergraduates enter **Professional occupations**, and **25%-31%** enter **Associate professional and technical occupations**<sup>24</sup>, which is broadly in line with the split observed between AHSS and STEM undergraduates in Figure 16.

Figure 17 demonstrates that a very different pattern is observed among **postgraduates**, with the share of AHSS postgraduate degrees holders working in **Associate Professional and Technical** occupations remaining relatively constant between 1997 (**22%**) and 2017 (**23%**). The share of AHSS postgraduates in both **Manager & Senior Official** and **Professional** roles has decreased over the course of the last 20 years, from **23%** to **20%** for the former and from **46%** to **42%** for the latter occupations. This decrease is accompanied by a corresponding increase in the share of AHSS postgraduates in commercial roles (**Sales & Customer Services**), from **2%** in 1997 to **4%** in 2017, and in **Administrative roles** (from **4%** in 1997 to **7%** in 2017). STEM postgraduate degree holders, in contrast, have consistently been predominantly clustered in **Professional** occupations over the entire time period (between **60%** and **64%**).

<sup>23</sup> This shift may be, at least in part, driven by a reclassification over time in the occupational level that certain jobs are categorised as in the Standard Occupational Classification between SOC1990, SOC2000 and SOC2010 (i.e. occupations that used to be classed as 'Manager and Senior Official' have been reclassified as 'Associate Professional and Technical' etc.).

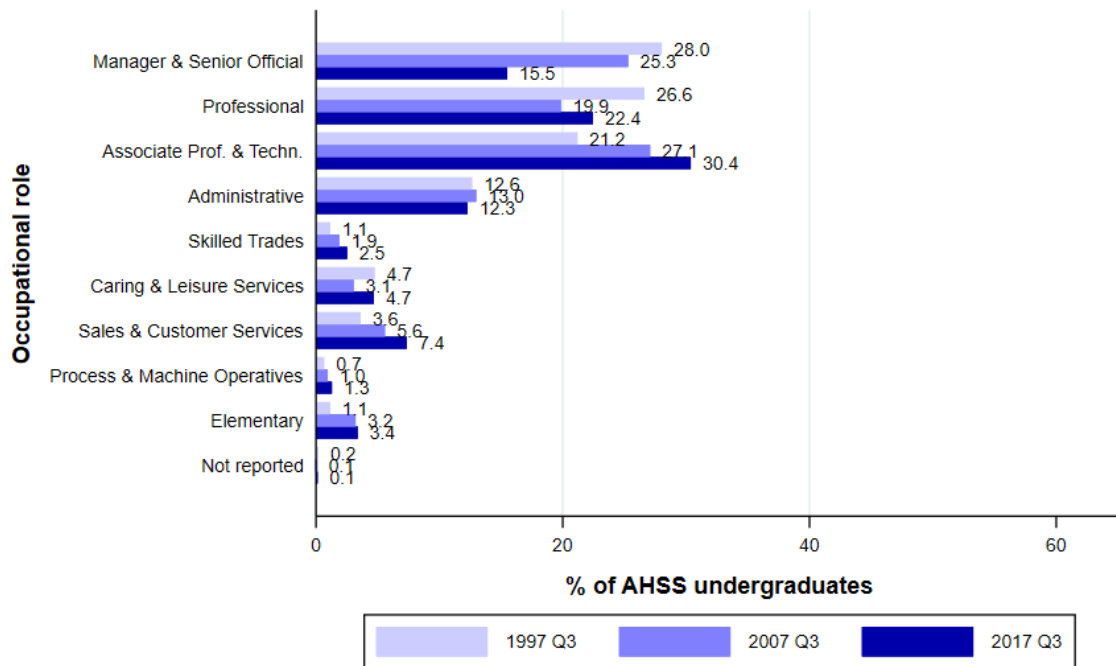
- The explanation provided in the Labour Force Survey User Guide for the reclassification from SOC1990 to SOC2000 is as follows: "Whilst an objective of the revision had been to maintain a reasonable degree of continuity with SOC 1990, the main priority was to bring the classification up-to-date to reflect changes in society. This has resulted in significant change to the classification." See Labour Force Survey User Guide – Volume 5: LFS Classifications (2009): <http://www.ons.gov.uk/ons/guide-method/method-quality/specific/labour-market/labour-market-statistics/volume-5---2009.pdf>
- The change from SOC2000 to SOC2010 was, among other objectives, intended to make the classification internationally comparable: "The title 'manager', qualified in some way, is frequently used in the UK to denote what would be regarded as supervisory or administrative positions in many other countries. Furthermore, the title is often used in the UK to denote the management of a set of activities that constitute a specific job, rather than the broader and more strategic managerial functions that define managerial roles in other countries. For this reason, UK occupational statistical information is not comparable with similar information from many other countries." See Standard Occupational Classification – Volume 1: Structure and descriptions of unit groups 2010: <https://www.ons.gov.uk/file?uri=/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2010/soc2010volume1structureanddescriptionsofunitgroups/soc2010volume1webtcm77181317.pdf>

<sup>24</sup> HESA (2018) Destinations of Leavers from Higher Education 2016/17. See: <https://www.hesa.ac.uk/news/19-07-2018/DLHE-publication-201617>

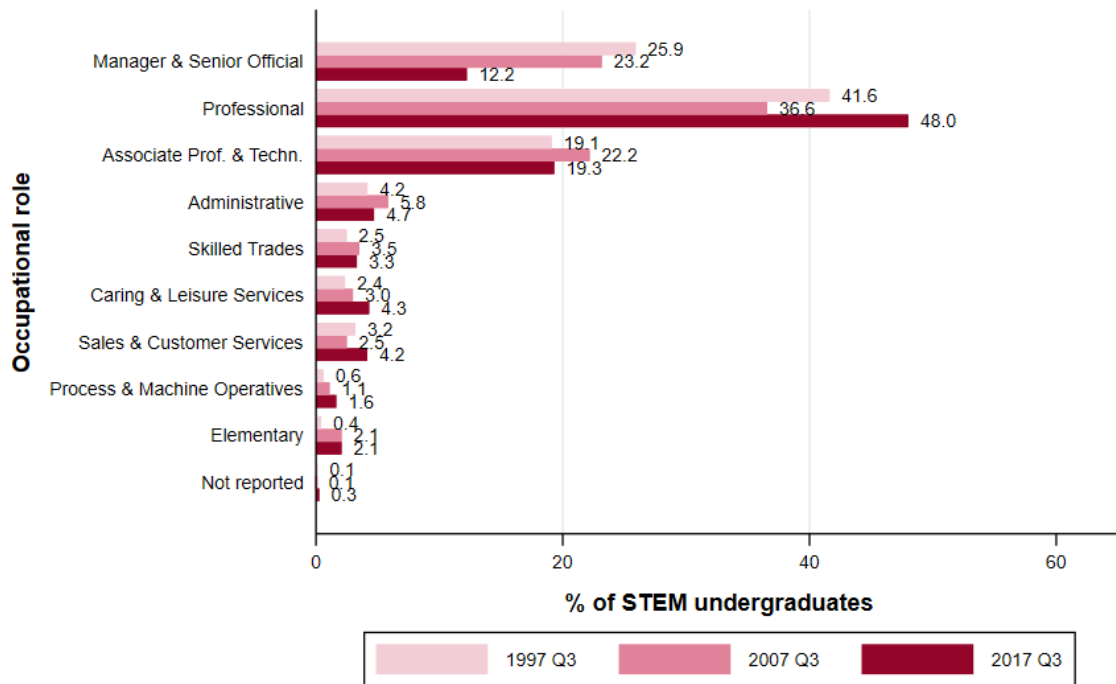


**Figure 16 Occupation of employment of undergraduates by subject area (1997, 2007, 2017)**

**a) AHSS undergraduates (based on 6,199 observations)**



**b) STEM undergraduates (based on 5,315 observations)**

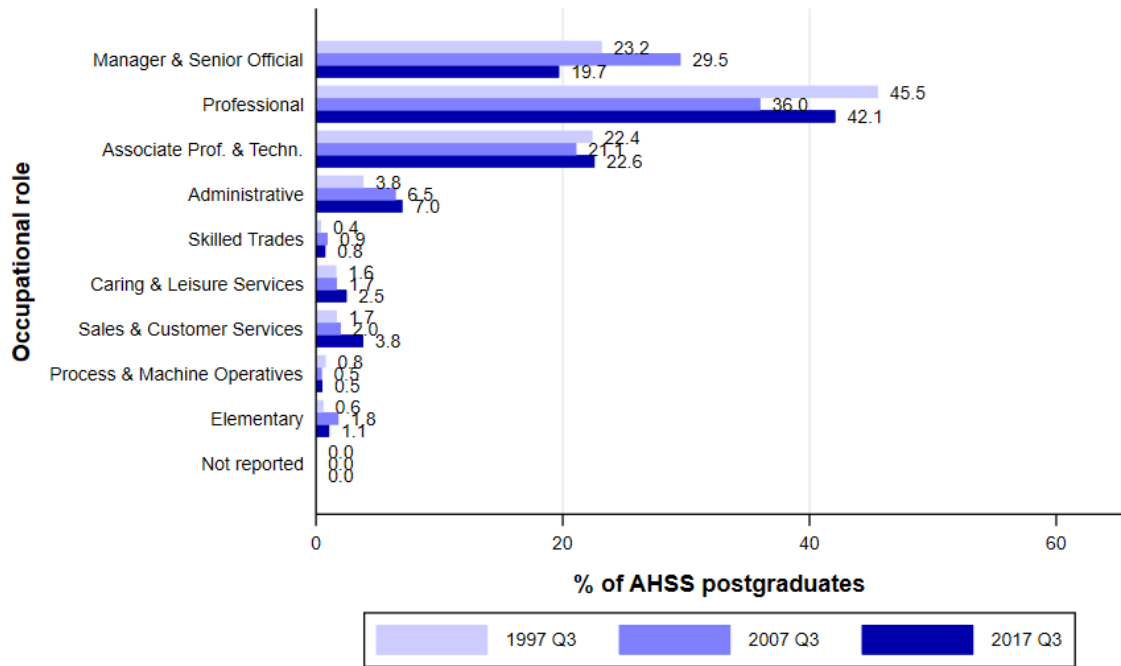


Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 Labour Force Survey.

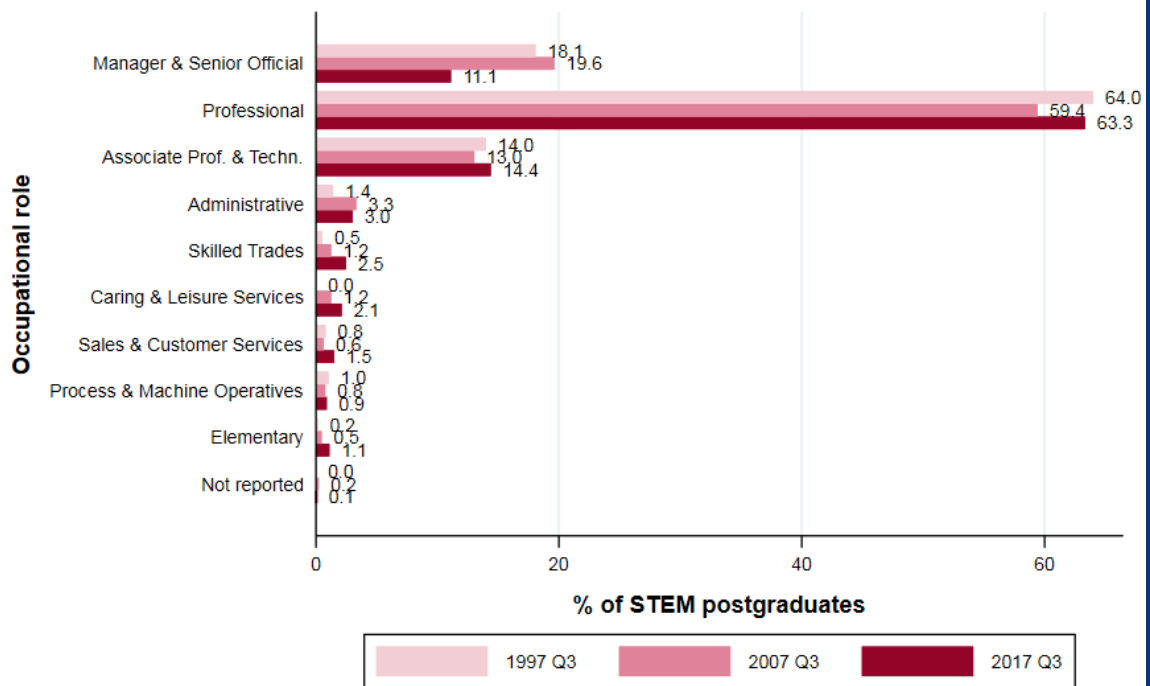
Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)

**Figure 17 Occupation of employment of postgraduates by subject area (1997, 2007, 2017)**

**a) AHSS postgraduates (based on 2,189 observations)**



**b) STEM postgraduates (based on 2,296 observations)**



Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 Labour Force Survey.

Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)

## 3.6 Wages

The trend in the **average gross hourly pay** of graduates at each qualification level over the time period has tracked that of the business cycle (Figure 18). Following an initial increase for both AHSS and STEM graduates (from approximately **£18** to **£21** per hour for undergraduates and **£22** to **£25** per hour for postgraduates), wages have declined post-2008 **reflecting the period of economic downturn following the financial crisis**; however, wages have stabilised to some extent at their initial levels since 2014. The **average gross hourly pay** earned by **AHSS graduates** is **consistently below that of STEM graduates** for all years at undergraduate level and for the majority of years at postgraduate level. However, the average gross hourly pay earned by AHSS graduates **still remains well above the UK average**: according to the Annual Survey of Hours and Earnings (ASHE), mean hourly earnings in the UK in 2017 were **£16.20**<sup>25</sup>.

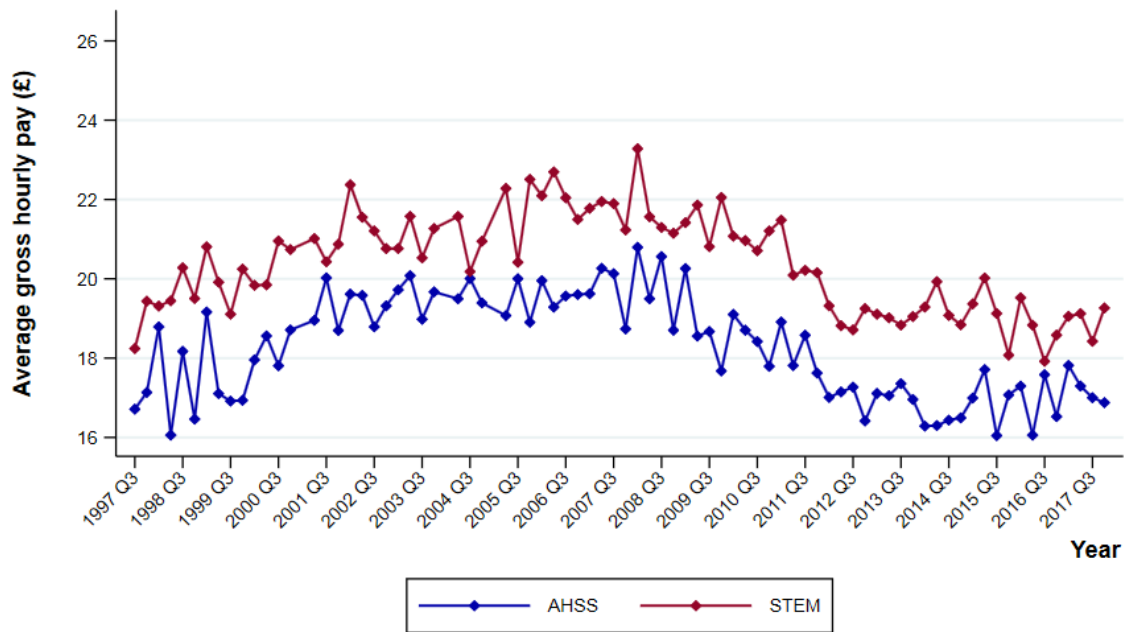
Figure 19 presents **information on the distribution of the gross hourly pay** for AHSS and STEM graduates (which clearly identifies the difference in mean earnings between the two subject groups). In addition to including the mean and median values at each point in time, the figures in each panel also demonstrate the extent to which the distribution was concentrated around the mean value, with the **box depicting the interquartile range** and the **vertical line** identifying the range of the **5<sup>th</sup>** and the **95<sup>th</sup> percentiles** of the distribution. At the undergraduate level (Figure 19 (panel a)) there is relatively little difference between the **distribution** of wages for AHSS and STEM graduates. However, for postgraduates (panel b)), the **wage distribution** of **AHSS degree holders** appears to be **more dispersed**. In particular, both the interquartile range and the 5<sup>th</sup> to 95<sup>th</sup> percentiles of gross hourly pay demonstrate a greater range for **AHSS postgraduate degree holders** than for **STEM postgraduate** degree holders.

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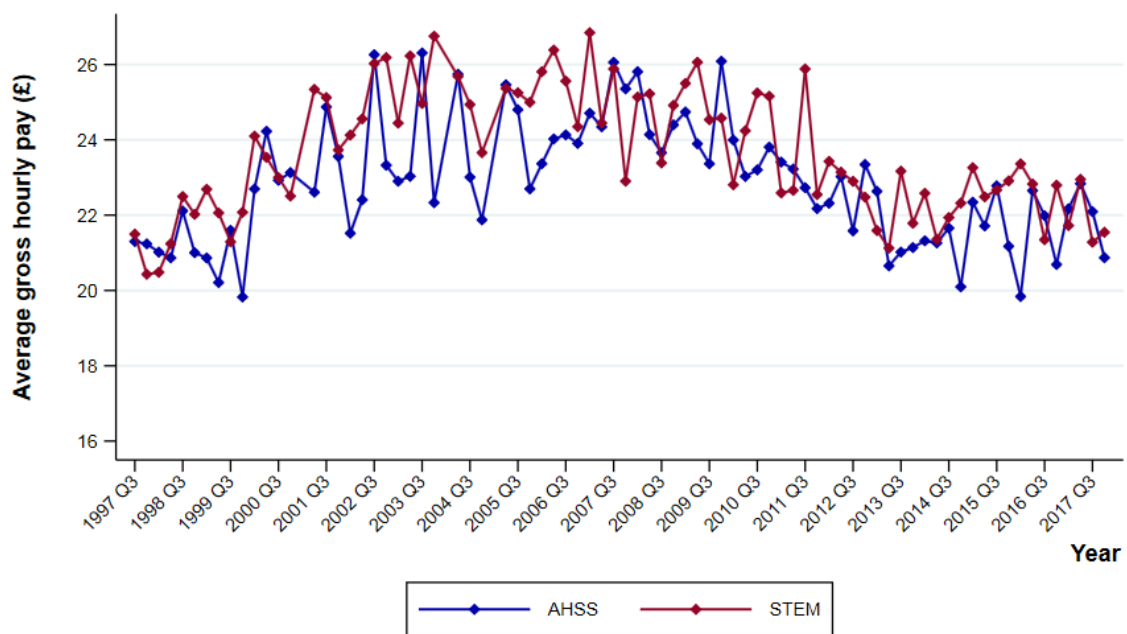
<sup>25</sup> ONS (2018) Annual Survey of Hours and Earnings time series of selected estimates. See: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/ashe1997to2015selectedestimates>

**Figure 18 Average gross hourly pay by qualification level, subject area and year of the survey (1997-2017)**

**a) Undergraduates (based on 78,402 observations)**



**b) Postgraduates (based on 31,835 observations)**

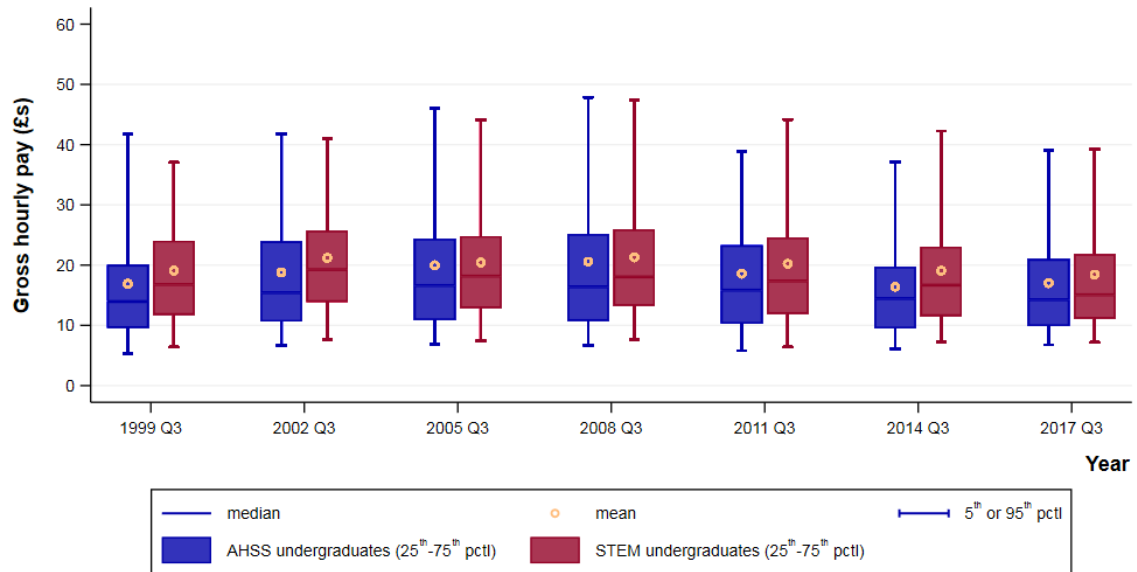


Note: Hourly pay is adjusted for inflation using the Consumer Price Index (CPI), where the base year is December 2017. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on the first and the fifth wave observations from all quarters of the UK Labour Force Survey in the reported years. Figures don't include observations from the first quarter in 1997, 2001, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

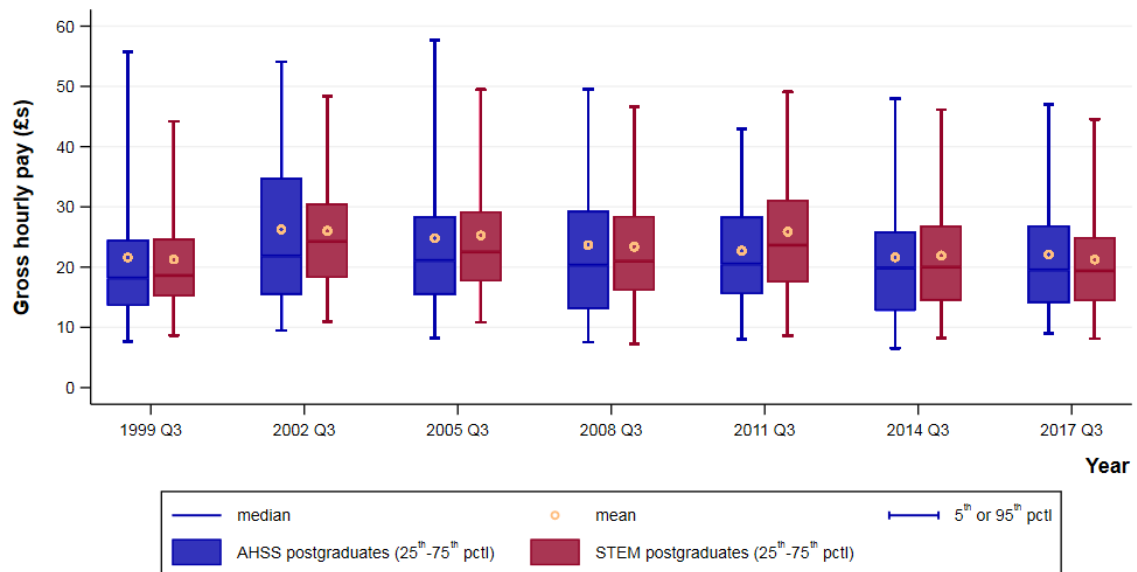
Source: London Economics' analysis of Labour Force Survey (1997-2017), ONS (1997-2017)

**Figure 19 Mean, median and interquartile range of gross hourly pay by qualification level, subject area and year of the survey (1999, 2002, 2005, 2008, 2011, 2014, 2017)**

**a) Undergraduates (based on 7,186 observations)**



**b) Postgraduates (based on 2,888 observations)**



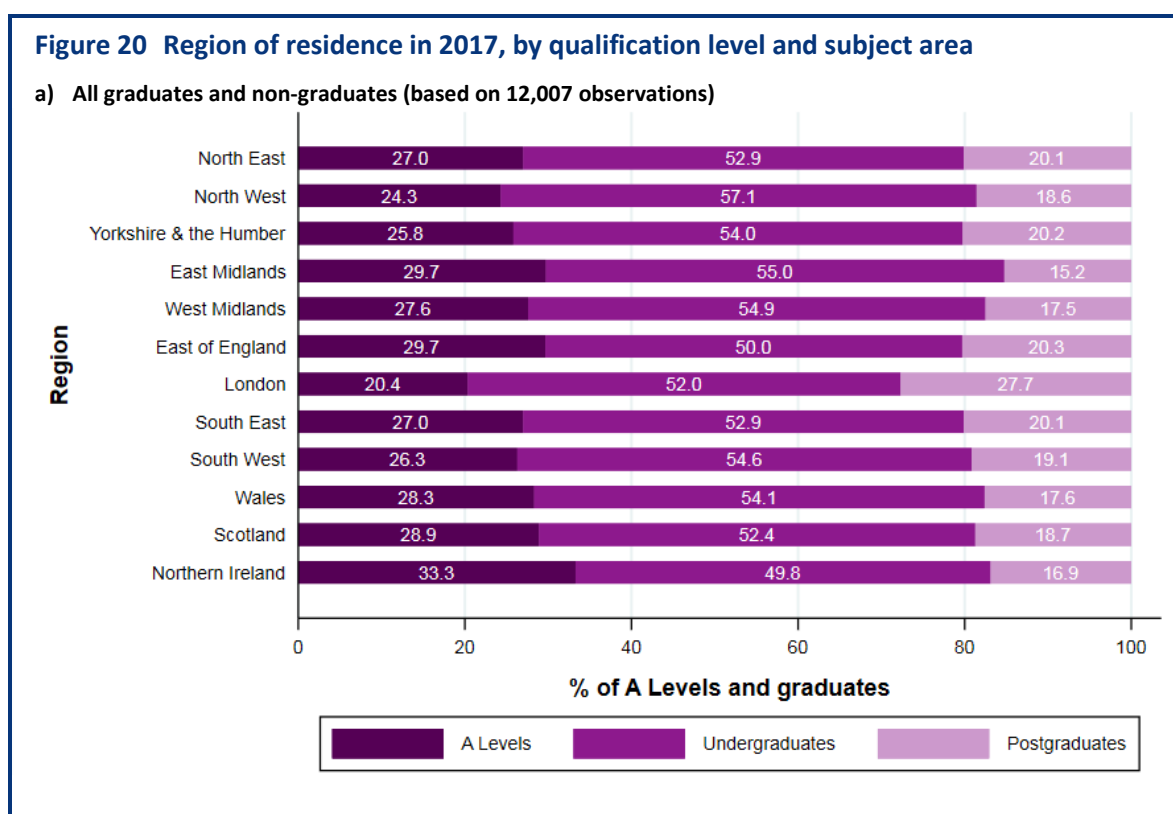
Note: Hourly pay is adjusted for inflation using the Consumer Price Index (CPI), where the base year is December 2017. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on the first and the fifth wave observations from all quarters of the UK Labour Force Survey in the reported years. Figures don't include observations from the first quarter in 1997, 2001, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets.

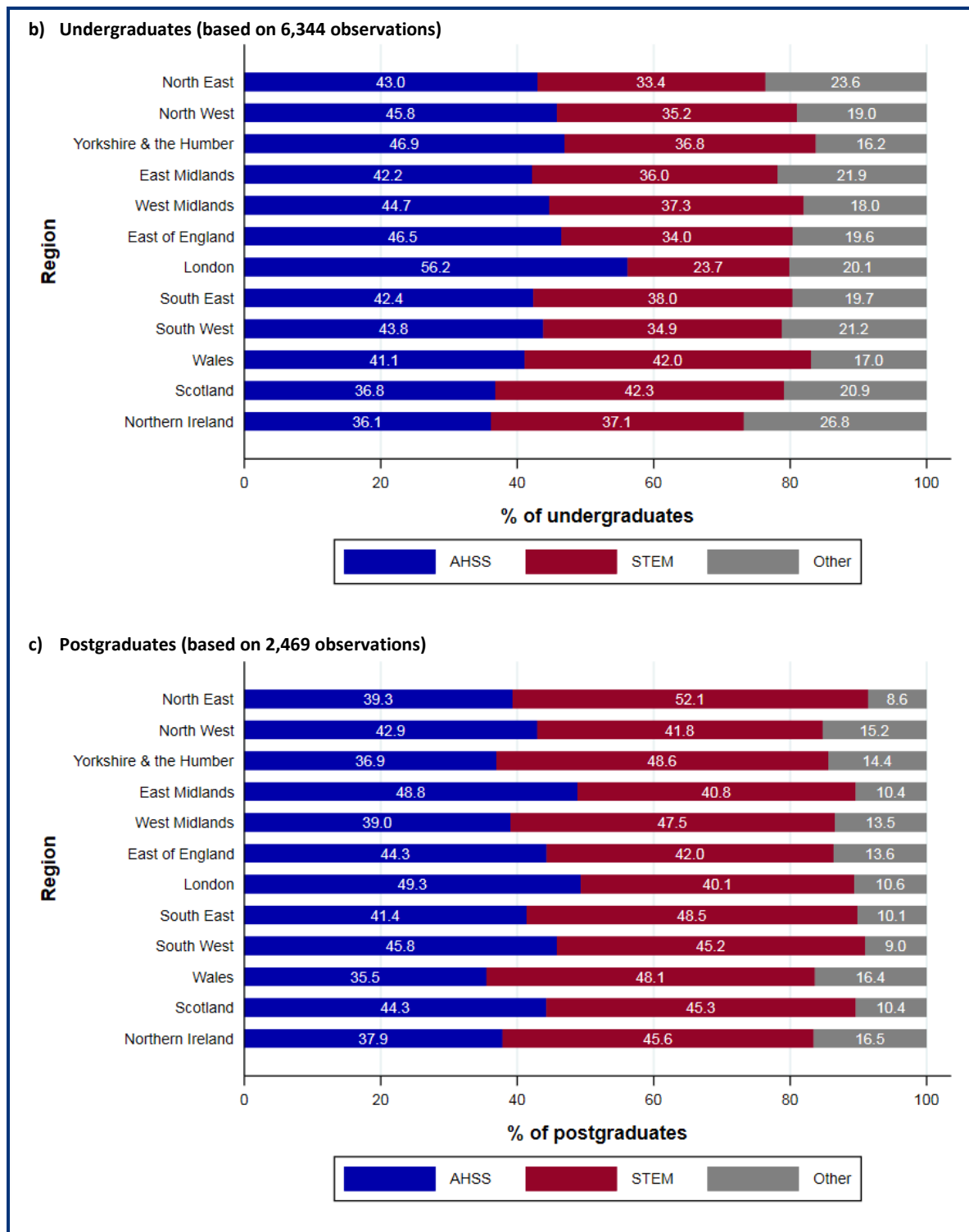
Source: London Economics' analysis of Labour Force Survey (1997-2017), ONS (1997-2017)

### 3.7 Region of residence

In 2017, there were clear **differences** in the **region of residence** of graduates (Figure 20) reflecting the location and concentration of different economic sectors across the UK regions. **Graduates** were **represented to the greatest extent in London**, where approximately **80%** of individuals included in our sample in possession of either an **undergraduate** or a **postgraduate degree** (panel a)). Conversely, the regions with the **lowest incidence of graduates** in 2017 were **Northern Ireland (67%)**, the **East Midlands (70%)** and the **East of England (70%)**. Note that the high concentration of graduates in **London** is accounted for by an exceptionally **high proportion of postgraduates (28%** of London residents included our sample, compared to **17%** in the West Midlands for instance).

Considering the breakdown by subject categories in 2017, **London** had a higher share of **AHSS degree holders** among undergraduates compared to all other regions, with approximately **56%** of the **undergraduates** resident in **London in possession of an AHSS degree** (panel b)). At the other end of the spectrum, **Northern Ireland** and **Scotland** were the regions with the **lowest proportion** of AHSS undergraduate degree holders (**36%** and **37%** respectively) in 2017. Among **postgraduates** (panel c)), **AHSS postgraduate** degree holders were **least** likely to be represented in **Wales (36%** of all postgraduate degrees achieved amongst people located in **Wales**), **Yorkshire & the Humber (37%)** and **Northern Ireland (38%)**. Again, in London, almost **50%** of individuals in possession of a postgraduate degree has obtained this qualification in AHSS.





Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Region shows the government office region. Figures based on observations from all waves within the third quarter of the 2017 UK Labour Force Survey.

Source: London Economics' analysis of Labour Force Survey (2017)

## 4 How resilient are AHSS graduates to changes in the economy?

### 4.1 Methodological approach

In order to investigate the extent to which AHSS graduates are affected by **fluctuations in the business cycle**, relative to STEM graduates or non-graduates, we have estimated a **probit** model of the form:

$$P(\text{employment})_i = \alpha + \beta \text{AHSS}_i + \delta \ln(\text{GDP})_i + \sigma(\text{AHSS}_i * \ln(\text{GDP})_i) + \gamma X_i + \varepsilon_i$$

where 'AHSS' is equal to 1 for respondents in possession of a degree in an AHSS subject, and 0 if the individual holds a STEM degree (or, for the comparison with non-graduates, A-levels). The business cycle is modelled via the **log of GDP** (the independent variable) and the dependant variable is the **probability of being in employment**.

The **interaction term between ln(GDP) and AHSS** allows the effect of the business cycle to differ between AHSS graduates and non-AHSS graduates. When AHSS is equal to 0, the interaction term disappears from the model: hence, for **non-AHSS graduates**, the coefficient  $\delta$  provides an estimate of the change in the probability of being in employment associated with a one percent change in GDP. In other words, this estimate provides the **elasticity** of employment with respect to changes in the business cycle. The coefficient  $\sigma$  quantifies the **additional impact** of the economy on employment for AHSS graduates, such that the impact of a one percent change in GDP on **AHSS graduates** can be estimated by summing the coefficients  $\delta$  and  $\sigma$ .

In order to disentangle the impact of GDP from other confounding factors that might also affect employment, we included a number of **control variables** ( $X_i$  in the equation above) to strip out the impact of observable characteristics. These control variables include **age, disability, marital status, ethnicity, region of residence, and time elapsed** since the achievement of the highest qualification. The analysis was undertaken for using both the STEM and A-level comparison groups (separately), and for postgraduates and undergraduates (separately). Furthermore, to account for any potential variation associated with gender, the analysis was also performed separately for males and females.

### 4.2 Findings

#### 4.2.1 STEM comparison

Figure 21 displays the overall elasticity of employment with respect to changes in the business cycle for AHSS graduates (corresponding to the blue markers) and STEM graduates (depicted by the red markers) for each qualification level and gender (estimated via separate regressions)<sup>26</sup>. We also tested whether the elasticities found were statistically different from each other within each level and gender, the results of which are displayed on the right of Figure 21.

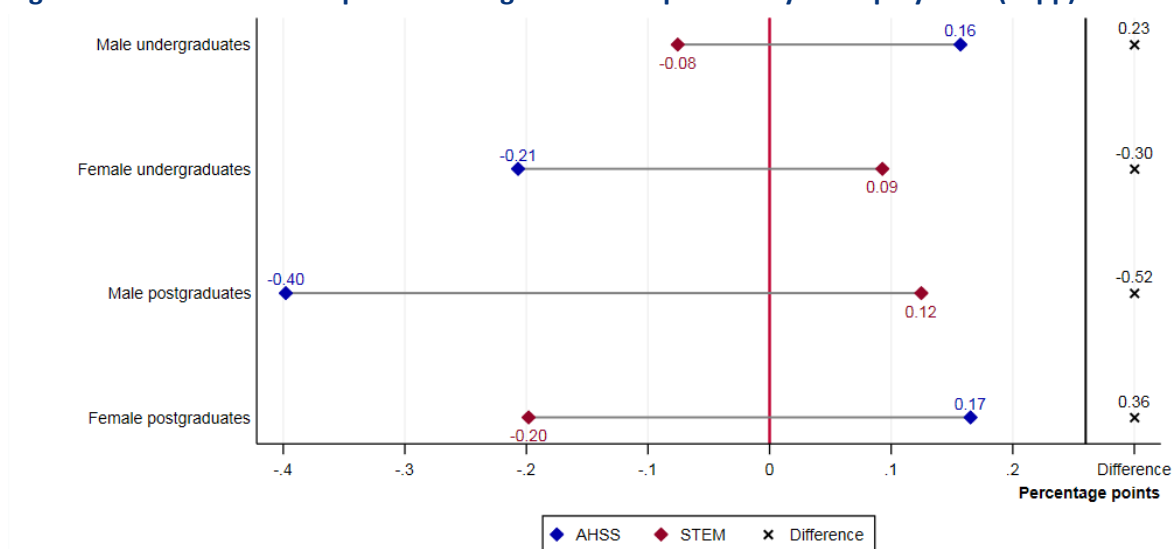
In all cases, the elasticities were found to be **not statistically significant**: in other words, we cannot say that the impact is statistically different from zero (i.e. **AHSS graduates and STEM graduates are both relatively resilient to changes in the economy**). Furthermore, the difference coefficients were

<sup>26</sup> The full regression outputs displaying the marginal effects for all control variables and the number of observations for each regression in the econometric analysis can be found in the Annex.



also not statistically significant, indicating that, for both genders, **AHSS undergraduates do not respond to changes in GDP differently to STEM undergraduates**<sup>27</sup>. This finding is potentially counterintuitive considering the dominant discourse on the importance of STEM subjects and the centrality of STEM to technological developments and economic growth. AHSS and STEM are often considered to develop very different sets of skills, yet the evidence presented here indicates that both types of skills are just as important to the labour market, irrespective of whether the economy is growing or contracting.

**Figure 21** Effect of a one percent change in GDP on probability of employment (in pp)



Note: (1) All specifications control for individual characteristics including age, disability, marital status, ethnicity, region and time elapsed since highest qualification. (2) Observations in the regressions are not weighted to represent the entire population. (3) GDP data is seasonally adjusted. (4) Asterisks indicate level of significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: London Economics' analysis of UK Labour Force Survey (1998-2017), ONS (1998-2017)

#### 4.2.2 Non-graduates comparison

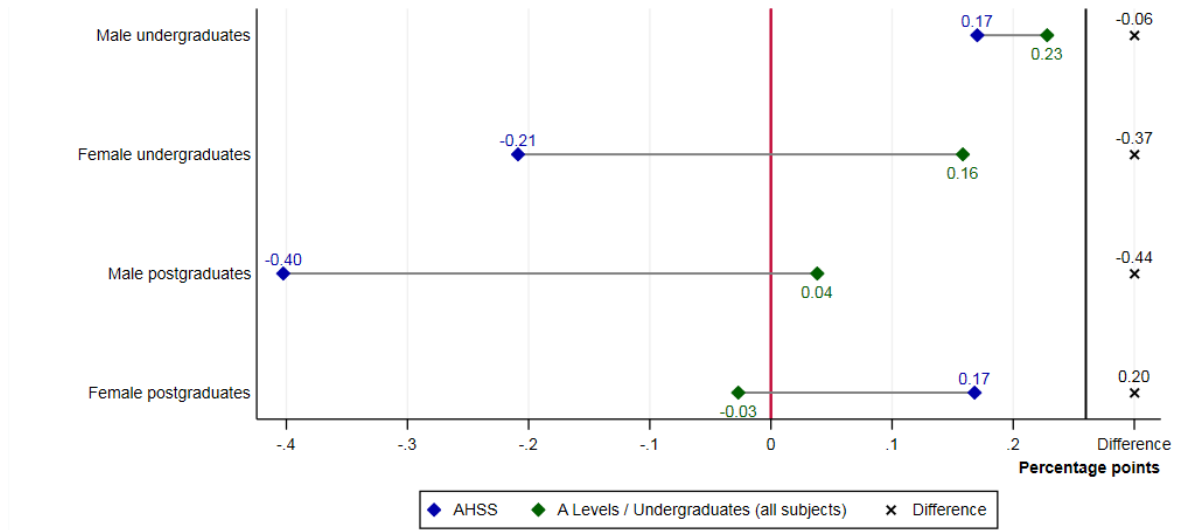
The same exercise was undertaken for comparison with non-graduates (Figure 22), where the blue markers for AHSS graduates are the same as those in Figure 21, and the green marker represents either **A-level achievers** (for comparison with AHSS undergraduates) or **undergraduate degree holders** of all subjects (for comparison with AHSS postgraduates): in essence, it is all of those who achieved qualifications at the adjacent level below the qualification of interest.

The findings are very similar to those for graduates: **non-graduates are also generally not differentially responsive** to changes in the business cycle for any level or gender, and do not respond in a significantly different way to AHSS graduates<sup>28</sup>.

<sup>27</sup> Given the lack of significance, it is very likely that the coefficients presented in Figure 21 are only different from zero due to random chance rather than a causal effect. However, should it be economically useful, the coefficients can be interpreted as follows: taking male undergraduates as an example, the estimates indicate that a 1% increase in GDP is associated with a 0.16 percentage point increase in the probability of employment for male AHSS undergraduates, and a 0.08 percentage point fall in the probability of employment for STEM undergraduates, where the difference between the two coefficients is 0.23 percentage points. Differences reported may differ slightly from the calculated difference in coefficients due to rounding.

<sup>28</sup> Coefficients for AHSS graduates in Figure 22 may differ slightly from the corresponding coefficients in Figure 21 because the calculated marginal effects are affected by sample composition. We have estimated both coefficients simultaneously via a fully interacted model to allow for a statistical test of the difference in estimates, so the inclusion of non-graduates as the counterfactual group (as opposed to STEM graduates) affects the distribution of the control variables upon which the marginal effects are computed.

**Figure 22** Effect of a one percent change in GDP on probability of employment (in pp)



Note: (1) All specifications control for individual characteristics including age, disability, marital status, ethnicity, region and time elapsed since highest qualification. (2) Observations in the regressions are not weighted to represent the entire population. (3) GDP data is seasonally adjusted. (4) The sample of non-graduates consists of A-levels for undergraduate regressions and of undergraduates (all subjects) for postgraduate regressions. (5) Asterisks indicate level of significance: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Source: London Economics' analysis of UK Labour Force Survey (1998-2017), ONS (1998-2017)

## 5 Are there regional differences in the employment of AHSS graduates?

### 5.1 Methodological approach

There are a number of factors that are likely to influence employment outcomes besides the business cycle. It may, for example, be the case that AHSS graduates enjoy greater employment prospects in certain regions of the United Kingdom, due to local demand or local labour market characteristics. In order to investigate this possibility, we explored the extent to which the probability of employment changes for **AHSS graduates across different UK regions** by restricting the sample to AHSS graduates only and estimating a probit model of the form:

$$P(\text{employment})_i = \alpha + \sum_r \beta_r \text{region}_{r,i} + \gamma X_i + \varepsilon_i$$

The dependent variable is the probability of employment, and  $X_i$  is a vector of the usual control variables. The term 'region' refers to the inclusion of separate dummy variables for each region,  $r$ , where the **North West** of England has been omitted as the baseline (comparison) region. Hence, the coefficients  $\beta_r$  provide an estimate of the **additional impact on employment of residing in each region for AHSS graduates**, compared to residence in the North West. The estimation has been conducted by gender and for undergraduates and postgraduates separately.

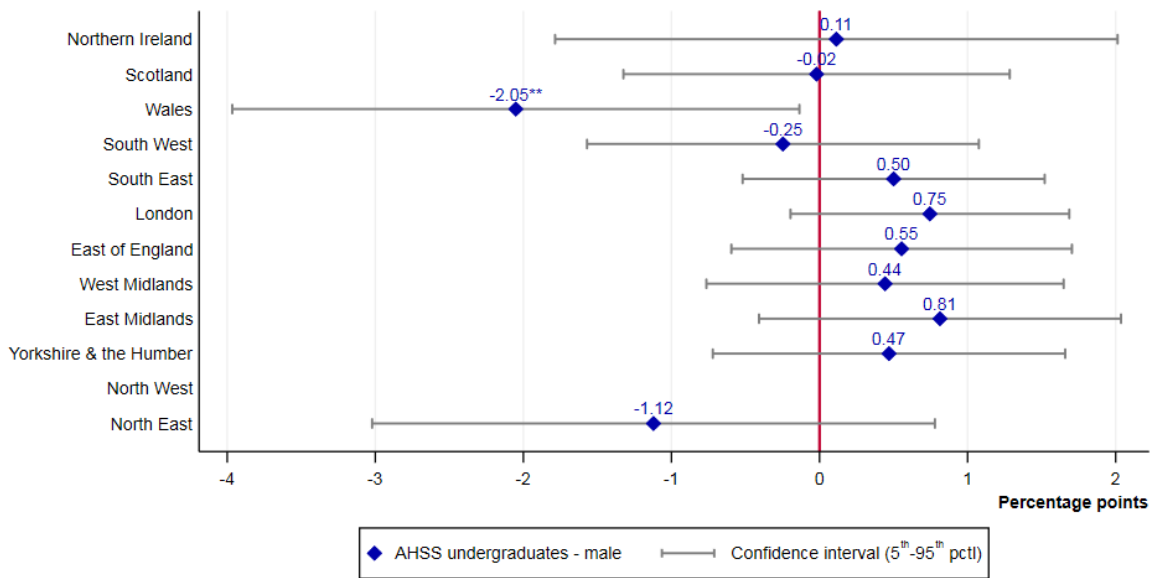
### 5.2 Findings

The results from the econometric analysis indicate that **there are limited regional differences** in terms of the labour market outcomes of AHSS graduates across the United Kingdom. At the undergraduate level (Figure 23), males living in **Wales** at the time of the survey and holding an undergraduate degree in an AHSS subject are **2.05 percentage points less likely** to be employed than their counterparts residing in the North West. For all other regions there is no statistically significant variation in the employment status of male AHSS undergraduates across the UK, although the point estimates do suggest that male AHSS graduates are more likely to be employed in **London**, the **South East**, **Yorkshire and the Humber**, the **West Midlands** and **East Midlands**. For females, there is no significant variation across regions at all although again the point estimates suggest that female AHSS graduates in **Northern Ireland** and **Yorkshire and the Humber** are more likely to be employed compared to the **North West** (and AHSS graduates in the **North East** are less likely to be employed).

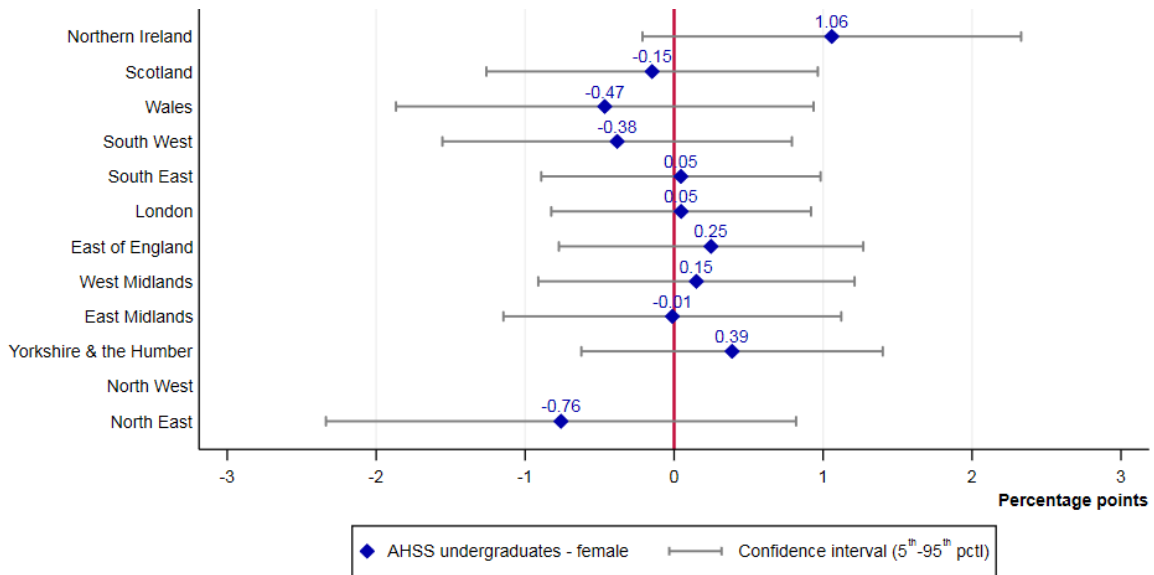
Region of residence has a **more distinct** impact on employment **for individuals with a postgraduate degree** level qualification. Estimates for both male and female graduates are generally larger in magnitude compared to undergraduates, although largely insignificant for males. Interestingly, **female postgraduates are most likely** to be employed in **North West**, since all of the coefficients are negative relative to the base category, but **male postgraduates are least likely** to be employed in the same region. It is not possible to determine the drivers of this without further analysis, but this provides a strong indication that there are varying labour market opportunities by gender across the United Kingdom for AHSS graduates.

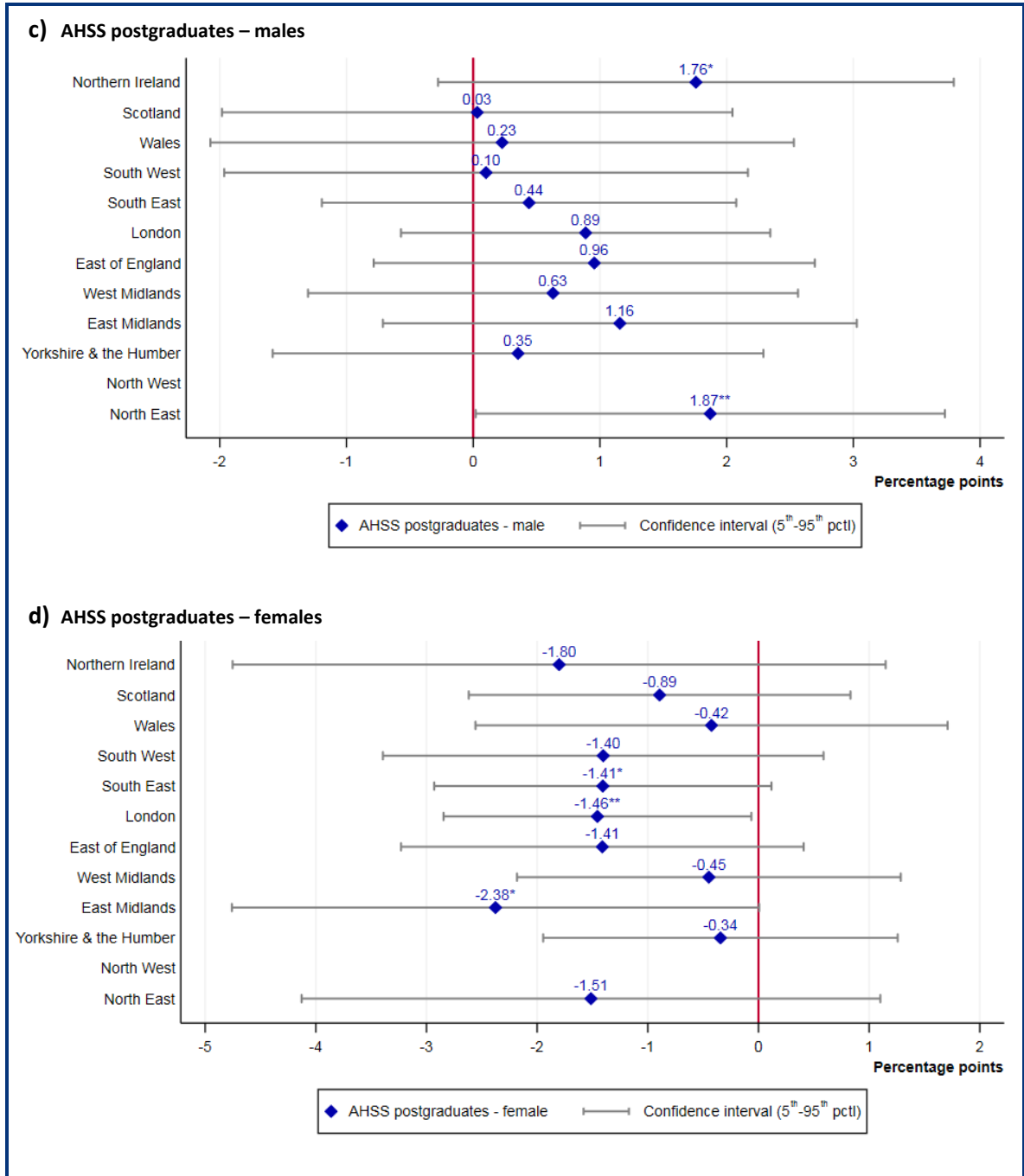
**Figure 23 Effect of region on probability of employment (in pp) – relative to North West England**

**a) AHSS undergraduates – males**



**b) AHSS undergraduates – females**





Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are limited to male/female AHSS undergraduates/postgraduates and are not weighted to represent the entire population. (3) Regression estimates are relative to the base region North West England. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (1998-2017)

## 6 What are the main differences in employment outcomes between different subjects within AHSS?

### 6.1 Methodological approach

In order to investigate any heterogeneity in the employment of AHSS graduates, we **disaggregated the component subject groups** and estimated the labour market outcomes for Arts, Humanities and Social Sciences separately. The subject categories are summarised in Table 3.

**Table 3 Subject categorisation by arts, humanities and social science**

Category	Subjects
Arts	Arts
Humanities	Information Studies, Linguistics, European Languages, Other Languages, Humanities
Social Sciences	Social Sciences, Law, Business & Finance

Source: London Economics

The disaggregated analysis has been conducted on a sample of AHSS graduates only, where the comparison group is always ‘all other AHSS subjects’, and we have estimated the impact of holding a degree in each subject on both the **probability of employment** and on **wages** using a model of the form:

$$Outcome_i = \alpha + \beta Subject_i + \gamma X_i + \varepsilon_i$$

where the term ‘outcome’ refers to either the **probability of employment** (in which case a probit model was utilised) or the **log of the hourly wage** (estimated via an Ordinary Least Squares (OLS) approach). The independent variable is a dummy variable equal to 1 if the individual graduated with a qualification **in the subject category of interest** and 0 if they achieved any other AHSS qualification. The estimate provided by  $\beta$  therefore tells us the **relative advantage** that graduates of a particular AHSS subject category receive in terms of employment outcomes compared to all other AHSS graduates.

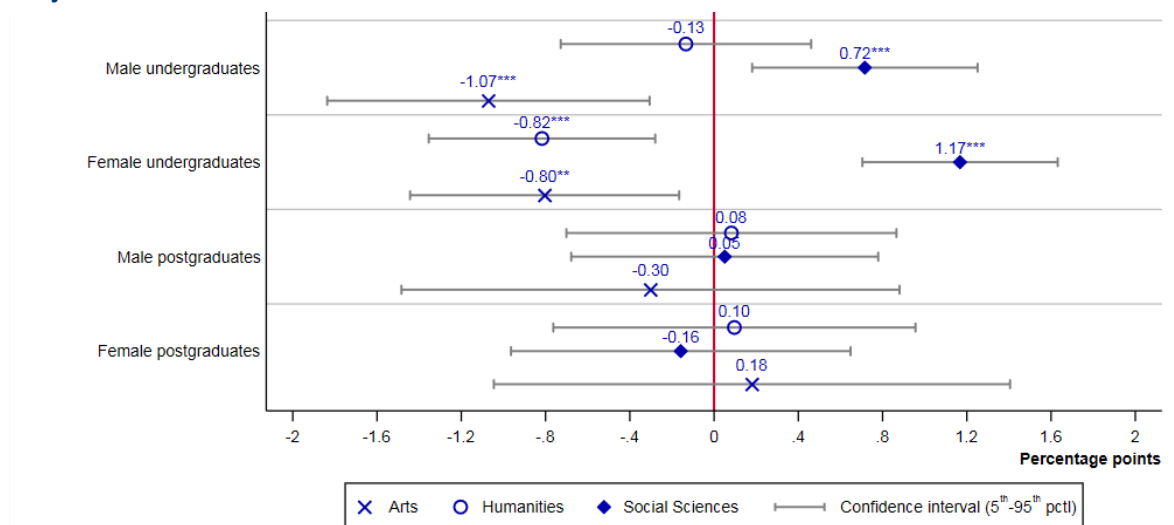
### 6.2 Findings

The estimated impact on the probability of employment for each of the specifications is displayed in Figure 24. For postgraduates of both genders, there is **no statistically significant difference** across the different subjects comprising the ‘AHSS’ group (although the point estimates associated with social sciences are positive – for both male and female postgraduates).

However, at the undergraduate level, **social sciences degree holders are slightly more likely** to be employed than other AHSS undergraduates: the probability of employment is **1.17** percentage points **higher for females** and **0.72** percentage points **higher for male undergraduates**, and these differences **are statistically significant** at the 1% level (although very small in magnitude).

The estimates for **Arts** and for **Humanities** undergraduates are negative (by construction). Within this, although female undergraduate employment returns are comparable between Arts and Humanities (**-0.80** and **-0.82** respectively), there is a clear (but still small) difference in the employment outcomes achieved by men: male undergraduate Arts degree holders are **1.07** percentage points less likely to be employed than other AHSS subjects, while there is no significant result for Humanities graduates.

**Figure 24** Effect of subject on probability of employment (in pp) – relative to all other AHSS subjects



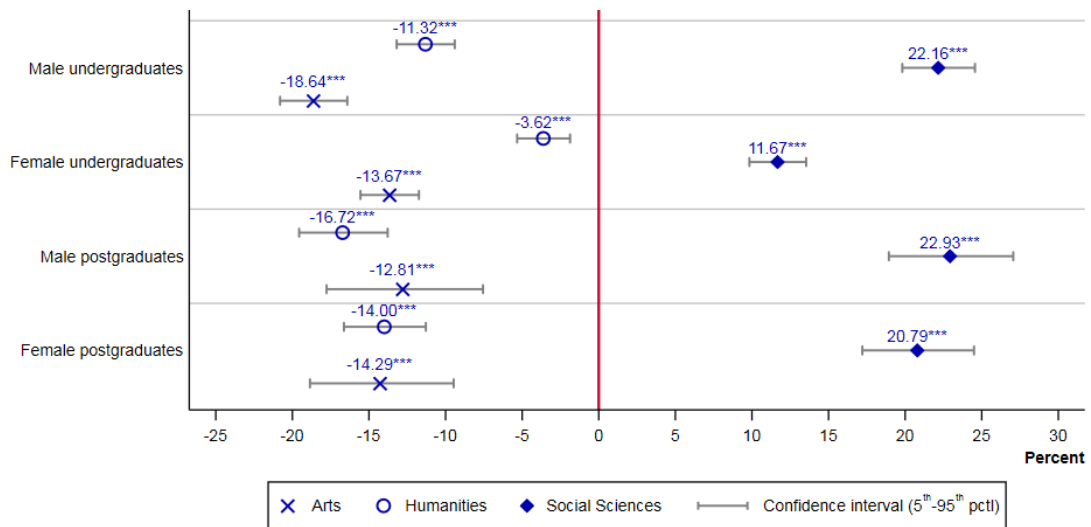
Note: (1) Regression estimates are relative to all other AHSS subjects (e.g. Arts relative to Humanities and Social Sciences). (2) All specifications control for individual characteristics, region and time fixed effects. (3) Observations in the regressions are limited to AHSS graduates only and are not weighted to represent the entire population. (4) Each coefficient refers to a separate regression.

Source: London Economics' analysis of UK Labour Force Survey (1998-2017), ONS (1998-2017)

The wage estimations show similar patterns to the differences exhibited in the previous probability of employment regressions, but are larger in magnitude. Consistent with evidence found by the Institute for Fiscal Studies (2018)<sup>29</sup>, **Social Science graduates** are not only more likely to be employed than **Arts** and **Humanities** graduates, but they also **earn significantly more**. In particular, at undergraduate level, males in possession of undergraduate degrees in Social Sciences register a **22%** per hour wage premium compared to all other AHSS degree holders, while the corresponding estimate for females stands at approximately **12%**. A similar phenomenon is identified at postgraduate level, with males and females achieving a **23%** and **21%** wage premium respectively. This substantial advantage is likely to originate from the fact that the Social Science category is comprised of individuals holding degrees in Law and Business & Finance, which are among the highest earning sectors in the UK economy.

In contrast, **Arts** graduates earn **between 4% and 13% per hour less** than other AHSS graduates at undergraduate level (females and males respectively), while the corresponding estimates for **Humanities** undergraduate degrees standing at **between 14% and 19% per hour less** than other AHSS graduates. Similar wage outcomes are identified for postgraduate qualification in the Arts and Humanities. **Arts** graduates earn **between 14% and 17% per hour less** than other AHSS postgraduates (females and males respectively), while the corresponding estimates for **Humanities** postgraduate degrees stand at **between 13% and 14% per hour less** than other AHSS postgraduates (males and females respectively).

<sup>29</sup> IFS (2018) The impact of undergraduate degrees on early-career earnings. See: [https://www.ifs.org.uk/uploads/publications/comms/DFE\\_returnsHE.pdf](https://www.ifs.org.uk/uploads/publications/comms/DFE_returnsHE.pdf)

**Figure 25** Effect of subject on hourly wages (in %) – relative to all other AHSS subjects

Note: (1) Regression estimates are relative to all other AHSS subjects (e.g. Arts relative to Humanities and Social Sciences). (2) All specifications control for individual characteristics, region and time fixed effects. (3) Observations in the regressions are limited to AHSS graduates only and are not weighted to represent the entire population. (4) Each coefficient refers to a separate regression.

Source: London Economics' analysis of UK Labour Force Survey (1998-2017), ONS (1998-2017)

Importantly, although results found by both the IFS and the Department for Education<sup>30</sup> based on Longitudinal Education Outcomes (LEO) data consistently place AHSS subjects, particularly Arts subjects, at the bottom of the distribution in terms of labour market outcomes, the analysis presented here has a number of benefits over these studies particularly in relation to the dataset used, potentially manifesting in **more robust results**. More specifically, the LEO data suffers from a number of **critical gaps in the data**, including a lack of information on many **personal and family details** and **details about where you are working in the UK and in what industry**. A previous report by London Economics (2018)<sup>31</sup> shows that without this information, the effect of specific qualifications on both the earnings and employment of graduates is **significantly exaggerated**. The LEO data also only covers graduates' earnings and employment in the **early stages of their careers** and provides **incomplete and potentially inaccurate** data on earnings from **self-employment**.

<sup>30</sup> DfE (2018) Graduate outcomes (LEO): Employment and earnings outcomes of higher education graduates by subject studied and graduate characteristics. See: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/690859/SFR15\\_2018\\_Main\\_text.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/690859/SFR15_2018_Main_text.pdf)

<sup>31</sup> London Economics (2018) Understanding the limitations of graduate outcome measures in higher education, A report to GuildHE and the HEAD Trust. See: <https://www.guildhe.ac.uk/wp-content/uploads/2018/09/Understanding-the-limitations-of-graduate-outcome-metrics-in-higher-education-18-09-2018-V2.3.pdf>



## 7 Are AHSS graduates better equipped than non-AHSS graduates or non-graduates for moving between employment sectors or making major career changes?

In order to establish whether AHSS graduates are better equipped for making career changes than STEM graduates or non-graduates, we have looked into four key areas:

- The **likelihood of experiencing a shock to employment**
- **Employment probabilities** following a shock to employment
- Whether voluntary career changes result in a **change in sector or occupation**, and
- Whether **wages** are affected by voluntary career changes

### 7.1 Probability of experiencing a shock to employment

#### Methodology

Prior to analysing the resilience of AHSS graduates following a shock to employment, it is important to establish whether there is a subject-driven difference in the probability of experiencing a shock in the first place. We approached this by implementing a probit model of the form:

$$P(\text{left job})_{i,t} = \alpha + \beta \text{AHSS}_i + \gamma X_i + \varepsilon_i$$

where the independent variable is a binary variable indicating AHSS graduates, while the dependent variable is an indicator for having **left a job in the last three months** (estimated separately for having left voluntarily or having been made redundant). The sample only includes all those who were employed in the previous quarter, and estimations have been undertaken by level and gender for the STEM and non-graduate counterfactuals.

#### Findings

Table 4 shows that there is **little, if any, difference in the probability of being made redundant** across subjects area for most of the specifications. The probability of losing a job by being made redundant is **0.11** percentage points **higher for female AHSS undergraduates** compared to their STEM counterfactual, but it is also **0.06** percentage points **lower for female AHSS postgraduates** compared to all female undergraduates. Despite being relatively small in magnitude, these findings **are statistically significant** at the 1% and 10% level respectively.

**Table 4 Probability of being made redundant (in pp)**

Counterfactual	AHSS undergraduates		AHSS postgraduates	
	Male	Female	Male	Female
STEM graduates	0.01	0.11***	0.05	0.04
Non-graduates	-0.04	0.02	-0.02	-0.06*

Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are not weighted to represent the entire population. (3) The sample of non-graduates consists of A-Levels for undergraduate regressions and undergraduates (all subjects) for postgraduate regressions. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (2001-2017), ONS

When looking at **voluntary job changes only** (as shown in Table 5), **AHSS graduates are more likely to leave their job voluntarily than STEM graduates and non-graduates**. The estimates are similar in magnitude across all specifications and portray a high level of statistical significance in several cases. This result is most notable for women, in particular for female undergraduates. The probability of leaving a job voluntarily is **0.15 percentage points higher for female AHSS undergraduates** compared to their STEM counterfactual, but it is also **0.24 percentage points higher for female AHSS undergraduates** compared to individuals in possession of GCE 'A' levels as their highest qualification. The drivers behind these results have not been investigated, but possible reasons include that AHSS graduates are more willing and able to switch between jobs, or in light of the fact that they might be in possession of more general transferable skills as a result of the qualification, there is less friction in the job market for AHSS graduates.

**Table 5 Probability of leaving job voluntarily (in pp)**

Counterfactual	AHSS undergraduates		AHSS postgraduates	
	Male	Female	Male	Female
STEM	0.06	0.15***	0.08	0.12*
Non-graduates	0.12***	0.24***	0.06	0.01

Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are not weighted to represent the entire population. (3) The sample of non-graduates consists of A-levels for undergraduate regressions and of undergraduates (all subjects) for postgraduate regressions. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (2001-2017), ONS

## 7.2 Probability of employment after having been made redundant

### Methodology

For individuals who voluntarily leave their job, it is likely that a significant proportion do so having found alternative employment (although some may take a voluntary break from employment). As such, following a voluntary separation, we would expect the proportion of those in employment to be quite high in the twelve-month window observable using the panel component of the Labour Force Survey. Consequently, we estimated employment probabilities only for those **individuals who involuntarily leave their job** (e.g. having been made redundant) via a probit model:

$$P(\text{employment})_{i,t} = \alpha + \beta \text{AHSS}_i + \gamma X_i + \varepsilon_i$$

where the sample is restricted to individuals who were made redundant in the preceding quarter, and the dummy variable 'AHSS' is equal to 1 for AHSS graduates and 0 for non-AHSS graduates. The dependent variable is the **probability of being employed in the quarter immediately after the job loss**, and  $X_i$  is a vector of control variables. The analysis has been run for AHSS undergraduates and AHSS postgraduates separately, using both the STEM and non-graduate comparison groups. In addition, to take into consideration potential differences by gender, the analysis was conducted for males and females separately.

### Findings

Table 6 shows that AHSS graduates are **less likely to have taken up employment** within the three months **after having been made redundant** compared to STEM graduates. The difference appears to be largest for **female undergraduates** with a difference of **11.8 percentage points**, and this is the only estimate which is statistically significant when using STEM as counterfactual.

Comparing AHSS undergraduates with A-level achievers, and AHSS postgraduates with all undergraduates (independent of subject), the econometric results indicate that male AHSS graduates have a strong advantage in terms of employability after having been made redundant compared to their non-graduate counterparts: men in possession of an AHSS undergraduate degrees are approximately **12 percentage points more likely to be employed** than men in possession of A levels (which is statistically significant at the 5% level). Men in possession of an AHSS postgraduate degrees are also approximately **12 percentage points more likely to be employed** than men in possession of undergraduate degrees (which is statistically significant at the 10% level).

In contrast, **female AHSS** graduates' likelihood of employment is **not statistically significantly different** from that of **non-graduates**. A possible factor influencing this outcome might be that fact that 'not employed' consists of both unemployed and economically inactive individuals<sup>32</sup>. Hence, female AHSS graduates might instead be more likely to become inactive rather than unemployed.

**Table 6 Probability of employment after having been made redundant (in pp)**

Counterfactual	AHSS undergraduates		AHSS postgraduates	
	Male	Female	Male	Female
STEM graduates	0.04	-11.80*	-10.99	---
Non-graduates	12.44**	0.29	12.47*	-4.80

Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are not weighted to represent the entire population. (3) The sample of non-graduates consists of A-levels for undergraduate regressions and of undergraduates (all subjects) for postgraduate regressions. (4) The model could not be estimated for female postgraduates due to too few observations. (5) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (2001-2017), ONS

### 7.3 Probability of changing sector and occupational role after changing jobs voluntarily

#### Methodology

For those who leave their job **voluntarily**, we have investigated whether this corresponds with a **change in sector or occupational role**. Implementing a probit model, controlling for a variety of observable characteristics and using the same AHSS dummy variable, we have estimated the following model:

$$P(\text{change})_{i,t} = \alpha + \beta \text{AHSS}_i + \gamma X_i + \varepsilon_i$$

where the probability of a career change (the dependent variable) corresponds to either a change in sector or a change in occupational role, in a sample restricted to individuals who left their job voluntarily in the preceding quarter. As for the other strands of the analysis, this model has been estimated for undergraduates and postgraduates, and males and females, separately and using both the STEM and non-graduate counterfactuals.

#### Findings

The results presented in Table 7 suggest that **AHSS graduates are less likely to change sector** after leaving their job voluntarily than non-graduates. All estimates using this counterfactual are negative and stand at between **3 and 4 percentage points** for female undergraduates and postgraduates

<sup>32</sup> It was not possible to exclude inactive due to small sample size.

## 7 | Are AHSS graduates better equipped than non-AHSS graduates or non-graduates for moving between employment sectors or making major career changes?

respectively. However, in all cases the estimates were not statistically significantly different from zero. The corresponding estimates for male AHSS undergraduate and postgraduates were **2 percentage points** and **1 percentage point** respectively (again not statistically significant).

**Table 7 Probability of changing sector after changing jobs voluntarily (in pp)**

Counterfactual	AHSS undergraduates		AHSS postgraduates	
	Male	Female	Male	Female
STEM graduates	-0.59	1.00	3.50	---
Non-graduates	-1.93	-3.32	-0.99	-3.71

Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are not weighted to represent the entire population. (3) The sample of non-graduates consists of A-levels for undergraduate regressions and of undergraduates (all subjects) for postgraduate regressions. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (2001-2017), ONS

According to Table 8, after leaving their job voluntarily, AHSS graduates appear to have a higher probability of changing occupational role. In particular, **male AHSS postgraduates** are approximately **13 percentage points more likely to change occupation** than male STEM postgraduates (significant at the 5% level), and approximately **4 percentage points more likely to change occupation** than male STEM undergraduates (though not statistically significant).

**Table 8 Probability of changing occupational role after changing jobs voluntarily (in pp)**

Counterfactual	AHSS undergraduates		AHSS postgraduates	
	Male	Female	Male	Female
STEM graduates	3.85	-0.51	13.43**	---
Non-graduates	-1.31	0.78	1.40	2.12

Note: (1) All specifications control for individual characteristics, region and time fixed effects. (2) Observations in the regressions are not weighted to represent the entire population. (3) The sample of non-graduates consists of A-levels for undergraduate regressions and of undergraduates (all subjects) for postgraduate regressions. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: London Economics' analysis of UK Labour Force Survey (2001-2017), ONS

### 7.4 Impact of a job change on wages after changing jobs voluntarily

#### Methodology

As an additional step to capture whether AHSS graduates are better equipped to undertake major career changes, we also investigated whether **wage differentials** between those who change careers (voluntarily) and those who remain with the same employer are different between AHSS graduates and STEM graduates by utilising a **difference-in-difference-in-differences model** (also known as a **triple differences** model). A detailed explanation of this methodology is provided in Annex A3.1.

In the triple difference model, we **compared AHSS to STEM graduates** and looked at individuals' wages at two different points in time. More specifically, as a first step we take the difference in earnings for AHSS graduates that have changed jobs by measuring their hourly wage both before and after the move (**difference one**). We also take the difference in earnings at the same points in time for AHSS graduates who have not changed jobs – the assumption being that this is the earnings growth that would have occurred for those who changed jobs had they not changed jobs – and take this away from difference one (**difference-in-difference**). Finally, we undertake the same exercise for STEM graduates, and subtract this from the difference-in-difference (**difference-in-difference-**

**in-difference**). The resulting estimate isolates the effect on wages of a job change for AHSS graduates compared to STEM graduates.

## Findings

Table 9 illustrates the extent to which the change in wages following a job change differs between AHSS and STEM graduates. This analysis only illustrates the additional effect for AHSS graduates over and above changes in STEM graduates' wages but does not indicate whether individuals' overall salary is higher or lower after leaving their job voluntarily.

Considering male undergraduates, the change in **wages associated with changing jobs is 2.33% higher for AHSS graduates** than for STEM graduates. The positive coefficients for male AHSS graduates suggest that they are more able to **mitigate potential wage losses or extend potential wage gains** compared to their STEM counterparts following a voluntary job change. However, the **estimates for female AHSS graduates are negative**, meaning that following a voluntary job change, any wage losses would be larger and any wage gains would be smaller than for female STEM graduates. However, in all cases the estimates are **not statistically significant**: the impact of voluntary job change on wages is not statistically different for AHSS and STEM graduates. Comparable outcomes are identified for individuals in possession of postgraduate qualifications in AHSS.

**Table 9 Additional impact of job changes on wages (in %) for AHSS (compared to STEM) graduates**

	Male	Female
<b>Undergraduates</b>	2.33	-3.78
<b>Postgraduates</b>	1.30	-4.06

Note: (1) Hourly pay is adjusted for inflation using the Consumer Price Index (CPI), where the base year is December 2017. (2) All specifications control for individual and firm characteristics, region and time fixed effects. (3) Observations in the regressions are not weighted to represent the entire population. (4) Asterisks indicate level of significance: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Source: *London Economics' analysis of UK Labour Force Survey (1998-2017), ONS (1998-2017), ONS*

The regressions investigating job transitions have shown that **AHSS graduates are very dynamic** compared to STEM graduates or non-graduates. There is strong evidence suggesting that AHSS graduates are **more likely to change their job voluntarily**, while most do **not show any differences in the probability of being made redundant**. Only female AHSS undergraduates are more likely to be made redundant and have a lower likelihood of finding a job following an employment shock. AHSS graduates choosing to leave their job voluntarily also exhibit a **higher probability of changing their occupation** and **staying in the same sector**. These findings indicate the ability to move freely between jobs.

At the same time, many of the results differ by gender and by level, indicating a large degree of **heterogeneity within AHSS graduates**. This becomes evident, for example, in the fact that the **impact of changing jobs on wages is more beneficial for male AHSS graduates** compared to STEM graduates but **more unfavourable for female AHSS graduates**.

## 8 Conclusions

Comprising almost half of the university students in the United Kingdom, Arts Humanities and Social Science (AHSS) graduates are a **core focus for the British Academy’s objective of promoting the public value of the humanities and social sciences**. To this end, the **Flagship Skills Project (FSP)**, which began in January 2017, aims to articulate the skills that are inherent to the study of AHSS. This analysis plays a key role in understanding their labour market outcomes.

Based on trends in the **sectoral and occupational destinations** of AHSS undergraduates and postgraduates over the last 20 years, the analysis identified that:

- AHSS and STEM graduates have **very similar employment rates** (both undergraduate and postgraduate level), meaning that both sets of graduates are as employable as each other.
- There has been a clear shift over time in the sector of employment. The proportion of AHSS undergraduates employed in **Manufacturing, Banking, Finance & Insurance** has declined. At the same time, there has been an increase in employment in **Public Administration, Education & Health** and **Distribution, Hotel & Restaurant** sectors. These trends have been mirrored at the postgraduate level.
- AHSS graduates at both levels comprise a decreasing proportion of the most senior roles: a decline in **Managerial and Senior Official roles** amongst STEM and AHSS undergraduates has resulted in a shift towards **Professional occupations** for **STEM undergraduates** but only to **Associate Professional & Technical roles** for **AHSS undergraduates**.
- The trend in the average gross hourly pay of graduates at each qualification level over the time period has tracked that of the economic cycle; however, more generally, the average gross hourly pay earned by AHSS graduates is **consistently below** that of STEM graduates for all years at undergraduate level and for the majority of years at postgraduate level. Nevertheless, there is (unsurprisingly) **significant variation** within Arts, Humanities and Social Sciences.
- At the postgraduate level, the wage distribution of AHSS degree holders has **more variation** compared to STEM postgraduate wages.

Considering the relationship between the employment outcomes achieved by AHSS graduates following **changes in economic growth**, the analysis suggests that:

- In general, the results were **not statistically significant**, meaning that **AHSS graduates** (at both the undergraduate and postgraduate level) **do not have significantly different outcomes to STEM graduates** as economic growth expanded or contracted.

In terms of **job separations**:

- There is **little, if any, difference in the probability of being made redundant** by subject area; however, **AHSS graduates are more likely to change sector and role voluntarily** than STEM graduates, and **without wage penalty**, suggesting **greater flexibility, and soft skills (and as a result, choice)** to thrive in different industries and roles.
- Despite this, **AHSS graduates are less likely to have taken up employment** within the three months **after having been made redundant** compared to STEM graduates.
- After leaving their job voluntarily, **male AHSS postgraduates** are approximately **13 percentage points more likely to change occupation** than male STEM postgraduates.

---

## What does this mean?

The analysis presented illustrates that the labour market outcomes achieved by AHSS graduates are similar to those achieved by STEM graduates – both in terms of employment and earnings. However, importantly, the analysis appears to indicate that the **choices** and **opportunities** available to AHSS qualifications holders (as a result of the wider set of skills that might have been developed as part of the qualification) might offer greater **flexibility** over the longer term compared to STEM graduates – in terms of occupation, role and industry.

The United Kingdom is facing **unparalleled economic uncertainty**. The short-term consequences of the decision of the United Kingdom to leave the European Union will result in an **economic slowdown** compared to what otherwise might have happened, and which might be expected to last at least a decade. With this in mind, it is imperative that the UK labour market is **sufficiently agile** to face the challenges presented. In this sense, agility means both being **resilient to changing economic circumstances**, but also **sufficiently adaptable to profit from new and emerging opportunities** that may present themselves. The availability of a highly qualified and versatile labour force should not be underestimated, and AHSS graduates are central to this ongoing and long-term requirement.

However, to understand the labour market success of AHSS graduates, there are still many questions that require further research. In particular, what are the **inherent characteristics** of AHSS graduates and what are the **core skills** that AHSS graduates acquire as part of their degrees that result in these identified labour market outcomes? Furthermore, what skills do AHSS graduates possess, and make use of as part of their jobs, that are **most valued by employers**? Finally, given the positive outcomes achieved by AHSS graduates in the labour market, what might be the impact on AHSS **higher education enrolments** if there are changes to the **higher education tuition fees** and **student support arrangements**, and what might be the impact on the **versatility** and **responsiveness** of the UK economy?

## Index of Tables, Figures and Boxes

### Tables

Table 1	Classification of subjects	11
Table 2	Employment activity by qualification level, subject category, gender and quarter of the survey (1997q3, 2007q3, 2017q3)	15
Table 3	Subject categorisation by arts, humanities and social science	44
Table 4	Probability of being made redundant (in pp)	47
Table 5	Probability of leaving job voluntarily (in pp)	48
Table 6	Probability of employment after having been made redundant (in pp)	49
Table 7	Probability of changing sector after changing jobs voluntarily (in pp)	50
Table 8	Probability of changing occupational role after changing jobs voluntarily (in pp)	50
Table 9	Additional impact of job changes on wages (in %) for AHSS (compared to STEM) graduates	51
Table 10	Sample restrictions by section	58
Table 11	Definition of treatment and counterfactual groups used in the econometric analysis	59
Table 12	Regression specifications - overview	67
Table 13	Interpretation of regression coefficients	69

### Figure

Figure 1	Structure of the Labour Force Survey	9
Figure 2	Sample size by year of the survey, total and as percentage of raw LFS	10
Figure 3	Average age of the sample, by year of the survey, qualification level and subject category (based on 499,240 observations)	12
Figure 4	Gender of the sample, by year of the survey, qualification level and subject category (based on 499,240 observations)	13
Figure 5	Ethnicity of the sample, by year of the survey, qualification level and subject category (based on 493,496 observations)	14
Figure 6	Economic activity of undergraduates, by year of the survey, subject category and gender	16
Figure 7	Difference in rate of employment (AHSS undergraduates minus STEM undergraduates), by year of the survey and gender	17



Figure 8	Economic activity of postgraduates, by year of the survey, subject category and gender	19
Figure 9	Difference in rate of employment (AHSS postgraduates minus STEM postgraduates), by year of the survey and gender	20
Figure 10	Proportion of undergraduates by year of the survey, subject category and gender	22
Figure 11	Changes in the proportion of AHSS undergraduates by subject and gender (1997, 2007, 2017)	23
Figure 12	Proportion of postgraduates by year of the survey, subject category and gender	25
Figure 13	Changes in the proportion of AHSS postgraduates by subject and gender (1997, 2007, 2017)	26
Figure 14	Sector of employment of undergraduates by subject area (1997, 2007, 2017)	28
Figure 15	Sector of employment of postgraduates by subject area (1997, 2007, 2017)	29
Figure 16	Occupation of employment of undergraduates by subject area (1997, 2007, 2017)	31
Figure 17	Occupation of employment of postgraduates by subject area (1997, 2007, 2017)	32
Figure 18	Average gross hourly pay by qualification level, subject area and year of the survey (1997-2017)	34
Figure 19	Mean, median and interquartile range of gross hourly pay by qualification level, subject area and year of the survey (1999, 2002, 2005, 2008, 2011, 2014, 2017)	35
Figure 20	Region of residence in 2017, by qualification level and subject area	36
Figure 21	Effect of a one percent change in GDP on probability of employment (in pp)	39
Figure 22	Effect of a one percent change in GDP on probability of employment (in pp)	40
Figure 23	Effect of region on probability of employment (in pp) – relative to North West England	42
Figure 24	Effect of subject on probability of employment (in pp) – relative to all other AHSS subjects	45
Figure 25	Effect of subject on hourly wages (in %) – relative to all other AHSS subjects	46
Figure 26	Demographic characteristics of the sample, by year of the survey, qualification level and subject area	61
Figure 27	Economic activity of AHSS undergraduates and non-graduates, by year of the survey and gender	62
Figure 28	Difference in rate of employment (AHSS undergraduates minus non-graduates), by year of the survey and gender	62

Figure 29	Economic activity of AHSS postgraduates and all undergraduates, by year of the survey and gender	63
Figure 30	Difference in rate of employment (AHSS postgraduates minus all undergraduates), by year of the survey and gender	63
Figure 31	Sector of employment of AHSS undergraduates and non-graduates (1997, 2007, 2017)	64
Figure 32	Sector of employment of AHSS postgraduates and all undergraduates (1997, 2007, 2017)	64
Figure 33	Occupation of employment of AHSS undergraduates and non-graduates (1997, 2007, 2017)	65
Figure 34	Occupation of employment of AHSS postgraduates and all undergraduates (1997, 2007, 2017)	65
Figure 35	Mean, median and interquartile range gross hourly pay by qualification level and year of the survey (1999, 2002, 2005, 2008, 2011, 2014, 2017)	66
Figure 36	Average gross hourly pay by qualification level and year of the survey (1997-2017)	66
Figure 37	Difference-in-differences analysis for AHSS graduates	68
Figure 38	Resilience to changes in the economy – STEM counterfactual – Undergraduates	70
Figure 39	Resilience to changes in the economy – STEM counterfactual – Postgraduates	71
Figure 40	Resilience to changes in the economy – Non-graduate counterfactual – Undergraduates	72
Figure 41	Resilience to changes in the economy – Non-graduate counterfactual – Postgraduates	73
Figure 42	Regional differences within AHSS	74
Figure 43	Differences by subject within AHSS – Employment – Undergraduates	75
Figure 44	Differences by subject within AHSS – Employment – Postgraduates	76
Figure 45	Differences by subject within AHSS – Wage – Undergraduates	77
Figure 46	Differences by subject within AHSS – Wage – Postgraduates	78

## **ANNEXES**

## Annex 1 Data and sample selection

In Section 2.1, we outlined the limitations that we applied to the sample in order to focus on observations of interest. This resulted in a dataset including only:

- **undergraduates, postgraduates** (with subject information) and individuals with 2 or more **A-levels (or equivalent)**;
- individuals aged **21 to 65** at the time of the survey; and
- observations with a reported **gross hourly pay** of **between £1 and £100** (or **missing** wage information).

In addition to these limitations, there are further restrictions that differ between sections of the report. These are presented in Table 10.

**Table 10 Sample restrictions by section**

Section	Data structure	Years	Waves	Observations weighted
Descriptive analysis (Section 3)	Repeated cross-section	1997-2017	All waves	Yes
Econometric analysis (Sections 4, 5, 6)	Repeated cross-section	1998-2017	Wave 1	No
Econometric analysis (Section 0)	Panel	2001*-2017	All waves (waves 1 and 5 only for wage regressions)	No

Note: \*Given that the person identifier is not available for the period 1997-2000, these years have been excluded for this strand of the analysis.

Source: *London Economics*

As described in Section 2, the Labour Force Survey interviews respondents once every quarter for **five consecutive quarters (known as waves)** on a rolling basis. Thus, each quarter includes responses from five different waves, with a fifth of the sample being replaced in each quarter (as they complete their fifth interview). The descriptive analysis draws on **all five waves**, and observations are weighted in each quarter such that the descriptive statistics are **representative of the entire population**.

Most regressions in the **econometric analyses** (Sections 4, 5 and 6) are undertaken on samples retaining **wave 1 responses only**<sup>33</sup>. This limitation has been adopted since the **non-secure version** of the LFS does not provide the identifiers necessary to link households' responses across waves, such that individuals appear more than once in a given year and it is not possible to make use of the panel component of the survey. Hence the data can only be treated as a repeated cross-section, and it is not possible to weight the observations: the weights are calculated by the LFS for each quarter, but in order to obtain sufficient sample size for the econometric analysis it is necessary to aggregate observations into each year, upon which quarterly weights cannot be applied. For this reason, the results derived from the **econometric analyses are unweighted** and, therefore, not representative of the entire population. Furthermore, the econometric analysis was restricted to the years from 1998 Q2 to 2017 Q4 due to the lack of availability of fundamental control variables that did not extend beyond this period. In addition, the quarters 1997 Q1, 1997 Q2, 1998 Q1, 2004 Q1, 2005 Q1 had to be excluded from the descriptive and econometric analysis because some control variables and variables on individuals' qualification do not exist or are not populated in these datasets.

<sup>33</sup> This is a standard approach in the academic literature using the Labour Force Survey and guarantees that observations in the sample are mutually independent.

Only the analysis in Section 0 has been undertaken with the **secure data** version within the Office for National Statistics (ONS) and can, hence, be treated as a **panel dataset** by including **all waves**<sup>34</sup>. Furthermore, the **wage regressions** are limited to the **first and fifth wave responses** only in Section 7.4 because wage information is only collected from respondents at these points.

## A1.1 Treatment and counterfactual groups

In total, the analysis considers **two levels of qualifications** - **AHSS undergraduate degrees** and **AHSS postgraduate degrees**. The definition of **undergraduate degree** used here is limited to **first degree** and does not extend to foundation degrees or other undergraduate level qualifications<sup>35</sup>. **Postgraduate degrees** include both **masters** and **doctorates**.

Throughout this study, the labour market performance of AHSS qualifications is assessed using **two different counterfactuals**:

- **STEM counterfactual**: this group is formed of individuals in possession of a STEM qualification at the same level as the AHSS group under consideration (as their highest qualification);
- **Non-graduate counterfactual**: this group is formed of individuals in possession of a qualification immediately below the qualification under consideration (as their highest qualification).

A detailed definition of treatment groups and corresponding counterfactuals in terms of highest academic and vocational qualifications is provided in Table 11. The grouping of subjects into the categories AHSS, STEM and Other can be found in Section 2.2.

**Table 11** Definition of treatment and counterfactual groups used in the econometric analysis

Level	Highest academic qualification	Highest vocational qualification	Counterfactual		
			Counterfactual	Highest academic qualification	Highest vocational qualification
AHSS postgraduates	Master or Doctorate (AHSS subject)	NVQ Level 3 (and equivalent) or below	STEM postgraduates	Master or Doctorate (STEM subject)	NVQ Level 3 (and equivalent) or below
			Non-graduates	First degree on this level (ANY subject)	NVQ Level 3 (and equivalent) or below
AHSS undergraduates	First degree at this level* (AHSS subject)	NVQ Level 3 (and equivalent) or below	STEM undergraduates	First degree on this level* (STEM subject only)	NVQ Level 3 (and equivalent) or below
			Non-graduates	2 or more A-levels	NVQ Level 3 (and equivalent) or below

Note: \*Individuals in possession of more than one degree at undergraduate level were not included.

Source: *London Economics*

<sup>34</sup> It should be noted that the panel structure has been used to identify how individuals' characteristics (i.e. employment status, type of occupation, economic sector etc.) have changed over time. However, in order to ensure that sampled observations are mutually independent, the same individual has been included only once in the regression sample.

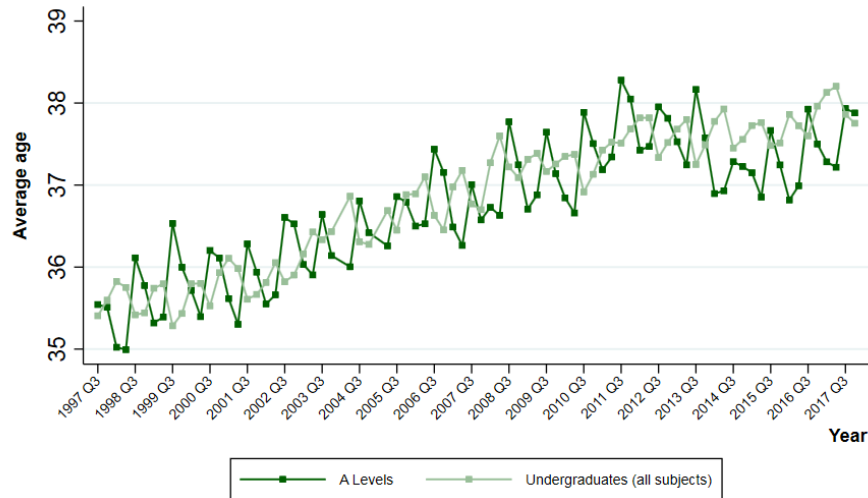
<sup>35</sup> Throughout this study, individuals are classified according to their highest attained qualification, irrespective of potential participation to higher education programmes when the survey was undertaken. To take an example, a respondent in possession of an undergraduate degree studying at postgraduate level will be classified as undergraduate.

## Annex 2 Descriptive analysis (non-graduate counterfactual)

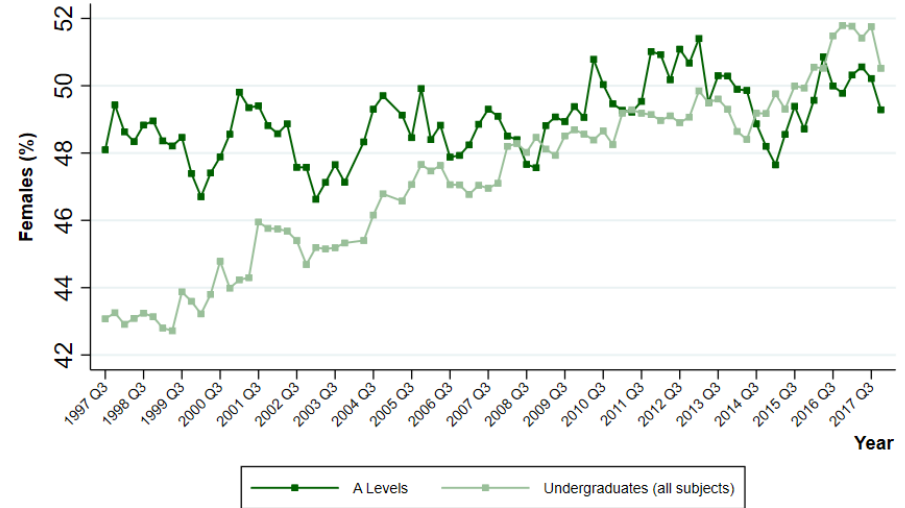
Throughout the study, the performance of AHSS qualifications was assessed compared to two alternative counterfactuals: those in possession of **STEM** qualifications at the same level, and **non-graduates** of the level of interest (where non-graduates means all those whose highest level of achievement is A-levels when looking at AHSS undergraduates, and all undergraduates irrespective of subject when evaluating AHSS postgraduates). Whereas the descriptive analysis presented in Section 3 provides a comparison between AHSS and STEM graduates only, we present in this section a descriptive analysis of the differences in demographic and labour market characteristics of AHSS undergraduates and postgraduates compared to the corresponding non-graduate counterfactual.

**Figure 26 Demographic characteristics of the sample, by year of the survey, qualification level and subject area**

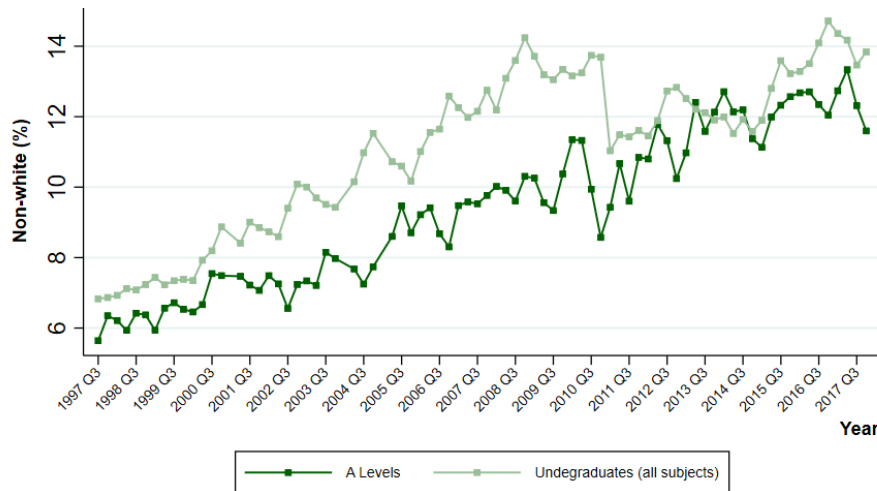
**a) Average age (based on 782,441 observations)**



**b) Gender (based on 782,441 observations)**



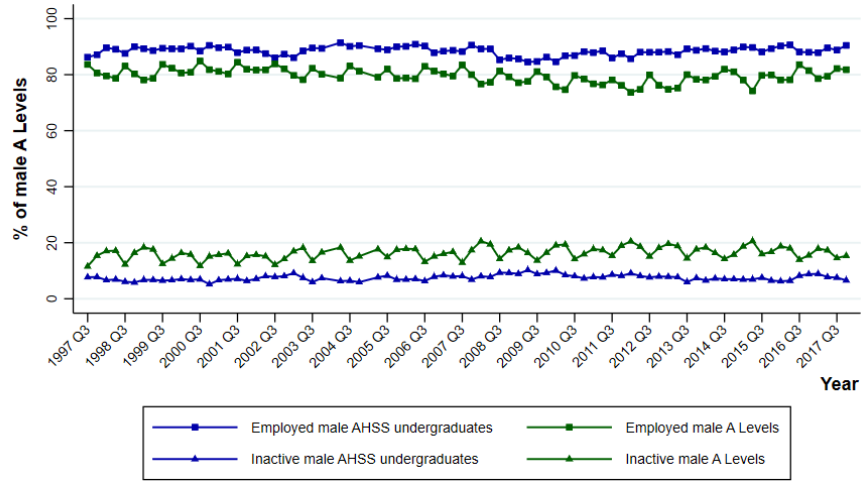
**c) Ethnicity (based on 771,252 observations)**



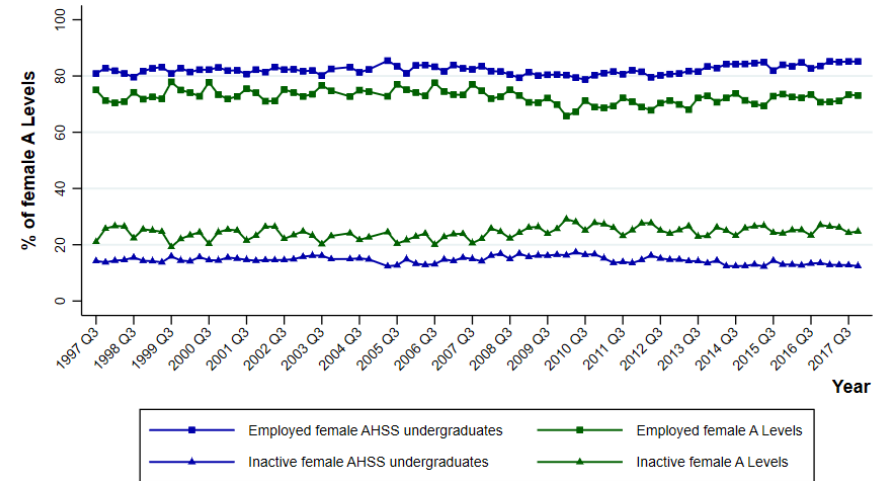
Note: Sample consists of undergraduates with a single subject degree or two or more A-levels. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures don't include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals/ qualification not appearing in the datasets. *Source: London Economics' analysis of UK Labour Force Survey (1997-2017)*

**Figure 27 Economic activity of AHSS undergraduates and non-graduates, by year of the survey and gender**

**a) Males (based on 231,634 observations)**

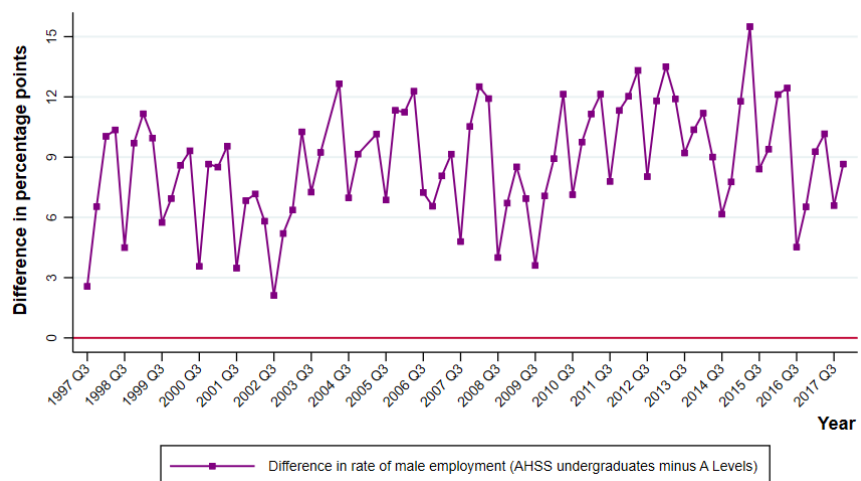


**b) Females (based on 252,454 observations)**

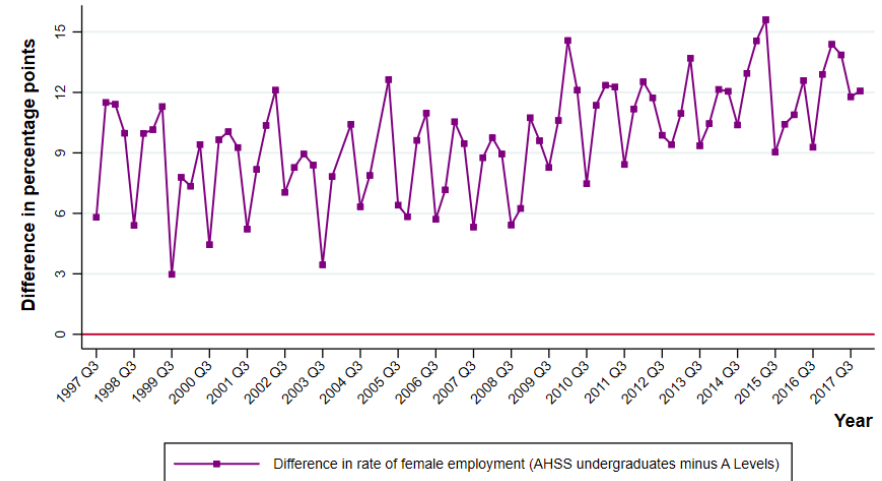


**Figure 28 Difference in rate of employment (AHSS undergraduates minus non-graduates), by year of the survey and gender**

**a) Males (based on 231,634 observations)**



**b) Females (based on 252,454 observations)**

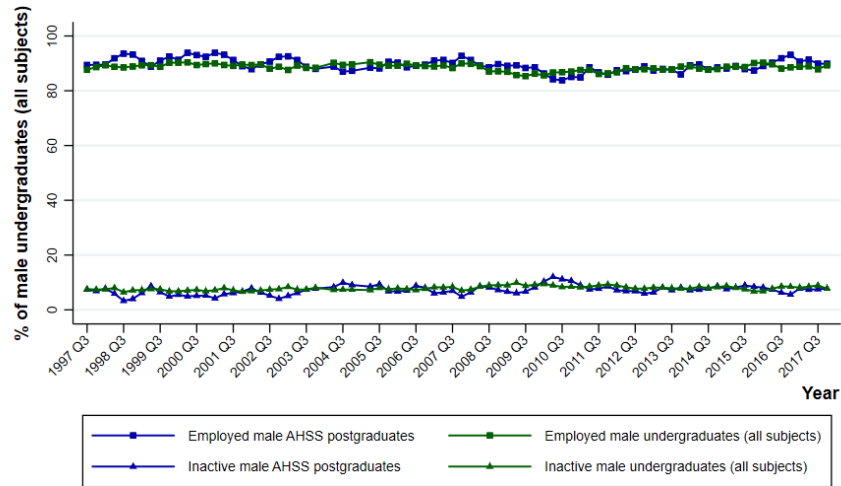


Note: The remaining shares in panel a) and b) of Figure 27 is unemployed according to the ILO standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. **Source: London Economics' analysis of UK Labour Force Survey (1997-2017)**

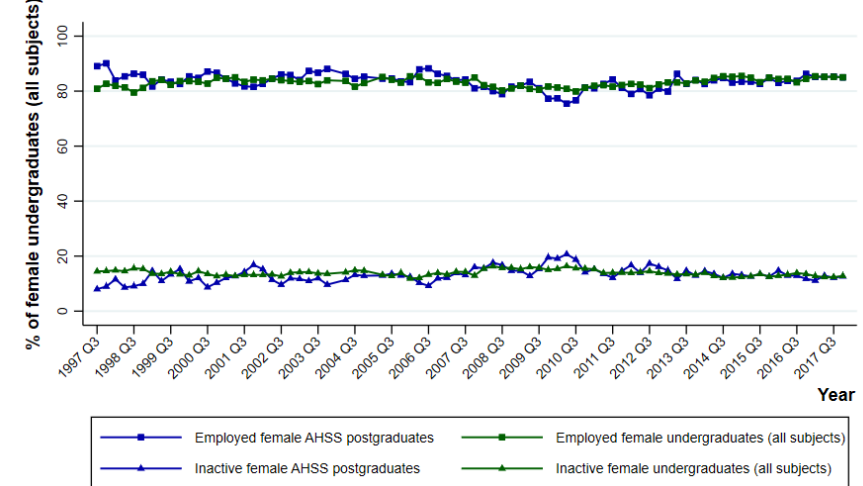


**Figure 29 Economic activity of AHSS postgraduates and all undergraduates, by year of the survey and gender**

**a) Males (based on 284,248 observations)**

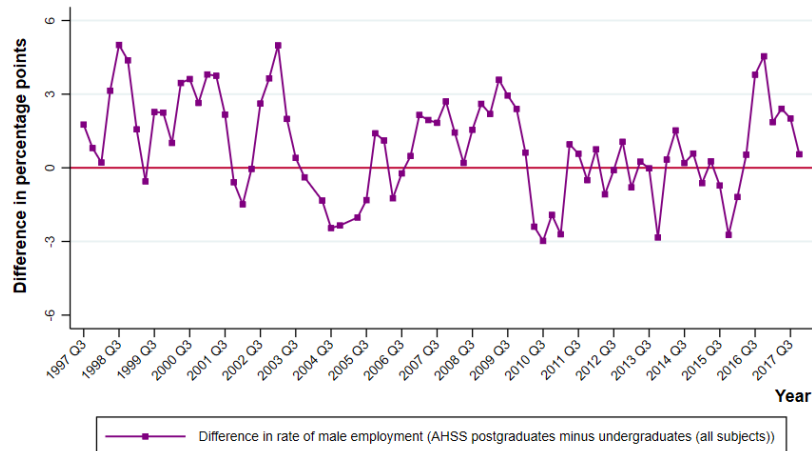


**b) Females (based on 273,742 observations)**

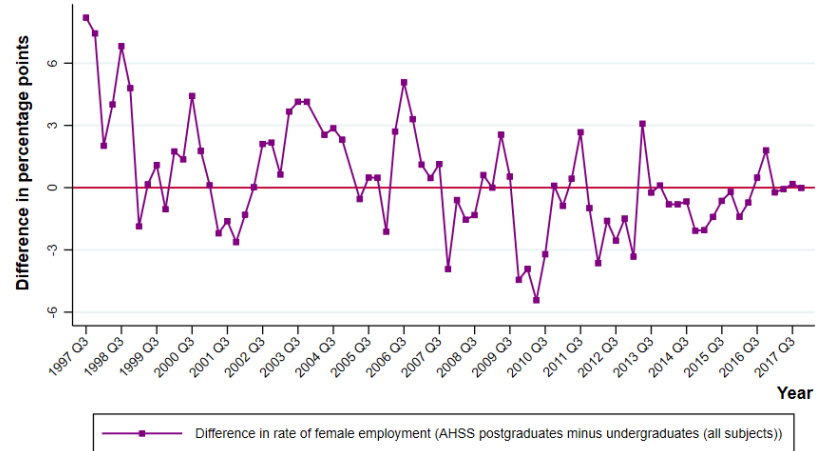


**Figure 30 Difference in rate of employment (AHSS postgraduates minus all undergraduates), by year of the survey and gender**

**a) Males (based on 284,248 observations)**



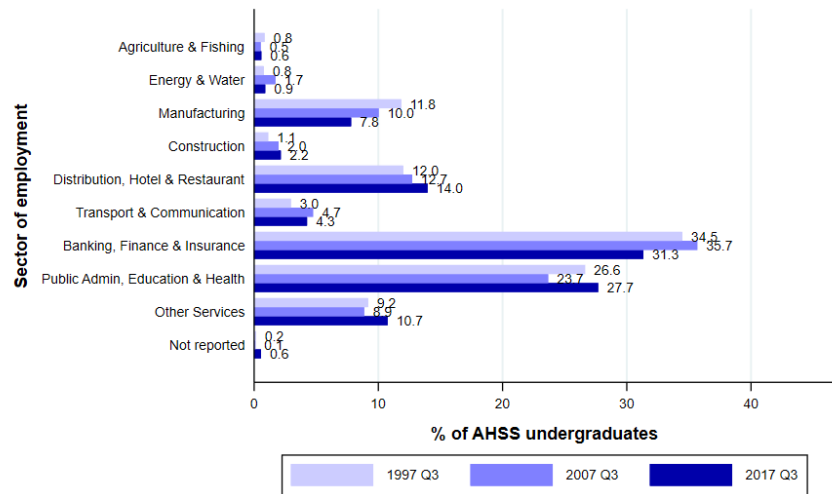
**b) Females (based on 273,742 observations)**



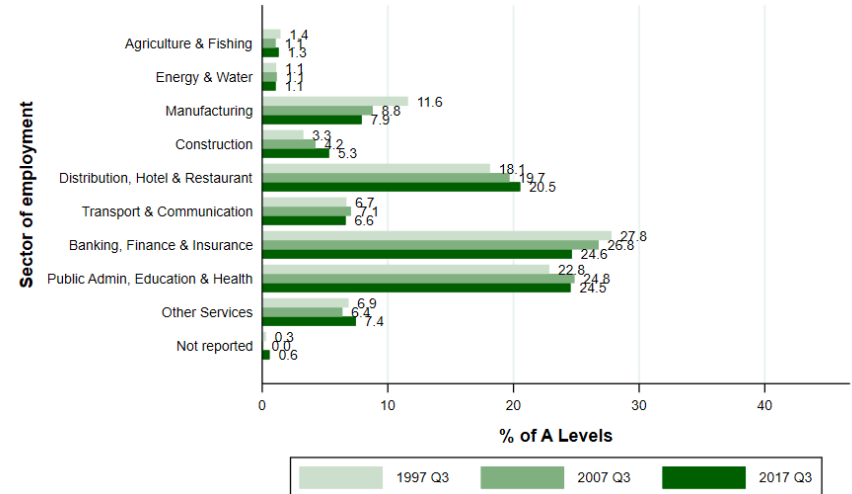
Note: The remaining shares in panel a) and b) of Figure 27 is unemployed according to the ILO standard definition. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all quarters and all waves of the UK Labour Force Survey in the reported years. Figures do not include observations from the first two quarters in 1997 and the first quarter in 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. **Source: London Economics' analysis of UK Labour Force Survey (1997-2017)**

**Figure 31 Sector of employment of AHSS undergraduates and non-graduates (1997, 2007, 2017)**

**a) AHSS undergraduates (based on 6,199 observations)**

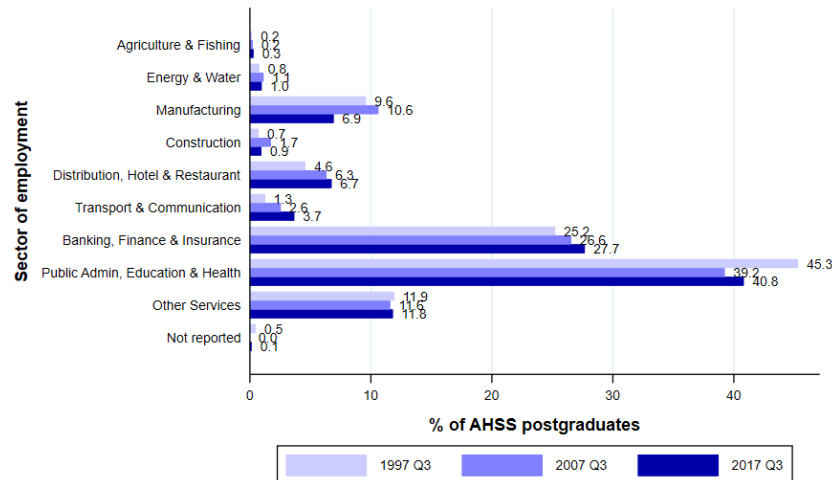


**b) Non-graduates (based on 8,368 observations)**

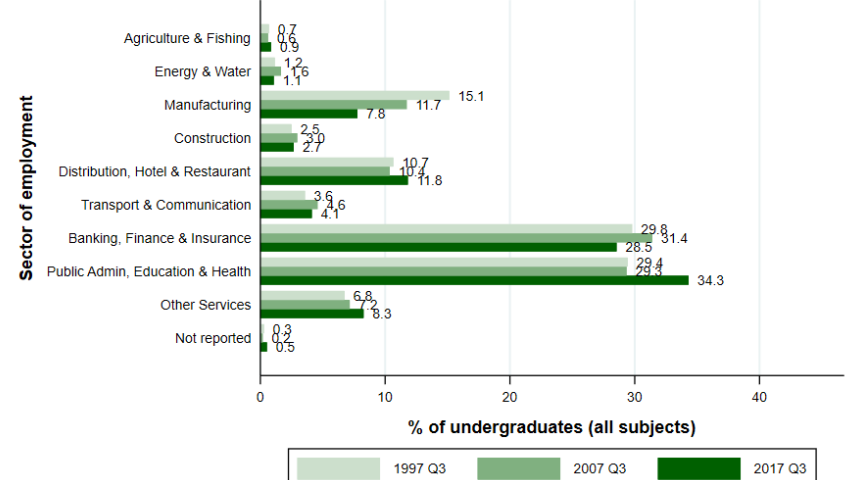


**Figure 32 Sector of employment of AHSS postgraduates and all undergraduates (1997, 2007, 2017)**

**a) AHSS postgraduates (based on 2,189 observations)**

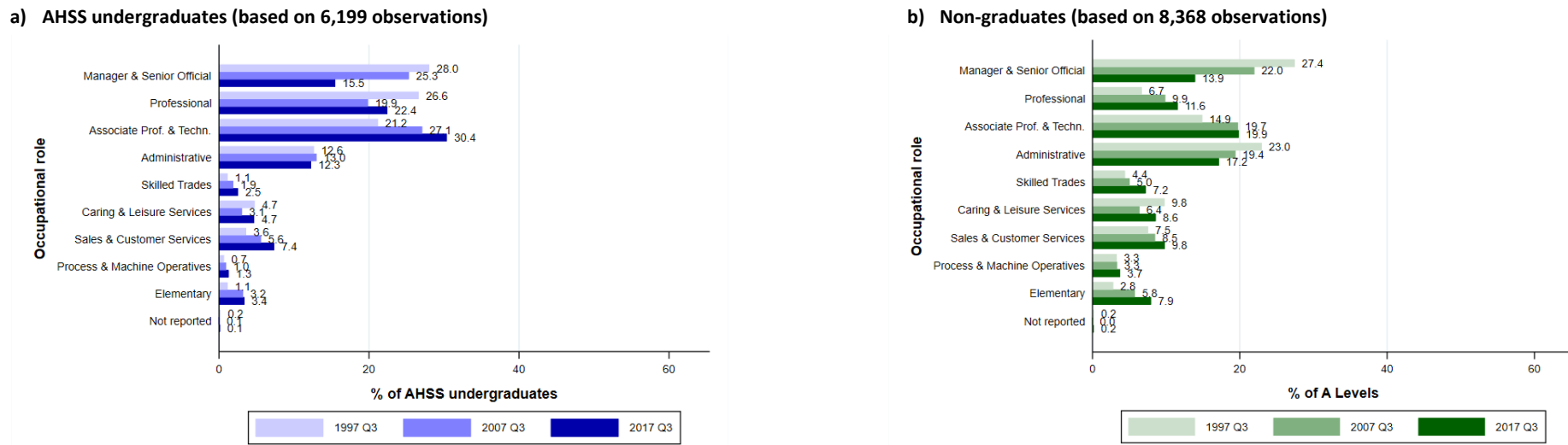


**b) All undergraduates (based on 15,520 observations)**

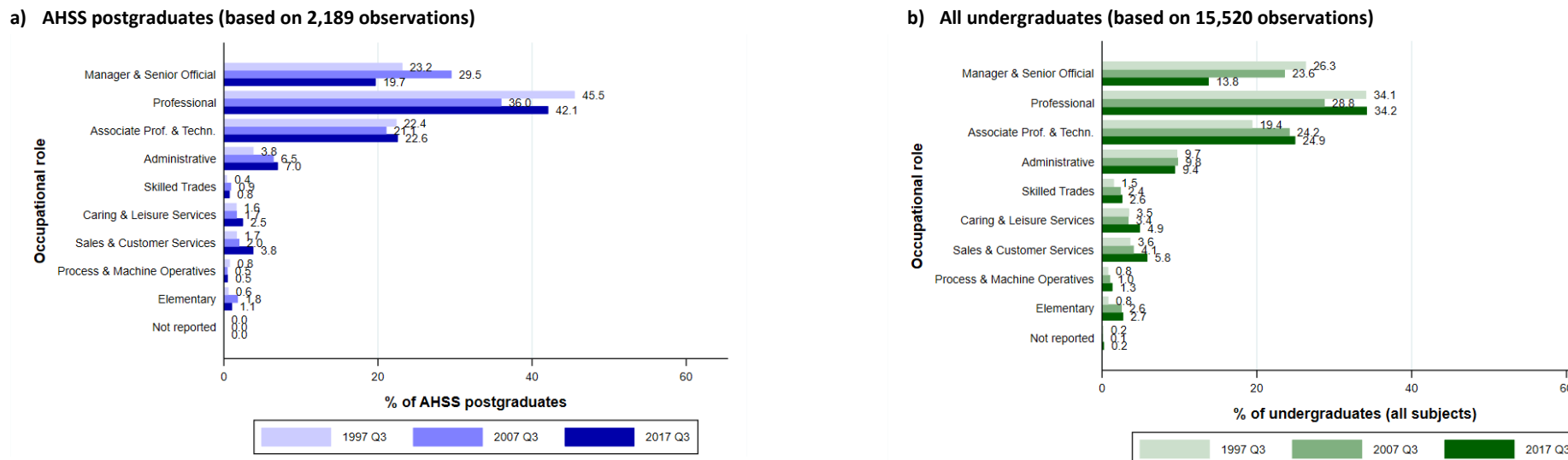


Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Industry breakdowns correspond to SIC92 & SIC2007. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey. **Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)**

**Figure 33 Occupation of employment of AHSS undergraduates and non-graduates (1997, 2007, 2017)**



**Figure 34 Occupation of employment of AHSS postgraduates and all undergraduates (1997, 2007, 2017)**

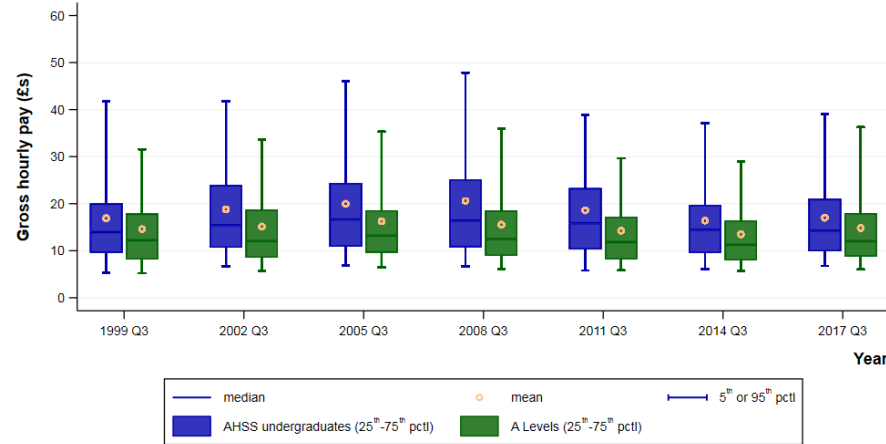


Note: Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on observations from all waves within the third quarter of the 1997, 2007 and 2017 UK Labour Force Survey.

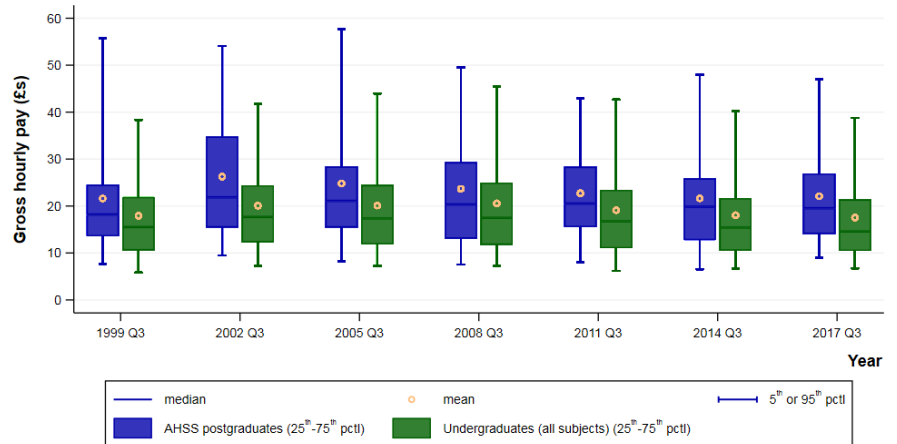
Source: London Economics' analysis of UK Labour Force Survey (1997, 2007, 2017)

**Figure 35 Mean, median and interquartile range gross hourly pay by qualification level and year of the survey (1999, 2002, 2005, 2008, 2011, 2014, 2017)**

**a) AHSS undergraduates and non-graduates (based on 8,758 observations)**

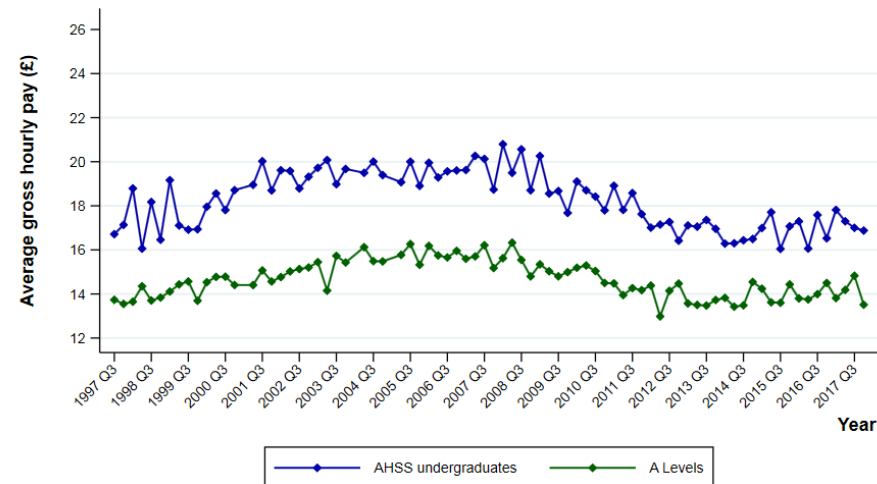


**b) AHSS postgraduates and all undergraduates (based on 11,016 observations)**

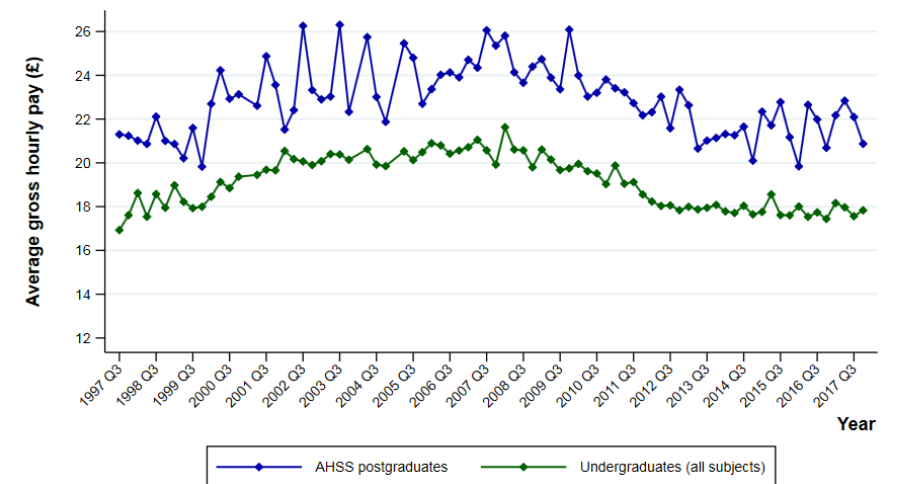


**Figure 36 Average gross hourly pay by qualification level and year of the survey (1997-2017)**

**a) AHSS undergraduates and non-graduates (based on 96,854 observations)**



**b) AHSS postgraduates and all undergraduates (based on 122,078 observations)**



Note: Hourly pay is adjusted for inflation using the Consumer Price Index (CPI), where the base year is December 2017. Observations are weighted (using quarterly weights provided by the LFS) to represent the entire population. Figures based on the first and the fifth wave observations from all quarters of the UK Labour Force Survey in the reported years. Figures don't include observations from the first quarter in 1997, 2001, 2004 and 2005 due to some variables on individuals' qualification not appearing in the datasets. **Source: London Economics' analysis of UK Labour Force Survey (1997-2017), ONS (1997-2017)**

## Annex 3 Econometric analysis – Methodology

**Table 12** Regression specifications - overview

Specification	Data structure	Regression type	Dependent variable	Sample
Section 4 - Resilience to changes in the economy	Repeated cross-section	Probit	ln(GDP)	All
Section 5 - Regional differences	Repeated cross-section	Probit	Employment <sup>d</sup>	AHSS graduates only
Section 6 - Differences by subject – employment	Repeated cross-section	Probit	Employment <sup>d</sup>	AHSS graduates only
Section 6 - Differences by subject – wage	Repeated cross-section	OLS	ln(Hourly pay)	AHSS graduates, employees and those on a government scheme
Section 7.1 - Shock to employment – made redundant	Panel	Probit	Made redundant <sub>t</sub> <sup>d</sup>	All
Section 7.1 - Shock to employment – left voluntarily	Panel	Probit	Left job voluntarily <sub>t</sub> <sup>d</sup>	Employed <sub>t</sub> <sup>d</sup> only
Section 7.2 - Employment after shock to employment	Panel	Probit	Employment <sub>t</sub> <sup>d</sup>	Made redundant <sub>t-1</sub> <sup>d</sup> only
Section 7.3 - Changing sector after shock to employment	Panel	Probit	Change in sector <sup>d</sup>	Left voluntarily <sub>t</sub> <sup>d</sup> , employed <sub>t-1</sub> , t <sup>d</sup>
Section 7.3 - Changing occupation after shock to employment	Panel	Probit	Change in occupation <sup>d</sup>	Left voluntarily <sub>t</sub> <sup>d</sup> , employed <sub>t-1</sub> , t <sup>d</sup>
Section 7.4 - Wage after shock to employment	Panel	OLS	ln(Hourly pay)	Employed <sub>t-1</sub> , t <sup>d</sup> , left job once or never in waves 1-5, employees and those on a government scheme

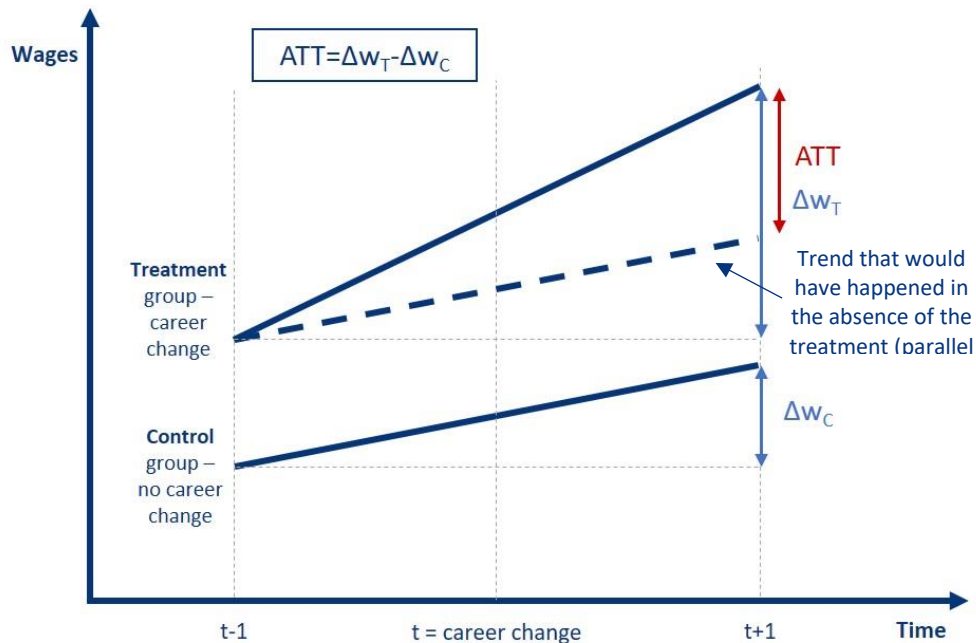
Note: The superscript <sup>d</sup> indicates dummy variables. If no time-subscript is specified, the variable refers to time t.

Source: *London Economics*

### A3.1 Triple difference - methodology (Section 7.4)

This model starts from a standard difference-in-differences model, where individuals are split into a “Treatment” and “Control” group. In this instance, the treatment group is comprised of **AHSS graduates who voluntarily changed jobs**, and in the control group are **AHSS graduates who remained with the same employer**.

Figure 37 Difference-in-differences analysis for AHSS graduates



Taking the difference between the wages of the two groups prior to the career change, and the difference after the career change, we calculated the difference between these two differences to arrive at an estimate of the **Average Treatment effect on the Treated (ATT)**.

$$ATT = (\overline{w_{T,1}} - \overline{w_{T,0}}) - (\overline{w_{C,1}} - \overline{w_{C,0}})$$

Where  $\overline{w_{T,1}}$  is the average wage of the treatment group after the treatment, and  $\overline{w_{T,0}}$  is the average wage of the treatment group prior to the treatment (and the same for the control group when the subscript is C rather than T). This concept can also be demonstrated graphically in Figure 37 above.

Typically, the parallel trends assumption is tested by looking at the trends in multiple time periods prior to the treatment. However, in the Labour Force Survey we only observe wages in two periods of time (quarters 1 and 5), so we could not evidence common trends. Furthermore, it is likely that there are some **unobservable characteristics**, such as motivation, which affect whether individuals change careers or not, and also affects labour market outcomes such as wages. As a result, we undertook a difference-in-difference-in-differences approach.

This approach added an additional step where the estimation above is undertaken for both AHSS graduates and separately for an alternative group (such as STEM graduates). We then took the difference between the two ATTs. The idea is that the unobservable characteristics that drive individuals to change careers, such as motivation, are **likely to be similar across the two groups**:

that is, although we know that individuals undertaking AHSS qualifications are different from those choosing STEM subjects, on average we don't expect AHSS graduates to have substantially different reasons for *changing careers* than other types of graduates. Since there might, however, be a more substantial difference between AHSS and non-graduates, we only conducted this analysis for STEM counterfactuals. By adding this additional step, we net out the impact of these unobservables. The resulting estimate can be interpreted as the wage differential associated with a career change for AHSS graduates relative to STEM graduates.

It is important to note that here we do not separate out the specific driver of this wage differential, since we know that selection into different types of degrees means that individuals in the two groups may be **fundamentally different** due to unobservable personal characteristics and inclinations. Hence, we cannot say whether it is the content or skills obtained during the degree, or the unobservable personal characteristics which make someone more likely to choose to study an AHSS degree in the first place that drive this differential. In all likelihood, it is the **combination** of all of these aspects together.

### A3.2 Coefficients – Interpretation

All estimates presented in this study are **marginal effects**. Table 13 provides an exemplary interpretation of the coefficients reported for each regression.

**Table 13 Interpretation of regression coefficients**

Specification	Interpretation
Section 4 - Resilience to changes in the economy	e.g. a one percent change in GDP increases female AHSS undergraduates' probability of being employed by 0.1pp
Section 5 - Regional differences	e.g. female AHSS undergraduates living in Northern Ireland are 1.1pp more likely to be in employment than their counterpart in North West England
Section 6 - Differences by subject – employment	e.g. female undergraduates with a social science degree are 1.2pp more likely to be employed than female humanities and arts undergraduates
Section 6- Differences by subject – wage	e.g. female undergraduates with an arts degree earn 18.6% less than female humanities and social science undergraduates
Section 7.1 - Shock to employment – made redundant	e.g. female AHSS undergraduates are 0.1pp more likely to be made redundant than their STEM counterpart
Section 7.1- Shock to employment – left voluntarily	e.g. female AHSS undergraduates who currently hold a job are 0.2pp more likely to have voluntarily left their job than their STEM counterpart
Section 7.2- Employment after shock to employment	e.g. female AHSS undergraduates who have been made redundant in the previous quarter are 11.8pp less likely to be employed than their STEM counterpart
Section 7.3- Changing sector after shock to employment	e.g. female AHSS undergraduates who have voluntarily left their job in the previous quarter and are currently in a new employment are 1pp more likely to have changed sector than their STEM counterpart
Section 7.3 Changing occupation after shock to employment	e.g. female AHSS undergraduates who have voluntarily left their job in the previous quarter and are currently in a new employment are 0.5pp less likely to have changed occupational role than their STEM counterpart
Section 7.4 - Wage after shock to employment	e.g. the effect of voluntarily changing jobs on hourly wages (as opposed to remaining with the same employer) is 3.8pp lower for female AHSS undergraduates than for their STEM counterpart

Source: London Economics

## Annex 4 Econometric analysis – Full regression outputs

**Figure 38 Resilience to changes in the economy – STEM counterfactual – Undergraduates**

Marginal effects & Difference testing - Probability of employment on change in ln(GDP)

	Undergraduates											
	Male						Female					
	STEM		AHSS		Difference		STEM		AHSS		Difference	
AHSS graduate	.	(.)	-0.006***	(0.002)	0	(.)	.	(.)	-0.009***	(0.002)	0	(.)
Change in ln(GDP)	-0.001	(0.002)	0.002	(0.002)	0.002	(0.003)	0.001	(0.002)	-0.002	(0.002)	-0.003	(0.003)
Age	0.009***	(0.001)	0.01***	(0.001)	0.002	(0.002)	0.007***	(0.001)	0.008***	(0.001)	0.001	(0.002)
Age squared	-0.01***	(0.001)	-0.012***	(0.001)	-0.001	(0.002)	-0.008***	(0.002)	-0.01***	(0.001)	-0.001	(0.002)
11-20 years since highest qualification	0.003	(0.005)	-0.001	(0.005)	-0.004	(0.007)	0.001	(0.005)	0.002	(0.004)	0.001	(0.007)
21-30 years since highest qualification	-0.001	(0.006)	-0.014*	(0.008)	-0.013	(0.01)	-0.003	(0.007)	0	(0.006)	0.003	(0.01)
>30 years since highest qualification	0.007	(0.005)	-0.002	(0.005)	-0.01	(0.007)	0	(0.005)	0.005	(0.004)	0.004	(0.007)
Disabled	-0.029***	(0.006)	-0.04***	(0.007)	-0.011	(0.01)	-0.017***	(0.007)	-0.017***	(0.005)	0.001	(0.009)
Married/cohabiting	0.044***	(0.004)	0.041***	(0.005)	-0.003	(0.006)	0.019***	(0.004)	0.031***	(0.003)	0.012**	(0.005)
1 child	-0.003	(0.005)	-0.005	(0.005)	-0.002	(0.007)	-0.008	(0.005)	-0.011**	(0.004)	-0.003	(0.007)
2 children	-0.004	(0.005)	0.003	(0.005)	0.007	(0.008)	-0.01	(0.006)	-0.014**	(0.006)	-0.004	(0.008)
3+ children	-0.015	(0.009)	-0.023**	(0.011)	-0.008	(0.014)	-0.035***	(0.014)	-0.04***	(0.012)	-0.005	(0.018)
Asian	-0.016***	(0.006)	-0.028***	(0.008)	-0.011	(0.01)	-0.029***	(0.008)	-0.03***	(0.007)	-0.001	(0.01)
Black	-0.066***	(0.016)	-0.059***	(0.016)	0.007	(0.022)	-0.035***	(0.013)	-0.043***	(0.011)	-0.009	(0.016)
Other ethnicity	-0.023**	(0.011)	-0.03**	(0.013)	-0.007	(0.017)	-0.032**	(0.013)	-0.05***	(0.012)	-0.018	(0.018)
North West	0.009	(0.009)	0.011	(0.011)	0.003	(0.014)	-0.016**	(0.007)	0.009	(0.009)	0.025**	(0.012)
Yorkshire & the Humber	0.007	(0.009)	0.018	(0.011)	0.011	(0.014)	-0.015**	(0.007)	0.013	(0.009)	0.029**	(0.012)
East Midlands	0.011	(0.009)	0.02*	(0.011)	0.01	(0.014)	-0.021***	(0.008)	0.008	(0.01)	0.029**	(0.013)
West Midlands	0.001	(0.009)	0.016	(0.011)	0.015	(0.014)	-0.023***	(0.008)	0.011	(0.009)	0.034***	(0.012)
East of England	0.011	(0.009)	0.018*	(0.011)	0.007	(0.014)	-0.021***	(0.008)	0.011	(0.009)	0.032***	(0.012)
London	0.005	(0.009)	0.02**	(0.01)	0.014	(0.013)	-0.019***	(0.007)	0.01	(0.009)	0.029***	(0.011)
South East	0.015*	(0.008)	0.018*	(0.01)	0.003	(0.013)	-0.015**	(0.007)	0.01	(0.009)	0.024**	(0.011)
South West	0.011	(0.009)	0.009	(0.011)	-0.002	(0.014)	-0.02**	(0.008)	0.005	(0.01)	0.025**	(0.013)
Wales	0.009	(0.01)	-0.011	(0.013)	-0.02	(0.017)	-0.009	(0.008)	0.004	(0.011)	0.013	(0.013)
Scotland	-0.001	(0.009)	0.011	(0.011)	0.011	(0.015)	-0.022***	(0.008)	0.007	(0.01)	0.029**	(0.012)
Northern Ireland	0.001	(0.011)	0.013	(0.014)	0.012	(0.018)	-0.015	(0.009)	0.02*	(0.011)	0.035**	(0.014)
Response by somebody else	0.012***	(0.003)	0.005*	(0.003)	-0.007*	(0.004)	0.004	(0.003)	0.008***	(0.003)	0.004	(0.004)
<b>Probit regression</b>												
Pseudo R-squared						0.098						0.073
Observations						36,094						30,222

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: STEM undergraduate, 0-10 years since highest qualification, not disabled, single, no child, white, North East England, answered by herself/himself.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)



**Figure 39 Resilience to changes in the economy – STEM counterfactual – Postgraduates**

Marginal effects &amp; Difference testing - Probability of employment on change in ln(GDP)

	Postgraduates											
	Male						Female					
	STEM	AHSS	Difference	STEM	AHSS	Difference	STEM	AHSS	Difference	STEM	AHSS	Difference
AHSS graduate	.	(.)	-0.01***	(0.003)	0	(.)	.	(.)	-0.004	(0.003)	0	(.)
Change in ln(GDP)	0.001	(0.003)	-0.004	(0.004)	-0.005	(0.005)	-0.002	(0.004)	0.002	(0.003)	0.004	(0.005)
Age	0.006***	(0.001)	0.004**	(0.002)	-0.002	(0.002)	0.007***	(0.002)	0.006***	(0.002)	-0.001	(0.003)
Age squared	-0.007***	(0.002)	-0.004**	(0.002)	0.002	(0.003)	-0.007***	(0.003)	-0.006***	(0.002)	0.001	(0.004)
11-20 years since highest qualification	0.005	(0.006)	0.015**	(0.006)	0.01	(0.009)	-0.002	(0.007)	0.003	(0.007)	0.005	(0.01)
21-30 years since highest qualification	0.004	(0.007)	0.009	(0.009)	0.005	(0.012)	0.002	(0.011)	0.005	(0.009)	0.004	(0.015)
>30 years since highest qualification	0.014***	(0.005)	0.029***	(0.006)	0.015*	(0.008)	0.01	(0.007)	0.004	(0.008)	-0.006	(0.011)
Disabled	-0.015*	(0.008)	-0.037***	(0.01)	-0.022*	(0.013)	-0.018*	(0.011)	-0.004	(0.008)	0.014	(0.013)
Married/cohabiting	0.034***	(0.007)	0.027***	(0.007)	-0.007	(0.009)	0.009	(0.006)	0.01*	(0.006)	0	(0.009)
1 child	-0.005	(0.006)	0.01	(0.007)	0.014	(0.009)	-0.006	(0.007)	-0.007	(0.007)	0	(0.01)
2 children	-0.006	(0.007)	0.018***	(0.006)	0.023**	(0.009)	-0.025**	(0.011)	-0.01	(0.009)	0.015	(0.014)
3+ children	-0.015	(0.011)	-0.014	(0.013)	0.001	(0.017)	-0.03	(0.019)	-0.011	(0.015)	0.019	(0.024)
Asian	-0.012*	(0.006)	-0.028***	(0.01)	-0.017	(0.011)	-0.033***	(0.01)	-0.038***	(0.012)	-0.005	(0.016)
Black	-0.017	(0.012)	-0.062***	(0.019)	-0.045**	(0.023)	-0.045**	(0.021)	-0.046***	(0.018)	-0.001	(0.028)
Other ethnicity	-0.01	(0.009)	-0.001	(0.011)	0.009	(0.014)	-0.042**	(0.019)	-0.037**	(0.017)	0.004	(0.026)
North West	0.003	(0.012)	-0.024**	(0.012)	-0.027	(0.017)	0.014	(0.017)	0.022	(0.017)	0.007	(0.024)
Yorkshire & the Humber	0.013	(0.012)	-0.02	(0.013)	-0.033*	(0.018)	0.006	(0.018)	0.017	(0.017)	0.01	(0.025)
East Midlands	0.007	(0.013)	-0.01	(0.013)	-0.017	(0.018)	0.026	(0.017)	-0.004	(0.02)	-0.031	(0.026)
West Midlands	0.014	(0.012)	-0.015	(0.013)	-0.029	(0.018)	0.029*	(0.017)	0.015	(0.018)	-0.014	(0.024)
East of England	0.015	(0.012)	-0.012	(0.012)	-0.027*	(0.016)	0.018	(0.016)	0.004	(0.018)	-0.014	(0.024)
London	0.01	(0.011)	-0.012	(0.01)	-0.022	(0.015)	0.011	(0.016)	0.004	(0.016)	-0.007	(0.023)
South East	0.017	(0.011)	-0.018*	(0.011)	-0.036**	(0.016)	0.015	(0.016)	0.005	(0.017)	-0.011	(0.023)
South West	0.001	(0.013)	-0.021	(0.013)	-0.022	(0.018)	0.017	(0.017)	0.004	(0.018)	-0.014	(0.025)
Wales	-0.004	(0.015)	-0.022	(0.015)	-0.018	(0.021)	0.02	(0.018)	0.014	(0.019)	-0.006	(0.027)
Scotland	0.013	(0.012)	-0.023*	(0.013)	-0.036**	(0.018)	0.003	(0.018)	0.009	(0.018)	0.006	(0.025)
Northern Ireland	0.014	(0.014)	-0.002	(0.014)	-0.015	(0.02)	0.018	(0.02)	0.001	(0.022)	-0.017	(0.03)
Response by somebody else	0.01***	(0.003)	0.011**	(0.005)	0.001	(0.006)	0.003	(0.005)	0.005	(0.005)	0.002	(0.007)
<b>Probit regression</b>												
Pseudo R-squared						0.088						0.056
Observations						15,032						10,120

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Baseline categories: STEM postgraduate, 0-10 years since highest qualification, not disabled, single, no child, white, North East England, answered by herself/himself.

**Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)**

**Figure 40 Resilience to changes in the economy – Non-graduate counterfactual – Undergraduates**

Marginal effects & Difference testing - Probability of employment on change in ln(GDP)

	Undergraduates											
	Male						Female					
	A Levels		AHSS		Difference		A Levels		AHSS		Difference	
AHSS graduate	.	(.)	-0.002	(0.002)	0	(.)	.	(.)	-0.001	(0.002)	0	(.)
Change in ln(GDP)	0.002	(0.002)	0.002	(0.002)	-0.001	(0.003)	0.002	(0.002)	-0.002	(0.002)	-0.004	(0.003)
Age	0.005***	(0.001)	0.011***	(0.001)	0.006***	(0.002)	0.004***	(0.001)	0.008***	(0.001)	0.004***	(0.002)
Age squared	-0.006***	(0.001)	-0.013***	(0.002)	-0.007***	(0.002)	-0.005***	(0.001)	-0.01***	(0.001)	-0.005***	(0.002)
11-20 years since highest qualification	0.005	(0.005)	-0.001	(0.006)	-0.006	(0.007)	0.007	(0.004)	0.002	(0.005)	-0.005	(0.006)
21-30 years since highest qualification	0.002	(0.006)	-0.015*	(0.008)	-0.017*	(0.01)	0.003	(0.005)	0	(0.006)	-0.003	(0.008)
>30 years since highest qualification	0	(0.005)	-0.003	(0.005)	-0.002	(0.007)	0.001	(0.004)	0.005	(0.004)	0.004	(0.006)
Disabled	-0.039***	(0.006)	-0.043***	(0.008)	-0.004	(0.01)	-0.025***	(0.005)	-0.017***	(0.005)	0.008	(0.007)
Married/cohabiting	0.053***	(0.004)	0.043***	(0.005)	-0.01	(0.006)	0.028***	(0.003)	0.031***	(0.003)	0.004	(0.005)
1 child	-0.005	(0.005)	-0.006	(0.006)	-0.001	(0.007)	-0.008**	(0.003)	-0.011**	(0.004)	-0.003	(0.006)
2 children	-0.004	(0.005)	0.003	(0.006)	0.007	(0.008)	-0.018***	(0.005)	-0.014**	(0.006)	0.004	(0.007)
3+ children	-0.009	(0.009)	-0.025**	(0.011)	-0.016	(0.014)	-0.044***	(0.01)	-0.04***	(0.012)	0.004	(0.015)
Asian	-0.036***	(0.008)	-0.03***	(0.008)	0.006	(0.012)	-0.037***	(0.009)	-0.03***	(0.007)	0.006	(0.011)
Black	-0.051***	(0.015)	-0.064***	(0.017)	-0.013	(0.022)	-0.057***	(0.014)	-0.045***	(0.011)	0.013	(0.018)
Other ethnicity	-0.068***	(0.016)	-0.033**	(0.014)	0.035	(0.021)	-0.052***	(0.014)	-0.051***	(0.012)	0.001	(0.018)
North West	0.002	(0.009)	0.012	(0.011)	0.011	(0.015)	-0.007	(0.008)	0.009	(0.009)	0.016	(0.012)
Yorkshire & the Humber	0.005	(0.01)	0.019	(0.012)	0.014	(0.015)	0.001	(0.008)	0.014	(0.009)	0.013	(0.012)
East Midlands	0.008	(0.01)	0.022*	(0.012)	0.014	(0.015)	-0.002	(0.008)	0.008	(0.01)	0.01	(0.013)
West Midlands	0.011	(0.009)	0.017	(0.012)	0.006	(0.015)	-0.002	(0.008)	0.011	(0.01)	0.013	(0.013)
East of England	0.01	(0.009)	0.02*	(0.011)	0.01	(0.015)	0.004	(0.008)	0.011	(0.009)	0.007	(0.012)
London	0.008	(0.009)	0.021**	(0.011)	0.014	(0.014)	-0.005	(0.008)	0.01	(0.009)	0.015	(0.012)
South East	0.015*	(0.009)	0.019*	(0.011)	0.004	(0.014)	0.001	(0.007)	0.01	(0.009)	0.009	(0.012)
South West	0.015	(0.009)	0.01	(0.012)	-0.004	(0.015)	-0.007	(0.008)	0.005	(0.01)	0.012	(0.013)
Wales	-0.009	(0.012)	-0.012	(0.014)	-0.003	(0.018)	-0.001	(0.009)	0.004	(0.011)	0.004	(0.014)
Scotland	0.002	(0.009)	0.011	(0.012)	0.01	(0.015)	-0.004	(0.008)	0.007	(0.01)	0.011	(0.012)
Northern Ireland	0	(0.011)	0.014	(0.015)	0.014	(0.018)	0.014*	(0.008)	0.021*	(0.011)	0.006	(0.014)
Response by somebody else	0.019***	(0.003)	0.006*	(0.003)	-0.014***	(0.004)	0.02***	(0.003)	0.008***	(0.003)	-0.012***	(0.004)
<b>Probit regression</b>												
Pseudo R-squared						0.087						0.073
Observations						39,114						40,056

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: A-levels, 0-10 years since highest qualification, not disabled, single, no child, white, North East England, answered by herself/himself.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)

**Figure 41 Resilience to changes in the economy – Non-graduate counterfactual – Postgraduates**

Marginal effects &amp; Difference testing - Probability of employment on change in ln(GDP)

	Postgraduates											
	Male						Female					
	Undergraduates	AHSS		Difference			Undergraduates	AHSS		Difference		
AHSS graduate	.	(.)	0.001	(0.003)	0	(.)	.	(.)	-0.001	(0.003)	0	(.)
Change in ln(GDP)	0	(0.001)	-0.004	(0.004)	-0.004	(0.004)	0	(0.001)	0.002	(0.003)	0.002	(0.004)
Age	0.009***	(0.001)	0.004**	(0.002)	-0.005***	(0.002)	0.008***	(0.001)	0.006**	(0.002)	-0.003	(0.002)
Age squared	-0.011***	(0.001)	-0.004**	(0.002)	0.006***	(0.002)	-0.01***	(0.001)	-0.007**	(0.003)	0.003	(0.003)
11-20 years since highest qualification	0.002	(0.003)	0.015**	(0.007)	0.013*	(0.007)	0	(0.003)	0.003	(0.007)	0.004	(0.007)
21-30 years since highest qualification	-0.007	(0.004)	0.009	(0.009)	0.016	(0.01)	-0.003	(0.004)	0.006	(0.009)	0.008	(0.01)
>30 years since highest qualification	0.003	(0.003)	0.03***	(0.006)	0.028***	(0.007)	0.001	(0.003)	0.004	(0.008)	0.004	(0.009)
Disabled	-0.034***	(0.004)	-0.038***	(0.011)	-0.003	(0.011)	-0.02***	(0.004)	-0.004	(0.008)	0.015*	(0.009)
Married/cohabiting	0.043***	(0.003)	0.026***	(0.006)	-0.017**	(0.007)	0.026***	(0.002)	0.01*	(0.006)	-0.016***	(0.006)
1 child	-0.006*	(0.003)	0.01	(0.007)	0.015**	(0.008)	-0.009***	(0.003)	-0.007	(0.008)	0.002	(0.008)
2 children	0.001	(0.003)	0.018***	(0.006)	0.016**	(0.007)	-0.019***	(0.004)	-0.01	(0.009)	0.008	(0.01)
3+ children	-0.018***	(0.006)	-0.014	(0.013)	0.004	(0.015)	-0.038***	(0.007)	-0.012	(0.016)	0.026	(0.017)
Asian	-0.016***	(0.004)	-0.03***	(0.01)	-0.014	(0.011)	-0.027***	(0.005)	-0.04***	(0.013)	-0.013	(0.013)
Black	-0.059***	(0.01)	-0.064***	(0.02)	-0.006	(0.022)	-0.043***	(0.007)	-0.049***	(0.019)	-0.006	(0.02)
Other ethnicity	-0.024***	(0.007)	-0.001	(0.011)	0.023*	(0.013)	-0.044***	(0.008)	-0.039**	(0.018)	0.005	(0.02)
North West	0.006	(0.006)	-0.025**	(0.012)	-0.031**	(0.014)	0.002	(0.005)	0.022	(0.017)	0.021	(0.018)
Yorkshire & the Humber	0.008	(0.006)	-0.02	(0.013)	-0.028**	(0.014)	0.003	(0.006)	0.017	(0.018)	0.014	(0.018)
East Midlands	0.012*	(0.006)	-0.01	(0.013)	-0.022	(0.014)	0	(0.006)	-0.004	(0.02)	-0.004	(0.021)
West Midlands	0.002	(0.006)	-0.015	(0.013)	-0.017	(0.014)	0.001	(0.006)	0.016	(0.018)	0.015	(0.019)
East of England	0.013**	(0.006)	-0.012	(0.012)	-0.025*	(0.013)	0.001	(0.006)	0.004	(0.018)	0.004	(0.019)
London	0.008	(0.006)	-0.012	(0.01)	-0.021*	(0.012)	0.001	(0.005)	0.005	(0.017)	0.004	(0.017)
South East	0.012**	(0.006)	-0.018*	(0.011)	-0.031**	(0.012)	0.001	(0.005)	0.005	(0.017)	0.004	(0.018)
South West	0.007	(0.006)	-0.021	(0.013)	-0.029**	(0.015)	-0.006	(0.006)	0.004	(0.019)	0.01	(0.02)
Wales	-0.004	(0.007)	-0.023	(0.015)	-0.018	(0.017)	-0.001	(0.006)	0.015	(0.02)	0.016	(0.021)
Scotland	0.002	(0.006)	-0.023*	(0.013)	-0.025*	(0.015)	-0.002	(0.006)	0.009	(0.018)	0.011	(0.019)
Northern Ireland	0.006	(0.007)	-0.002	(0.014)	-0.008	(0.016)	0.004	(0.006)	0.001	(0.023)	-0.003	(0.024)
Response by somebody else	0.009***	(0.002)	0.011**	(0.005)	0.002	(0.005)	0.007***	(0.002)	0.005	(0.005)	-0.002	(0.006)
<b>Probit regression</b>												
Pseudo R-squared						0.095						0.064
Observations						51,083						47,324

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Baseline categories: Undergraduates, 0-10 years since highest qualification, not disabled, single, no child, white, North East England, answered by herself/himself.

**Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)**

Figure 42 Regional differences within AHSS

Marginal effects - Effect of region on probability of employment

	Undergraduates		Postgraduates	
	Male	Female	Male	Female
	AHSS	AHSS	AHSS	AHSS
North East	-0.011 (0.01)	-0.008 (0.008)	0.019** (0.009)	-0.015 (0.013)
Yorkshire & the Humber	0.005 (0.006)	0.004 (0.005)	0.004 (0.01)	-0.003 (0.008)
East Midlands	0.008 (0.006)	0 (0.006)	0.012 (0.01)	-0.024* (0.012)
West Midlands	0.004 (0.006)	0.001 (0.005)	0.006 (0.01)	-0.004 (0.009)
East of England	0.006 (0.006)	0.002 (0.005)	0.01 (0.009)	-0.014 (0.009)
London	0.007 (0.005)	0 (0.004)	0.009 (0.007)	-0.015** (0.007)
South East	0.005 (0.005)	0 (0.005)	0.004 (0.008)	-0.014* (0.008)
South West	-0.002 (0.007)	-0.004 (0.006)	0.001 (0.011)	-0.014 (0.01)
Wales	-0.021** (0.01)	-0.005 (0.007)	0.002 (0.012)	-0.004 (0.011)
Scotland	0 (0.007)	-0.001 (0.006)	0 (0.01)	-0.009 (0.009)
Northern Ireland	0.001 (0.01)	0.011 (0.006)	0.018* (0.01)	-0.018 (0.015)
Age	0.009*** (0.001)	0.007*** (0.001)	0.003** (0.001)	0.005*** (0.002)
Age squared	-0.011*** (0.001)	-0.009*** (0.001)	-0.003** (0.002)	-0.006*** (0.002)
11-20 years since highest qualification	0.002 (0.005)	0.004 (0.004)	0.013** (0.006)	0.005 (0.006)
21-30 years since highest qualification	-0.005 (0.007)	0.005 (0.006)	0.009 (0.008)	0.007 (0.009)
>30 years since highest qualification	0.016*** (0.006)	0.021*** (0.005)	0.028*** (0.006)	0.026*** (0.007)
Disabled	-0.037*** (0.007)	-0.014*** (0.005)	-0.032*** (0.009)	-0.003 (0.007)
Married/cohabiting	0.038*** (0.004)	0.028*** (0.003)	0.024*** (0.006)	0.009* (0.005)
1 child	-0.004 (0.005)	-0.009** (0.004)	0.008 (0.006)	-0.005 (0.006)
2 children	0.002 (0.005)	-0.011** (0.005)	0.014*** (0.005)	-0.008 (0.007)
3+ children	-0.02** (0.009)	-0.034*** (0.011)	-0.012 (0.011)	-0.009 (0.013)
Asian	-0.026*** (0.007)	-0.027*** (0.007)	-0.026*** (0.009)	-0.034*** (0.011)
Black	-0.058*** (0.015)	-0.037*** (0.01)	-0.054*** (0.017)	-0.038** (0.015)
Other ethnicity	-0.029** (0.013)	-0.046*** (0.011)	-0.001 (0.008)	-0.03** (0.015)
Response by somebody else	0.004 (0.003)	0.007*** (0.002)	0.009** (0.004)	0.004 (0.004)
1999	0.015 (0.019)	0.028 (0.021)	0.05 (0.036)	0 (0.063)
2000	0.019 (0.016)	0.017 (0.019)	0.035 (0.033)	-0.018 (0.057)
2001	0.036* (0.02)	0.057** (0.022)	0.04 (0.037)	0.094 (0.066)
2002	0.04** (0.019)	0.06*** (0.022)	0.046 (0.036)	0.098 (0.065)
2003	0.041** (0.019)	0.062*** (0.022)	0.06* (0.035)	0.093 (0.065)
2004	0.055*** (0.018)	0.06*** (0.022)	0.048 (0.036)	0.091 (0.066)
2005	0.058*** (0.018)	0.055** (0.022)	0.032 (0.038)	0.103 (0.065)
2006	0.053*** (0.018)	0.06*** (0.022)	0.056 (0.035)	0.097 (0.065)
2007	0.049*** (0.018)	0.06*** (0.022)	0.059* (0.035)	0.093 (0.065)
2008	0.046** (0.018)	0.062*** (0.022)	0.056 (0.034)	0.095 (0.066)
2009	0.031 (0.019)	0.057*** (0.022)	0.047 (0.036)	0.099 (0.065)
2010	0.036* (0.019)	0.047** (0.022)	0.037 (0.036)	0.07 (0.066)
2011	0.05*** (0.018)	0.045** (0.022)	0.039 (0.036)	0.073 (0.066)
2012	0.046** (0.019)	0.045** (0.023)	0.046 (0.035)	0.083 (0.066)
2013	0.048*** (0.018)	0.05** (0.022)	0.041 (0.036)	0.091 (0.065)
2014	0.048*** (0.018)	0.06*** (0.022)	0.054 (0.035)	0.083 (0.066)
2015	0.047** (0.018)	0.055** (0.022)	0.052 (0.035)	0.08 (0.066)
2016	0.052*** (0.018)	0.053** (0.022)	0.062* (0.034)	0.084 (0.066)
2017	0.056*** (0.018)	0.061*** (0.022)	0.06* (0.035)	0.09 (0.065)
2nd quarter	0 (0.004)	0.002 (0.003)	0.013** (0.005)	0.001 (0.006)
3rd quarter	-0.007* (0.004)	-0.008** (0.003)	0.002 (0.006)	0.005 (0.006)
4th quarter	0.002 (0.004)	-0.002 (0.003)	0.004 (0.006)	0.013** (0.006)
<b>Probit regression</b>				
Pseudo R-squared	0.098	0.079	0.106	0.065
Observations	16,785	18,892	6,504	5,492

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: North West England, 0-10 years since highest qualification, not disabled, single, no child, white, answered by herself/himself, 1998, 1<sup>st</sup> quarter.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)

Figure 43 Differences by subject within AHSS – Employment – Undergraduates

Marginal effects - Effect of subject on probability of employment

	Undergraduates					
	Male			Female		
	Arts	Humanities	Social Sciences	Arts	Humanities	Social Sciences
Arts	-0.011*** (0.004)	.	.	-0.008** (0.003)	.	.
Humanities	.	-0.001 (0.003)	.	.	-0.008*** (0.003)	.
Social Sciences	.	.	0.007*** (0.003)	.	.	0.012*** (0.002)
Age	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)
Age squared	-0.011*** (0.001)	-0.011*** (0.001)	-0.011*** (0.001)	-0.009*** (0.001)	-0.009*** (0.001)	-0.009*** (0.001)
11-20 years since highest qualification	0.002 (0.005)	0.002 (0.005)	0.002 (0.005)	0.005 (0.004)	0.005 (0.004)	0.005 (0.004)
21-30 years since highest qualification	-0.006 (0.007)	-0.005 (0.007)	-0.006 (0.007)	0.006 (0.006)	0.006 (0.006)	0.007 (0.006)
>30 years since highest qualification	0.016*** (0.006)	0.016*** (0.006)	0.016*** (0.006)	0.021*** (0.005)	0.021*** (0.005)	0.022*** (0.005)
Disabled	-0.036*** (0.007)	-0.037*** (0.007)	-0.036*** (0.007)	-0.013*** (0.005)	-0.014*** (0.005)	-0.013*** (0.005)
Married/cohabiting	0.038*** (0.004)	0.038*** (0.004)	0.037*** (0.004)	0.028*** (0.003)	0.028*** (0.003)	0.028*** (0.003)
1 child	-0.005 (0.005)	-0.004 (0.005)	-0.005 (0.005)	-0.009** (0.004)	-0.009** (0.004)	-0.009** (0.004)
2 children	0.002 (0.005)	0.002 (0.005)	0.002 (0.005)	-0.012** (0.005)	-0.012** (0.005)	-0.012*** (0.005)
3+ children	-0.021** (0.01)	-0.02** (0.009)	-0.02** (0.009)	-0.035*** (0.011)	-0.034*** (0.011)	-0.035*** (0.011)
Asian	-0.028*** (0.007)	-0.026*** (0.007)	-0.029*** (0.008)	-0.029*** (0.007)	-0.029*** (0.007)	-0.033*** (0.007)
Black	-0.06*** (0.016)	-0.058*** (0.015)	-0.061*** (0.016)	-0.039*** (0.01)	-0.04*** (0.01)	-0.043*** (0.01)
Other ethnicity	-0.03** (0.013)	-0.029** (0.013)	-0.03** (0.013)	-0.046*** (0.011)	-0.048*** (0.012)	-0.048*** (0.012)
North East	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)	-0.007 (0.008)	-0.008 (0.008)	-0.008 (0.008)
Yorkshire & the Humber	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)	0.004 (0.005)	0.004 (0.005)	0.004 (0.005)
East Midlands	0.008 (0.006)	0.008 (0.006)	0.008 (0.006)	0 (0.006)	0 (0.006)	0 (0.006)
West Midlands	0.004 (0.006)	0.004 (0.006)	0.004 (0.006)	0.002 (0.005)	0.001 (0.005)	0.001 (0.005)
East of England	0.006 (0.006)	0.006 (0.006)	0.006 (0.006)	0.003 (0.005)	0.003 (0.005)	0.003 (0.005)
London	0.008 (0.005)	0.008 (0.005)	0.008 (0.005)	0.001 (0.004)	0.001 (0.004)	0.001 (0.004)
South East	0.005 (0.005)	0.005 (0.005)	0.005 (0.005)	0 (0.005)	0.001 (0.005)	0.001 (0.005)
South West	-0.002 (0.007)	-0.002 (0.007)	-0.002 (0.007)	-0.003 (0.006)	-0.004 (0.006)	-0.003 (0.006)
Wales	-0.02** (0.01)	-0.021** (0.01)	-0.02** (0.01)	-0.004 (0.007)	-0.005 (0.007)	-0.005 (0.007)
Scotland	0 (0.007)	0 (0.007)	0 (0.007)	-0.002 (0.006)	-0.002 (0.006)	-0.003 (0.006)
Northern Ireland	0.001 (0.01)	0.001 (0.01)	0.001 (0.01)	0.01 (0.007)	0.01 (0.007)	0.009 (0.007)
Response by somebody else	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)
1999	0.016 (0.019)	0.015 (0.019)	0.015 (0.019)	0.029 (0.021)	0.029 (0.021)	0.03 (0.021)
2000	0.02 (0.016)	0.019 (0.016)	0.019 (0.016)	0.017 (0.019)	0.017 (0.019)	0.017 (0.019)
2001	0.037* (0.02)	0.036* (0.02)	0.036* (0.02)	0.058*** (0.022)	0.058*** (0.022)	0.06*** (0.023)
2002	0.041** (0.019)	0.04** (0.019)	0.04** (0.019)	0.061*** (0.022)	0.061*** (0.022)	0.063*** (0.023)
2003	0.042** (0.019)	0.041** (0.019)	0.041** (0.019)	0.062*** (0.022)	0.063*** (0.022)	0.064*** (0.023)
2004	0.056*** (0.018)	0.055*** (0.018)	0.055*** (0.018)	0.061*** (0.022)	0.061*** (0.022)	0.063*** (0.023)
2005	0.059*** (0.018)	0.058*** (0.018)	0.058*** (0.018)	0.056** (0.023)	0.057** (0.023)	0.059** (0.023)
2006	0.053*** (0.018)	0.052*** (0.018)	0.053*** (0.018)	0.061*** (0.022)	0.061*** (0.022)	0.063*** (0.023)
2007	0.05*** (0.019)	0.049*** (0.018)	0.049*** (0.018)	0.061*** (0.022)	0.062*** (0.022)	0.063*** (0.023)
2008	0.047** (0.018)	0.046** (0.018)	0.046** (0.018)	0.063*** (0.022)	0.064*** (0.022)	0.066*** (0.022)
2009	0.032* (0.019)	0.031 (0.019)	0.031 (0.019)	0.058*** (0.022)	0.058*** (0.022)	0.06*** (0.023)
2010	0.036* (0.019)	0.035* (0.019)	0.036* (0.019)	0.048** (0.023)	0.048** (0.023)	0.05** (0.023)
2011	0.051*** (0.018)	0.049*** (0.018)	0.049*** (0.018)	0.046** (0.023)	0.047** (0.023)	0.049** (0.023)
2012	0.047** (0.019)	0.046** (0.019)	0.046** (0.019)	0.046** (0.023)	0.046** (0.023)	0.048** (0.023)
2013	0.049*** (0.019)	0.048*** (0.018)	0.048*** (0.018)	0.051** (0.023)	0.052** (0.023)	0.054** (0.023)
2014	0.049*** (0.018)	0.048*** (0.018)	0.048*** (0.018)	0.061*** (0.022)	0.061*** (0.022)	0.063*** (0.023)
2015	0.048*** (0.019)	0.047** (0.018)	0.047** (0.018)	0.056** (0.022)	0.056** (0.023)	0.058** (0.023)
2016	0.053*** (0.018)	0.051*** (0.018)	0.052*** (0.018)	0.054** (0.022)	0.054** (0.022)	0.056** (0.023)
2017	0.057*** (0.018)	0.056*** (0.018)	0.057*** (0.018)	0.062*** (0.022)	0.062*** (0.022)	0.064*** (0.022)
2nd quarter	0 (0.004)	0 (0.004)	0 (0.004)	0.002 (0.003)	0.002 (0.003)	0.002 (0.003)
3rd quarter	-0.006* (0.004)	-0.007* (0.004)	-0.006* (0.004)	-0.008** (0.003)	-0.007** (0.003)	-0.007** (0.003)
4th quarter	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
<b>Probit regression</b>						
Pseudo R-squared	0.100	0.098	0.099	0.080	0.081	0.083
Observations	16,785	16,785	16,785	18,892	18,892	18,892

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: all other AHSS subjects, 0-10 years since highest qualification, not disabled, single, no child, white, North West England, answered by herself/himself, 1998, 1<sup>st</sup> quarter.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)

Figure 44 Differences by subject within AHSS – Employment – Postgraduates

Marginal effects - Effect of subject on probability of employment

	Postgraduates					
	Male			Female		
	Arts	Humanities	Social Sciences	Arts	Humanities	Social Sciences
Arts	-0.003 (0.006)	.	.	0.002 (0.006)	.	.
Humanities	.	0.001 (0.004)	.	.	0.001 (0.004)	.
Social Sciences	.	.	0.001 (0.004)	.	.	-0.002 (0.004)
Age	0.003** (0.001)	0.003** (0.001)	0.003** (0.001)	0.005*** (0.002)	0.005*** (0.002)	0.005*** (0.002)
Age squared	-0.003** (0.002)	-0.003** (0.002)	-0.003** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)
11-20 years since highest qualification	0.013** (0.006)	0.013** (0.006)	0.013** (0.006)	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)
21-30 years since highest qualification	0.009 (0.008)	0.009 (0.008)	0.009 (0.008)	0.007 (0.009)	0.007 (0.009)	0.007 (0.009)
>30 years since highest qualification	0.028*** (0.006)	0.028*** (0.006)	0.028*** (0.006)	0.026*** (0.007)	0.026*** (0.007)	0.026*** (0.007)
Disabled	-0.031*** (0.009)	-0.032*** (0.009)	-0.032*** (0.009)	-0.004 (0.007)	-0.003 (0.007)	-0.003 (0.007)
Married/cohabiting	0.023*** (0.006)	0.024*** (0.006)	0.024*** (0.006)	0.009* (0.005)	0.009* (0.005)	0.009* (0.005)
1 child	0.008 (0.006)	0.008 (0.006)	0.008 (0.006)	-0.005 (0.006)	-0.005 (0.006)	-0.005 (0.006)
2 children	0.014*** (0.005)	0.014*** (0.005)	0.014*** (0.005)	-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.007)
3+ children	-0.012 (0.011)	-0.012 (0.011)	-0.012 (0.011)	-0.009 (0.013)	-0.009 (0.013)	-0.009 (0.013)
Asian	-0.026*** (0.009)	-0.025*** (0.009)	-0.026*** (0.009)	-0.034*** (0.011)	-0.034*** (0.011)	-0.033*** (0.011)
Black	-0.055*** (0.018)	-0.054*** (0.018)	-0.055*** (0.018)	-0.037** (0.015)	-0.037** (0.015)	-0.037** (0.015)
Other ethnicity	-0.001 (0.008)	-0.001 (0.008)	-0.001 (0.008)	-0.03** (0.015)	-0.03** (0.015)	-0.03* (0.015)
North East	0.019** (0.009)	0.019** (0.009)	0.019** (0.009)	-0.015 (0.013)	-0.015 (0.013)	-0.015 (0.013)
Yorkshire & the Humber	0.003 (0.01)	0.003 (0.01)	0.004 (0.01)	-0.003 (0.008)	-0.003 (0.008)	-0.003 (0.008)
East Midlands	0.011 (0.01)	0.012 (0.01)	0.012 (0.01)	-0.024* (0.012)	-0.024* (0.012)	-0.024* (0.012)
West Midlands	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)	-0.004 (0.009)	-0.004 (0.009)	-0.004 (0.009)
East of England	0.009 (0.009)	0.009 (0.009)	0.01 (0.009)	-0.014 (0.009)	-0.014 (0.009)	-0.014 (0.009)
London	0.009 (0.007)	0.009 (0.007)	0.009 (0.007)	-0.015** (0.007)	-0.015** (0.007)	-0.015** (0.007)
South East	0.004 (0.008)	0.004 (0.008)	0.004 (0.008)	-0.014* (0.008)	-0.014* (0.008)	-0.014* (0.008)
South West	0.001 (0.011)	0.001 (0.011)	0.001 (0.011)	-0.014 (0.01)	-0.014 (0.01)	-0.014 (0.01)
Wales	0.002 (0.012)	0.002 (0.012)	0.002 (0.012)	-0.004 (0.011)	-0.004 (0.011)	-0.004 (0.011)
Scotland	0 (0.01)	0 (0.01)	0 (0.01)	-0.009 (0.009)	-0.009 (0.009)	-0.009 (0.009)
Northern Ireland	0.017* (0.01)	0.017* (0.01)	0.018* (0.01)	-0.018 (0.015)	-0.018 (0.015)	-0.018 (0.015)
Response by somebody else	0.008** (0.004)	0.009** (0.004)	0.009** (0.004)	0.004 (0.004)	0.004 (0.004)	0.004 (0.004)
1999	0.05 (0.037)	0.05 (0.036)	0.05 (0.037)	0 (0.063)	0 (0.063)	0 (0.063)
2000	0.035 (0.033)	0.035 (0.033)	0.035 (0.033)	-0.018 (0.057)	-0.018 (0.057)	-0.018 (0.057)
2001	0.041 (0.037)	0.04 (0.037)	0.04 (0.037)	0.094 (0.065)	0.093 (0.066)	0.093 (0.065)
2002	0.047 (0.036)	0.046 (0.036)	0.046 (0.036)	0.098 (0.065)	0.097 (0.065)	0.097 (0.065)
2003	0.061* (0.035)	0.06* (0.035)	0.06* (0.035)	0.093 (0.065)	0.093 (0.065)	0.092 (0.065)
2004	0.049 (0.036)	0.048 (0.036)	0.048 (0.036)	0.091 (0.066)	0.091 (0.066)	0.091 (0.065)
2005	0.033 (0.038)	0.032 (0.038)	0.032 (0.038)	0.103 (0.065)	0.103 (0.065)	0.103 (0.064)
2006	0.057 (0.035)	0.056 (0.035)	0.057 (0.035)	0.097 (0.065)	0.097 (0.065)	0.097 (0.065)
2007	0.06* (0.035)	0.059* (0.035)	0.06* (0.035)	0.093 (0.065)	0.092 (0.065)	0.092 (0.065)
2008	0.056 (0.034)	0.056 (0.034)	0.056 (0.034)	0.095 (0.065)	0.095 (0.066)	0.095 (0.065)
2009	0.048 (0.036)	0.047 (0.036)	0.047 (0.036)	0.098 (0.065)	0.098 (0.065)	0.098 (0.065)
2010	0.037 (0.036)	0.036 (0.036)	0.037 (0.036)	0.07 (0.066)	0.07 (0.066)	0.07 (0.066)
2011	0.04 (0.036)	0.039 (0.036)	0.039 (0.036)	0.073 (0.066)	0.073 (0.066)	0.073 (0.066)
2012	0.046 (0.035)	0.046 (0.035)	0.046 (0.035)	0.083 (0.066)	0.083 (0.066)	0.082 (0.065)
2013	0.042 (0.037)	0.041 (0.036)	0.041 (0.036)	0.091 (0.065)	0.091 (0.065)	0.091 (0.065)
2014	0.054 (0.035)	0.054 (0.035)	0.054 (0.035)	0.083 (0.066)	0.083 (0.066)	0.083 (0.065)
2015	0.052 (0.035)	0.052 (0.035)	0.052 (0.035)	0.08 (0.065)	0.079 (0.065)	0.079 (0.065)
2016	0.063* (0.035)	0.062* (0.034)	0.062* (0.034)	0.084 (0.066)	0.084 (0.066)	0.084 (0.066)
2017	0.061* (0.035)	0.06* (0.034)	0.06* (0.035)	0.09 (0.065)	0.09 (0.065)	0.089 (0.065)
2nd quarter	0.013** (0.005)	0.013** (0.005)	0.013** (0.005)	0.001 (0.006)	0.001 (0.006)	0.001 (0.006)
3rd quarter	0.002 (0.006)	0.002 (0.006)	0.002 (0.006)	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)
4th quarter	0.004 (0.006)	0.004 (0.006)	0.004 (0.006)	0.013** (0.006)	0.013** (0.006)	0.013** (0.006)
<b>Probit regression</b>						
Pseudo R-squared	0.106	0.106	0.106	0.065	0.065	0.065
Observations	6,504	6,504	6,504	5,492	5,492	5,492

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: all other AHSS subjects, 0-10 years since highest qualification, not disabled, single, no child, white, North West England, answered by herself/himself, 1998, 1<sup>st</sup> quarter.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)

Figure 45 Differences by subject within AHSS – Wage – Undergraduates

Marginal effects - Effect of subject on hourly wages (log £)

	Undergraduates					
	Male			Female		
	Arts	Humanities	Social Sciences	Arts	Humanities	Social Sciences
Arts	-0.206*** (0.014)	.	.	-0.147*** (0.011)	.	.
Humanities	.	-0.12*** (0.011)	.	.	-0.037*** (0.009)	.
Social Sciences	.	.	0.2*** (0.01)	.	.	0.11*** (0.008)
Age	0.08*** (0.005)	0.077*** (0.005)	0.078*** (0.005)	0.093*** (0.004)	0.092*** (0.004)	0.091*** (0.004)
Age squared	-0.084*** (0.006)	-0.081*** (0.006)	-0.082*** (0.006)	-0.106*** (0.005)	-0.104*** (0.005)	-0.103*** (0.005)
11-20 years since highest qualification	0.12*** (0.015)	0.116*** (0.015)	0.12*** (0.015)	0.131*** (0.013)	0.132*** (0.013)	0.139*** (0.013)
21-30 years since highest qualification	0.137*** (0.021)	0.134*** (0.022)	0.136*** (0.021)	0.102*** (0.019)	0.103*** (0.019)	0.114*** (0.019)
>30 years since highest qualification	0.191*** (0.03)	0.183*** (0.03)	0.187*** (0.03)	0.19*** (0.025)	0.191*** (0.025)	0.203*** (0.025)
Part time job	-0.236*** (0.023)	-0.254*** (0.023)	-0.23*** (0.023)	-0.193*** (0.012)	-0.202*** (0.012)	-0.195*** (0.012)
Temporary job	-0.143*** (0.025)	-0.146*** (0.025)	-0.139*** (0.025)	-0.136*** (0.017)	-0.137*** (0.017)	-0.133*** (0.017)
Large employer	0.225*** (0.012)	0.233*** (0.012)	0.219*** (0.012)	0.183*** (0.01)	0.189*** (0.01)	0.182*** (0.01)
Public sector job	-0.126*** (0.011)	-0.115*** (0.011)	-0.107*** (0.011)	-0.048*** (0.009)	-0.044*** (0.009)	-0.039*** (0.009)
Disabled	-0.09*** (0.019)	-0.095*** (0.02)	-0.086*** (0.019)	-0.074*** (0.015)	-0.079*** (0.015)	-0.076*** (0.015)
Married/cohabiting	0.15*** (0.012)	0.14*** (0.012)	0.141*** (0.012)	0.101*** (0.009)	0.103*** (0.009)	0.102*** (0.009)
1 child	0.052*** (0.015)	0.061*** (0.015)	0.053*** (0.015)	-0.01 (0.013)	-0.005 (0.013)	-0.009 (0.013)
2 children	0.106*** (0.016)	0.115*** (0.016)	0.107*** (0.016)	-0.032** (0.016)	-0.024 (0.016)	-0.033** (0.016)
3+ children	0.087*** (0.027)	0.1*** (0.027)	0.089*** (0.027)	-0.102*** (0.031)	-0.093*** (0.031)	-0.101*** (0.031)
Asian	-0.177*** (0.025)	-0.178*** (0.025)	-0.214*** (0.025)	-0.103*** (0.02)	-0.098*** (0.02)	-0.121*** (0.02)
Black	-0.362*** (0.037)	-0.355*** (0.038)	-0.385*** (0.038)	-0.184*** (0.026)	-0.177*** (0.027)	-0.199*** (0.026)
Other ethnicity	-0.129*** (0.049)	-0.123*** (0.049)	-0.138*** (0.049)	-0.114*** (0.03)	-0.115*** (0.03)	-0.124*** (0.03)
North East	-0.044 (0.028)	-0.052* (0.028)	-0.047* (0.027)	-0.031 (0.024)	-0.03 (0.024)	-0.033 (0.024)
Yorkshire & the Humber	-0.002 (0.022)	-0.002 (0.022)	0.003 (0.022)	0.012 (0.018)	0.013 (0.018)	0.013 (0.018)
East Midlands	0.021 (0.024)	0.014 (0.024)	0.016 (0.024)	0.018 (0.019)	0.011 (0.019)	0.013 (0.019)
West Midlands	0.042* (0.022)	0.04* (0.022)	0.045** (0.022)	0.01 (0.019)	0.009 (0.019)	0.011 (0.019)
East of England	0.16*** (0.023)	0.162*** (0.023)	0.163*** (0.023)	0.109*** (0.019)	0.109*** (0.019)	0.113*** (0.019)
London	0.334*** (0.019)	0.339*** (0.019)	0.345*** (0.019)	0.3*** (0.016)	0.302*** (0.016)	0.31*** (0.016)
South East	0.18*** (0.019)	0.182*** (0.019)	0.185*** (0.019)	0.112*** (0.017)	0.112*** (0.017)	0.116*** (0.017)
South West	0.042* (0.023)	0.041* (0.023)	0.045** (0.023)	-0.002 (0.019)	-0.008 (0.02)	-0.003 (0.019)
Wales	-0.096*** (0.028)	-0.102*** (0.028)	-0.097*** (0.028)	-0.013 (0.023)	-0.014 (0.023)	-0.011 (0.023)
Scotland	0.041* (0.023)	0.042* (0.023)	0.034 (0.023)	0.066*** (0.018)	0.067*** (0.018)	0.061*** (0.018)
Northern Ireland	-0.117*** (0.036)	-0.112*** (0.036)	-0.123*** (0.035)	-0.056** (0.026)	-0.052** (0.026)	-0.065** (0.026)
Response by somebody else	-0.033*** (0.01)	-0.036*** (0.01)	-0.034*** (0.01)	-0.009 (0.009)	-0.012 (0.009)	-0.01 (0.009)
1999	0.007 (0.039)	0.007 (0.04)	0.006 (0.039)	0.037 (0.038)	0.033 (0.039)	0.039 (0.038)
2000	-0.011 (0.035)	-0.004 (0.035)	-0.001 (0.034)	0.067* (0.035)	0.069** (0.035)	0.072** (0.035)
2001	0.214*** (0.047)	0.206*** (0.047)	0.211*** (0.046)	0.279*** (0.042)	0.285*** (0.042)	0.296*** (0.042)
2002	0.236*** (0.045)	0.226*** (0.045)	0.233*** (0.044)	0.284*** (0.041)	0.292*** (0.041)	0.299*** (0.041)
2003	0.197*** (0.043)	0.186*** (0.044)	0.191*** (0.043)	0.335*** (0.039)	0.335*** (0.039)	0.346*** (0.039)
2004	0.242*** (0.045)	0.237*** (0.045)	0.237*** (0.045)	0.294*** (0.041)	0.299*** (0.041)	0.309*** (0.041)
2005	0.239*** (0.045)	0.226*** (0.045)	0.232*** (0.045)	0.325*** (0.041)	0.326*** (0.041)	0.337*** (0.041)
2006	0.265*** (0.043)	0.255*** (0.043)	0.263*** (0.043)	0.324*** (0.039)	0.325*** (0.039)	0.337*** (0.039)
2007	0.234*** (0.043)	0.222*** (0.044)	0.231*** (0.043)	0.33*** (0.039)	0.331*** (0.039)	0.341*** (0.039)
2008	0.213*** (0.041)	0.201*** (0.042)	0.205*** (0.041)	0.278*** (0.037)	0.278*** (0.037)	0.289*** (0.037)
2009	0.188*** (0.045)	0.18*** (0.045)	0.184*** (0.045)	0.272*** (0.039)	0.272*** (0.039)	0.283*** (0.039)
2010	0.199*** (0.044)	0.184*** (0.044)	0.193*** (0.043)	0.269*** (0.039)	0.27*** (0.039)	0.279*** (0.039)
2011	0.138*** (0.044)	0.132*** (0.044)	0.138*** (0.044)	0.26*** (0.04)	0.264*** (0.04)	0.274*** (0.04)
2012	0.148*** (0.043)	0.135*** (0.043)	0.146*** (0.043)	0.196*** (0.039)	0.193*** (0.039)	0.206*** (0.039)
2013	0.132*** (0.043)	0.121*** (0.043)	0.131*** (0.043)	0.214*** (0.039)	0.214*** (0.039)	0.226*** (0.039)
2014	0.069 (0.043)	0.054 (0.043)	0.073* (0.043)	0.196*** (0.039)	0.192*** (0.039)	0.203*** (0.039)
2015	0.106** (0.044)	0.086* (0.044)	0.103** (0.044)	0.231*** (0.039)	0.229*** (0.039)	0.241*** (0.039)
2016	0.131*** (0.043)	0.12*** (0.044)	0.133*** (0.043)	0.194*** (0.038)	0.189*** (0.038)	0.202*** (0.038)
2017	0.157*** (0.043)	0.146*** (0.043)	0.158*** (0.043)	0.203*** (0.038)	0.196*** (0.038)	0.208*** (0.038)
2nd quarter	-0.029** (0.015)	-0.031** (0.015)	-0.028* (0.015)	-0.01 (0.013)	-0.01 (0.013)	-0.008 (0.013)
3rd quarter	-0.009 (0.014)	-0.011 (0.015)	-0.01 (0.014)	-0.002 (0.012)	-0.004 (0.013)	-0.001 (0.012)
4th quarter	-0.036** (0.015)	-0.037** (0.015)	-0.035** (0.014)	-0.006 (0.013)	-0.007 (0.013)	-0.006 (0.013)
<b>OLS regression</b>						
Adjusted R-squared	0.366	0.360	0.378	0.281	0.272	0.281
Observations	9,842	9,842	9,842	12,399	12,399	12,399

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: all other AHSS subjects, 0-10 years since highest qualification, full-time job, permanent job, small employer, private sector job, not disabled, single, no child, white, answered by herself/himself, North West England, 1998, 1<sup>st</sup> quarter.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)

Figure 46 Differences by subject within AHSS – Wage – Postgraduates

Marginal effects - Effect of subject on hourly wages (log £)

	Postgraduates					
	Male			Female		
	Arts	Humanities	Social Sciences	Arts	Humanities	Social Sciences
Arts	-0.137*** (0.03)	.	.	-0.154*** (0.028)	.	.
Humanities	.	-0.183*** (0.018)	.	.	-0.151*** (0.016)	.
Social Sciences	.	.	0.206*** (0.017)	.	.	0.189*** (0.015)
Age	0.086*** (0.007)	0.082*** (0.007)	0.083*** (0.007)	0.086*** (0.007)	0.084*** (0.007)	0.083*** (0.007)
Age squared	-0.087*** (0.009)	-0.083*** (0.009)	-0.084*** (0.009)	-0.087*** (0.008)	-0.085*** (0.008)	-0.085*** (0.008)
11-20 years since highest qualification	0.035 (0.021)	0.039* (0.021)	0.043** (0.021)	0.066*** (0.021)	0.079*** (0.021)	0.084*** (0.021)
21-30 years since highest qualification	0.107*** (0.03)	0.129*** (0.03)	0.136*** (0.03)	0.047 (0.032)	0.071** (0.032)	0.079** (0.031)
>30 years since highest qualification	0.112*** (0.043)	0.129*** (0.043)	0.143*** (0.042)	0.132*** (0.048)	0.148*** (0.048)	0.16*** (0.047)
Part time job	-0.235*** (0.037)	-0.245*** (0.037)	-0.22*** (0.037)	-0.14*** (0.02)	-0.137*** (0.02)	-0.124*** (0.02)
Temporary job	-0.158*** (0.04)	-0.149*** (0.04)	-0.155*** (0.04)	-0.111*** (0.03)	-0.111*** (0.03)	-0.106*** (0.03)
Large employer	0.333*** (0.023)	0.321*** (0.023)	0.317*** (0.023)	0.259*** (0.02)	0.254*** (0.02)	0.25*** (0.02)
Public sector job	-0.127*** (0.016)	-0.106*** (0.016)	-0.101*** (0.016)	-0.022 (0.016)	-0.01 (0.016)	-0.009 (0.016)
Disabled	-0.082*** (0.029)	-0.082*** (0.028)	-0.076*** (0.028)	-0.085*** (0.024)	-0.092*** (0.024)	-0.094*** (0.024)
Married/cohabiting	0.128*** (0.021)	0.123*** (0.02)	0.119*** (0.02)	0.036** (0.017)	0.041** (0.017)	0.04** (0.017)
1 child	0.035 (0.023)	0.041* (0.023)	0.039* (0.023)	-0.016 (0.024)	-0.026 (0.023)	-0.031 (0.023)
2 children	0.078*** (0.024)	0.081*** (0.024)	0.073*** (0.024)	0.044* (0.025)	0.036 (0.025)	0.025 (0.025)
3+ children	0.071* (0.039)	0.075* (0.039)	0.069* (0.038)	0.016 (0.047)	0.006 (0.047)	-0.004 (0.047)
Asian	-0.244*** (0.034)	-0.27*** (0.034)	-0.288*** (0.035)	-0.154*** (0.032)	-0.163*** (0.032)	-0.179*** (0.032)
Black	-0.301*** (0.045)	-0.332*** (0.045)	-0.345*** (0.044)	-0.277*** (0.043)	-0.292*** (0.044)	-0.311*** (0.044)
Other ethnicity	-0.18*** (0.052)	-0.175*** (0.05)	-0.184*** (0.05)	-0.119*** (0.042)	-0.119*** (0.042)	-0.126*** (0.042)
North East	-0.007 (0.05)	0.001 (0.05)	0.001 (0.05)	0.031 (0.044)	0.031 (0.045)	0.033 (0.044)
Yorkshire & the Humber	-0.024 (0.038)	-0.01 (0.038)	-0.012 (0.037)	0.028 (0.035)	0.03 (0.035)	0.026 (0.035)
East Midlands	-0.006 (0.044)	0 (0.043)	-0.004 (0.043)	0.028 (0.041)	0.03 (0.041)	0.022 (0.04)
West Midlands	-0.034 (0.041)	-0.017 (0.041)	-0.025 (0.04)	0.072** (0.036)	0.069* (0.037)	0.07* (0.037)
East of England	0.158*** (0.038)	0.171*** (0.037)	0.168*** (0.037)	0.158*** (0.037)	0.167*** (0.037)	0.168*** (0.037)
London	0.195*** (0.032)	0.21*** (0.032)	0.203*** (0.031)	0.297*** (0.029)	0.302*** (0.03)	0.302*** (0.03)
South East	0.124*** (0.032)	0.144*** (0.032)	0.135*** (0.031)	0.149*** (0.031)	0.156*** (0.032)	0.153*** (0.031)
South West	-0.011 (0.038)	0.003 (0.038)	0.001 (0.038)	-0.045 (0.039)	-0.027 (0.039)	-0.032 (0.039)
Wales	-0.034 (0.048)	-0.033 (0.048)	-0.024 (0.048)	0.059 (0.048)	0.061 (0.049)	0.061 (0.048)
Scotland	0.047 (0.038)	0.053 (0.037)	0.048 (0.036)	0.065* (0.035)	0.069* (0.035)	0.065* (0.035)
Northern Ireland	-0.048 (0.054)	-0.024 (0.054)	-0.037 (0.054)	0.038 (0.046)	0.03 (0.046)	0.013 (0.046)
Response by somebody else	-0.008 (0.018)	-0.004 (0.017)	-0.005 (0.017)	0 (0.018)	-0.003 (0.018)	-0.003 (0.017)
1999	0.039 (0.073)	0.045 (0.073)	0.035 (0.072)	-0.086 (0.07)	-0.094 (0.068)	-0.097 (0.067)
2000	0.162*** (0.059)	0.154** (0.06)	0.155*** (0.059)	0.005 (0.055)	0.015 (0.055)	0.005 (0.055)
2001	0.246*** (0.076)	0.255*** (0.077)	0.274*** (0.076)	0.135* (0.077)	0.147* (0.076)	0.153** (0.076)
2002	0.261*** (0.07)	0.269*** (0.07)	0.28*** (0.07)	0.211*** (0.076)	0.21*** (0.075)	0.223*** (0.075)
2003	0.234*** (0.072)	0.236*** (0.072)	0.251*** (0.072)	0.244*** (0.073)	0.256*** (0.073)	0.262*** (0.073)
2004	0.185** (0.077)	0.196** (0.077)	0.208*** (0.077)	0.246*** (0.072)	0.257*** (0.071)	0.264*** (0.071)
2005	0.321*** (0.076)	0.319*** (0.077)	0.333*** (0.076)	0.25*** (0.075)	0.279*** (0.075)	0.286*** (0.075)
2006	0.31*** (0.069)	0.316*** (0.07)	0.328*** (0.07)	0.243*** (0.069)	0.249*** (0.068)	0.259*** (0.068)
2007	0.317*** (0.069)	0.31*** (0.069)	0.327*** (0.069)	0.203*** (0.072)	0.218*** (0.072)	0.226*** (0.072)
2008	0.269*** (0.064)	0.267*** (0.064)	0.281*** (0.064)	0.194*** (0.062)	0.204*** (0.062)	0.209*** (0.062)
2009	0.276*** (0.071)	0.279*** (0.072)	0.297*** (0.072)	0.255*** (0.068)	0.245*** (0.068)	0.259*** (0.067)
2010	0.221*** (0.074)	0.219*** (0.075)	0.238*** (0.075)	0.245*** (0.069)	0.253*** (0.069)	0.258*** (0.069)
2011	0.232*** (0.073)	0.226*** (0.074)	0.242*** (0.074)	0.199*** (0.068)	0.199*** (0.068)	0.208*** (0.068)
2012	0.275*** (0.07)	0.271*** (0.071)	0.29*** (0.07)	0.192*** (0.067)	0.205*** (0.067)	0.217*** (0.066)
2013	0.187*** (0.069)	0.189*** (0.07)	0.212*** (0.069)	0.116* (0.069)	0.119* (0.068)	0.125* (0.068)
2014	0.195*** (0.072)	0.191*** (0.072)	0.211*** (0.072)	0.161** (0.067)	0.173*** (0.067)	0.184*** (0.067)
2015	0.236*** (0.07)	0.244*** (0.071)	0.26*** (0.07)	0.165** (0.069)	0.176** (0.069)	0.186*** (0.068)
2016	0.159** (0.07)	0.167** (0.07)	0.182*** (0.07)	0.157** (0.067)	0.167** (0.067)	0.175*** (0.067)
2017	0.216*** (0.07)	0.222*** (0.07)	0.237*** (0.07)	0.181*** (0.068)	0.181*** (0.067)	0.191*** (0.067)
2nd quarter	-0.024 (0.023)	-0.031 (0.023)	-0.026 (0.023)	-0.029 (0.024)	-0.035 (0.023)	-0.034 (0.023)
3rd quarter	-0.003 (0.023)	-0.004 (0.022)	-0.001 (0.022)	-0.011 (0.023)	-0.012 (0.023)	-0.01 (0.023)
4th quarter	0.009 (0.024)	0.007 (0.023)	0.005 (0.023)	0.012 (0.023)	0.009 (0.023)	0.011 (0.022)
<b>OLS regression</b>						
Adjusted R-squared	0.277	0.291	0.299	0.252	0.263	0.27£
Observations	4,089	4,089	4,089	3,689	3,689	3,68£

Estimates are marginal effects. Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Baseline categories: all other AHSS subjects, 0-10 years since highest qualification, full-time job, permanent job, small employer, private sector job, not disabled, single, no child, white, answered by herself/himself, North West England, 1998, 1<sup>st</sup> quarter.

Source: London Economics' analysis based on the UK Labour Force Survey (1998-2017)





# LE

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