International Baccalaureate students studying at UK higher education institutions: How do they perform in comparison with A level students?

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Executive summary

Students enter higher education (HE) in the UK from a wide variety of educational backgrounds with differing academic qualifications. It is of interest to explore any differences in the characteristics or trends in the cohorts of students with different academic qualification prior to higher education, during and after their student journey.

The aim of this report is to compare students who enter UK HE with a qualification awarded by the International Baccalaureate Organization (IBO) and those entering with a more typical A level qualification.

The report begins by investigating differences between first year, full-time first degree International Baccalaureate (IB) and A level students enrolled in UK HE from 2013/14 to 2018/19 by their background characteristics including domicile, entry qualification grade, equal opportunities and widening participation. Following this, comparisons are made on the type of HE providers that IB and A level students attend and the subject areas that they are enrolled on.

On successful completion of a HE qualification, students become "qualifiers". Differences between the achievement of qualifiers from 2013/14 to 2018/19 who hold an IB or A level qualification are analysed; this is further investigated by subject.

The Higher Education Statistics Agency (HESA) Destinations of Leavers from Higher Education (DLHE) survey was collected 6 months after successful completion of their qualification; qualifiers become known as "leavers". The survey results give insight into whether leavers engage in work or study post-HE. Differences between leavers in 2013/14 to 2016/17 who hold an IB or A level qualification by post-HE activity are explored, including type of further study, occupation, and industry, as applicable. The median salaries of IB and A level leavers in work by subject area of study are compared.

Investigations into background demographics in the report show that the cohorts of IB and A level students, qualifiers and leavers differ. Propensity score matching is used to create matched IB and A level samples for each of the student, qualifier and leaver cohorts to examine the effect of enrolling on an IB diploma on several outcomes of interest. These outcomes of interest include, amongst others, enrolment at a Top 20 HE provider for students, achieving a first class honours degree for qualifiers and engagement in an activity with a study element for leavers.

The results show that students holding an IB Diploma are 3.02 times more likely than students holding an A level qualification to enrol at a Top 20 higher education provider, after controlling for academic ability. At the same time, students holding an IB Diploma are 36% less likely to enrol in a STEM subject course in their first year of study, when compared with students with an A level qualification. IB diploma students were 21% more likely than A level students to continue at the HE provider or leave after gaining their intended award or higher.

Among students awarded first degree qualifications in the UK, students holding an IB Diploma have higher odds of earning a first- class honours degree than A level holders, when controlling for academic ability. Achieving at least a second-class honours degree was also significantly associated with pre-HE qualification; IB diploma qualifiers are 40% more likely than A level qualifiers to obtain at least an upper second-class honours degree.

Regarding the outcomes of leavers, IB diploma degree holders were 38% more likely to be engaged in an activity with a study element, while they were 25% less likely to be engaged in an activity with a work element after successful completion of an HE degree, compared with A level holders.

Contents

Introduction

This report provides a comparative in depth-analysis of students who enter UK higher education with an International Baccalaureate (IB) qualification to those who enter with A level qualifications, with a focus on enrolment at Top 20 UK higher education (HE) providers, enrolment on Science Technology Engineering or Mathematics (STEM) subject, continuation into the second year, achievement of first class honours degree, and activity six months post completion of first degree.

The IB qualification is studied by students aged 16-19 in schools around the world. The Diploma Programme (DP) curriculum consists of courses in six subject groups (studies in language and literature, language acquisition, individuals and society, sciences, mathematics and the arts) and the DP core. The DP core comprises theory of knowledge (TOK), an extended essay (EE) and a project about creativity, activity and service (CAS). Students are awarded 1-7 points on completion of the subject courses (7 being the highest) and up to 3 extra points for their performance in TOK and EE. The full diploma is awarded to students who achieve at least 24 points; those who achieve fewer than this or take fewer subject courses are awarded IB diploma programme course results. The full IB diploma qualification is referred to as IB diploma and IB diploma programme course qualifications are referred to as IB course throughout this report.

A level qualifications are traditionally studied by school students in England, Wales and Northern Ireland aged 16-18[1] over two years and are offered in a wide variety of subjects. Students have the freedom to study subjects of their choice. A levels are graded A* to E based on student performance (see Definitions section for more information). There is no limit to the number of A level subjects a student can study, but typically it is 3 or 4. HE providers have different entrance requirements; A level qualifications are one of them, with offers to students usually being made on 3 A levels.

Data sources

The report combines data sourced from both the International Baccalaureate Organization (IBO) and the Higher Education Statistics Agency (HESA).

IBO maintains an information system (IBIS) that holds information about students around the world who have taken at least one IB examination. HESA collects information about the academic career of students prior to their enrolment in HE, their achievement at HE and their destination after leaving HE. HESA have linked the individual IB student records to HESA student records to identify students holding IB qualifications to enable the tracking of students through their academic career.

The IB cohort is based on students known to hold an IB qualification from IBIS who successfully link to the HESA data. Detailed information about students' qualifications prior to starting HE was collected by HESA for entrants from 2007/08 onwards. This information only covers a subset of students who apply to HE through the admissions service responsible for managing applications to HE courses in the UK (UCAS). Only information on qualifications for which the students passed prior to entering HE are held in the HESA record. IBIS also includes qualifications which were taken but not passed.

Successful linking between the HESA record and IBIS enabled HESA to identify students in the HESA record who were known to hold an IB qualification. The IB cohort is therefore comprised of all students in the HESA record who have a successful link to the IBO datasets and the qualification information from that record can be utilised.

Some of the information that the HESA record contains is returned from an entrant's UCAS application form via the student's HE provider. If an entrant does not apply through UCAS, the HE provider is encouraged to complete this information but that is not always the case and so may return unknown. This creates missing values for qualifications on entry, a student's previous school and socio-Economic classification (SEC), to name but a few.

The IB cohort comprises those with an IB diploma or at least one IB course qualification. The data specifies whether this qualification is received or not received, and the points awarded on the completion of the qualification.

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[1] . Advanced Higher qualifications are taken by school students in Scotland aged 16-18 after they have completed Higher qualifications, they are not considered within this report.

The A level cohort is defined as a student whose highest qualification on entry is at least 3 A levels, double A levels (counted as two qualifications) with grades A* through E.

The report contains two parts. The first section provides an overview and descriptive statistics of the IB cohorts shown alongside the equivalent A level cohorts. The second section examines higher education enrolment and outcomes of IB Diploma and A level holders matched using propensity score matching. Analysis in this report focusses on full-time first degree qualifications at UK HE providers.

Throughout the report, any percentages, medians and quartiles calculated on small populations have been suppressed (see rounding strategy for details). Suppressed values are represented as '..' in the tables.

Section 1. Descriptive comparison of IB and A level holders

Time series of student cohorts

Within the section regarding students at UK HE providers, references to IB students/ A level students are students who were in their first year of study enrolled on a full-time first degree at a UK HE provider with an IB qualification or A level qualifications, respectively.

Between 2013/14 and 2018/19 there has been an overall decrease in IB and A level students from 211,495 to 204,550. Despite this, we see from Figure 1 that the number of IB students identifiable in the HESA data has risen from 7,105 in 2013/14 to 12,560 in 2018/19.

The overall drop appears to be driven by fewer A level student enrolments, with the number of falling from 204,395 students in 2013/14 to 191,990 students in 2018/19. This is despite a peak in A level students observed in 2015/16 when 211,725 commenced their studies.

Figure 1 Time series of first year full-time first degree students by entry qualification, 2013/14 to 2018/19
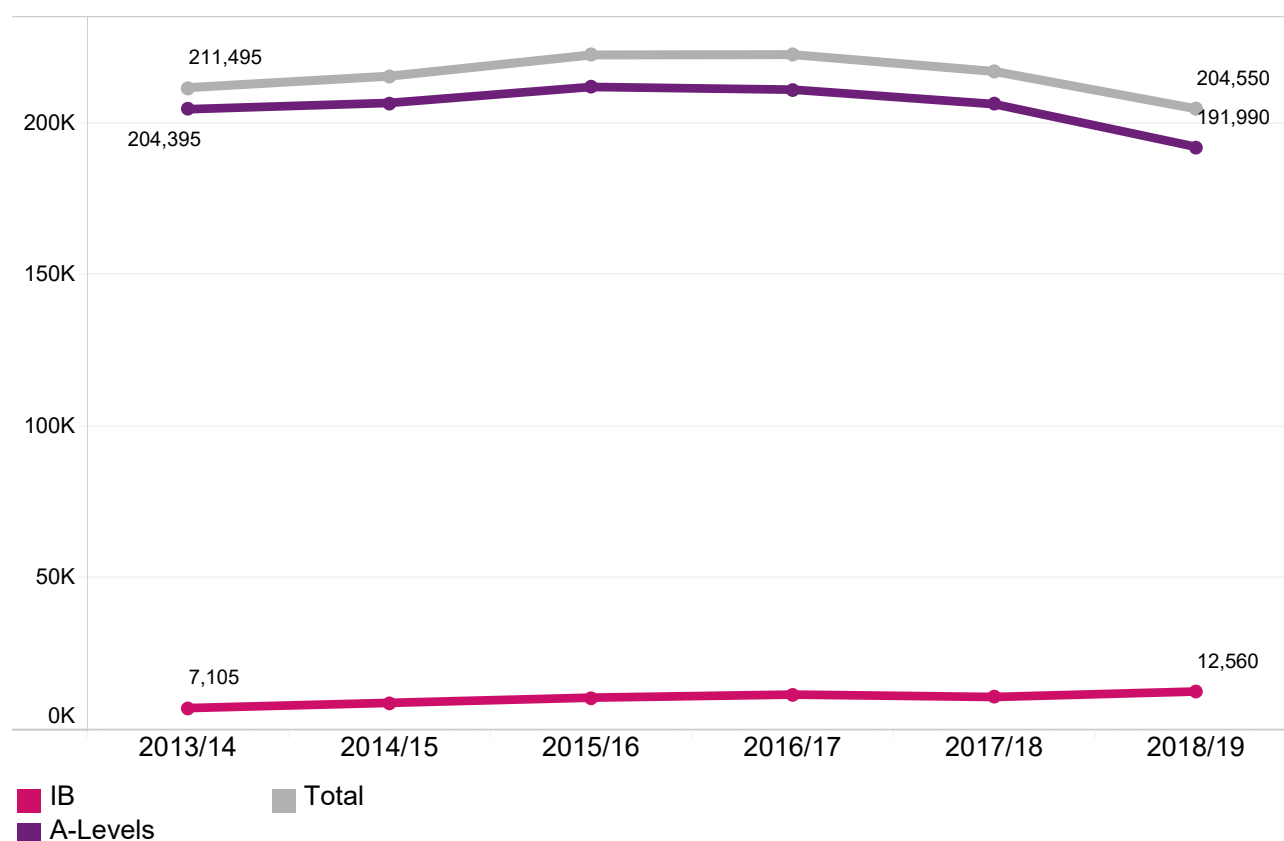
Figure 2 shows the breakdown of the entry qualifications by sex. Both IB and A level students across all years have a greater number of female than male enrolments.

In 2018/19, of the IB students, 43.9% were male and 56.0% were female. This closely reflects the proportions in the equivalent A level cohort, with 43.2% male students and 56.8% female students.

Figure 2 First year full-time first degree students by entry qualification and sex, 2013/14 to 2018/19
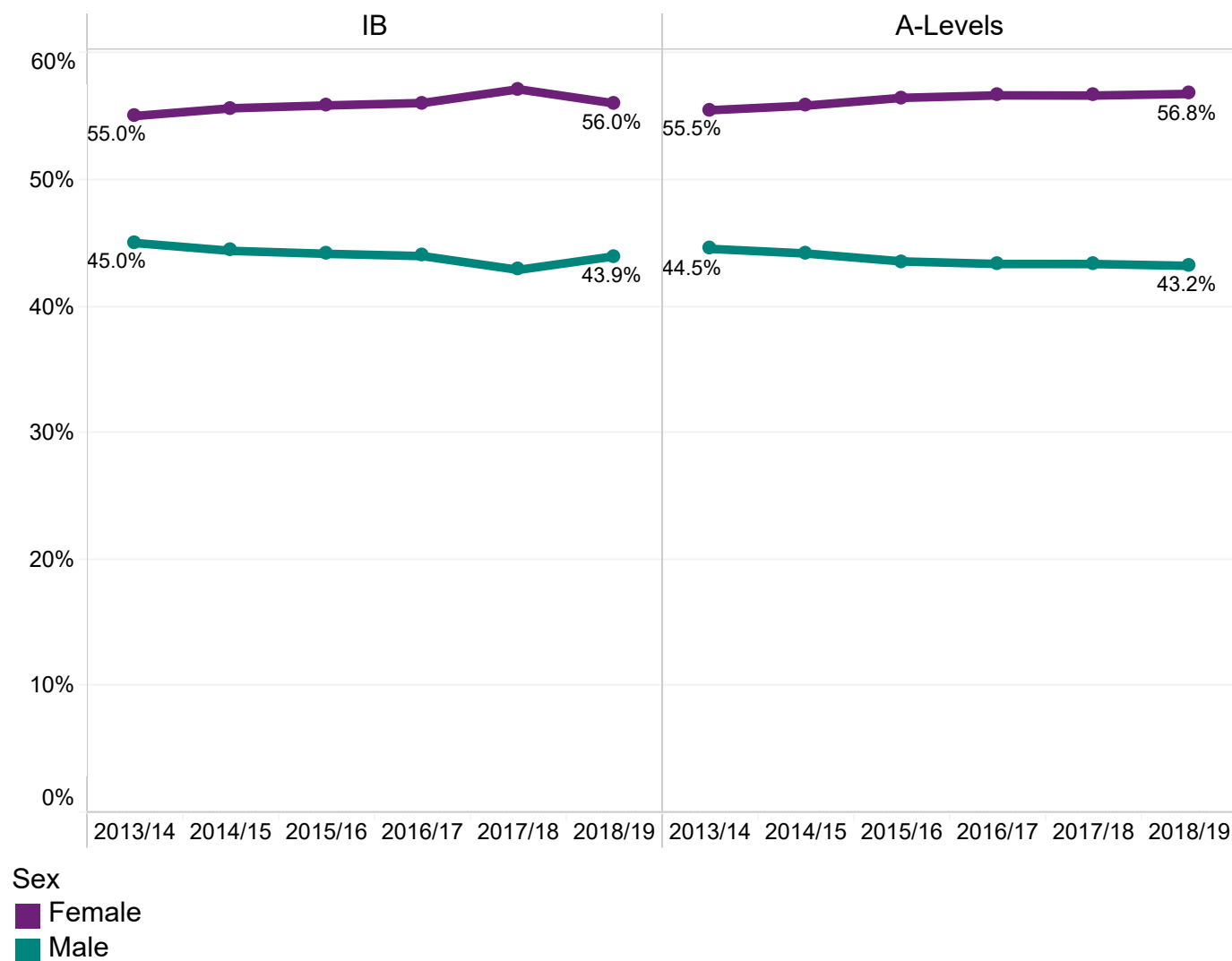
Domicile of students

Students can enter HE in the UK from anywhere in the world. 92.8% of IB and A level students in 2018/19 are noted to have the UK as their permanent residence prior to starting an HE course (referred to as UK domiciled). The majority of A level students were UK domiciled (97.0%) in 2018/19, compared to 28.1% of IB students. This is most likely due to the fact that A levels are UK based post-16 qualifications and overall high proportions of students stay in the UK to study.

Figure 3 shows that the proportion of UK domiciled A level students has increased since 2013/14, whereas the proportion of the equivalent IB students has decreased from 33.9% in 2013/14 to 28.1% in 2018/19. This decrease appears to be primarily because of a rise in Non-EU domiciled IB students from 38.1% in 2013/14 to 45.4% in 2018/19.

Figure 3 First year full-time first degree students by entry qualification and domicile, 2013/14 to 2018/19

Domicile
- UK
- EU
- Non-EU
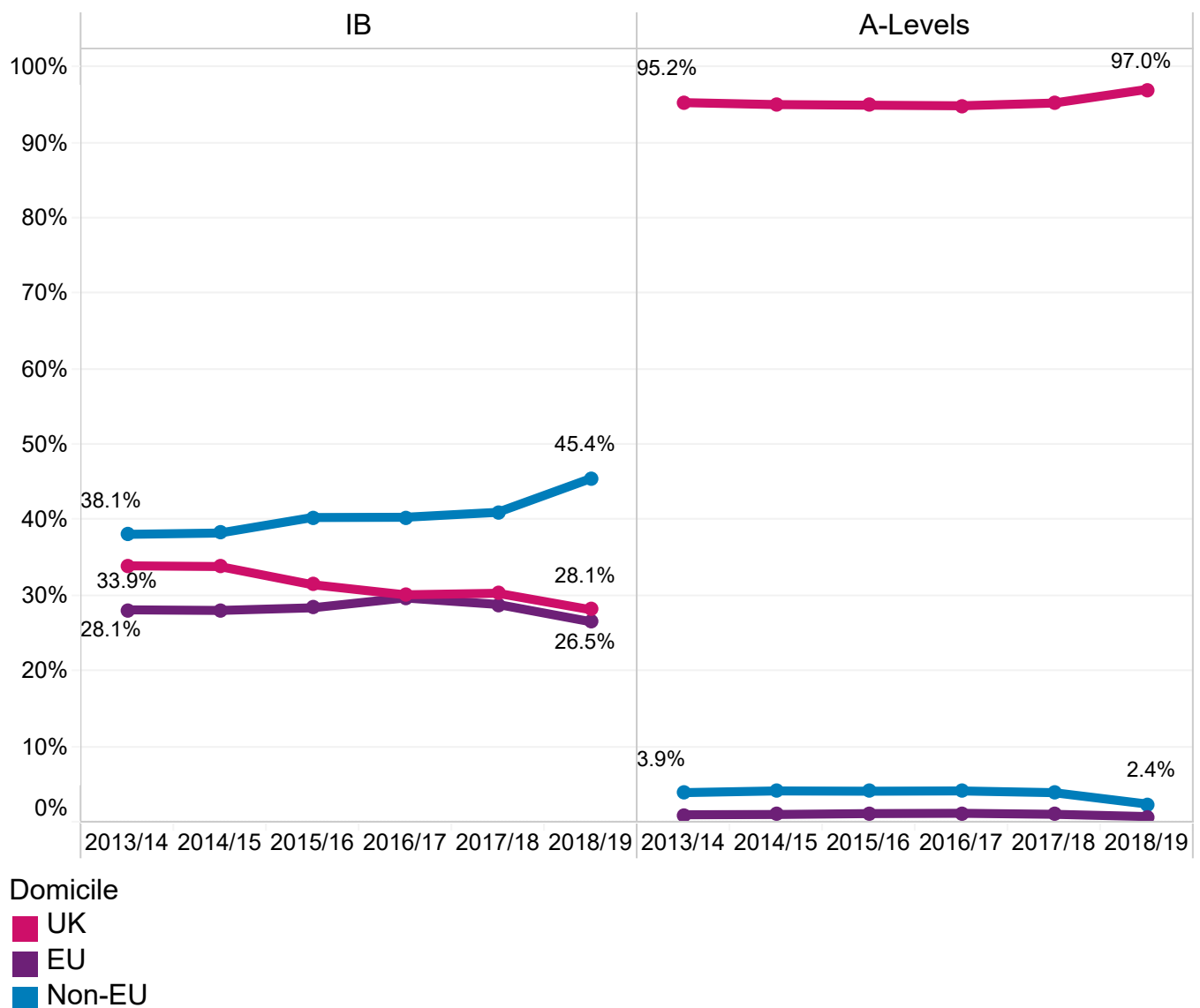
Considering only IB students who were domiciled from outside the UK, Figure 4 shows that most IB students in 2018/19 were from either the EU (36.8%) or Asia (34.4%). Figure 5 shows the top 10 countries, of which 5 are located in Asia and 4 in the EU. These countries make up nearly half (49.8%) of all IB students from outside the UK.

Figure 4 First year full-time first degree non-UK domiciled students with an IB qualification by region of domicile, 2018/19
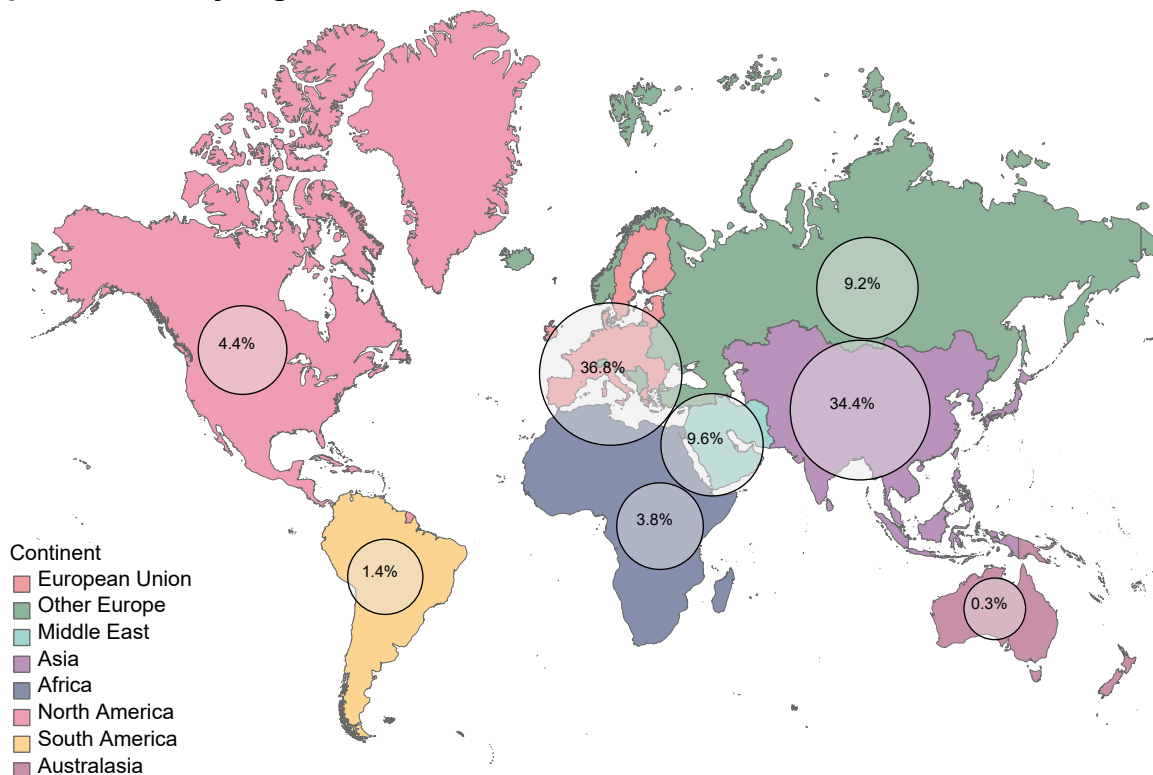
Figure 5 Top 10 non-UK countries of domicile for first year full-time first degree IB students, 2018/19
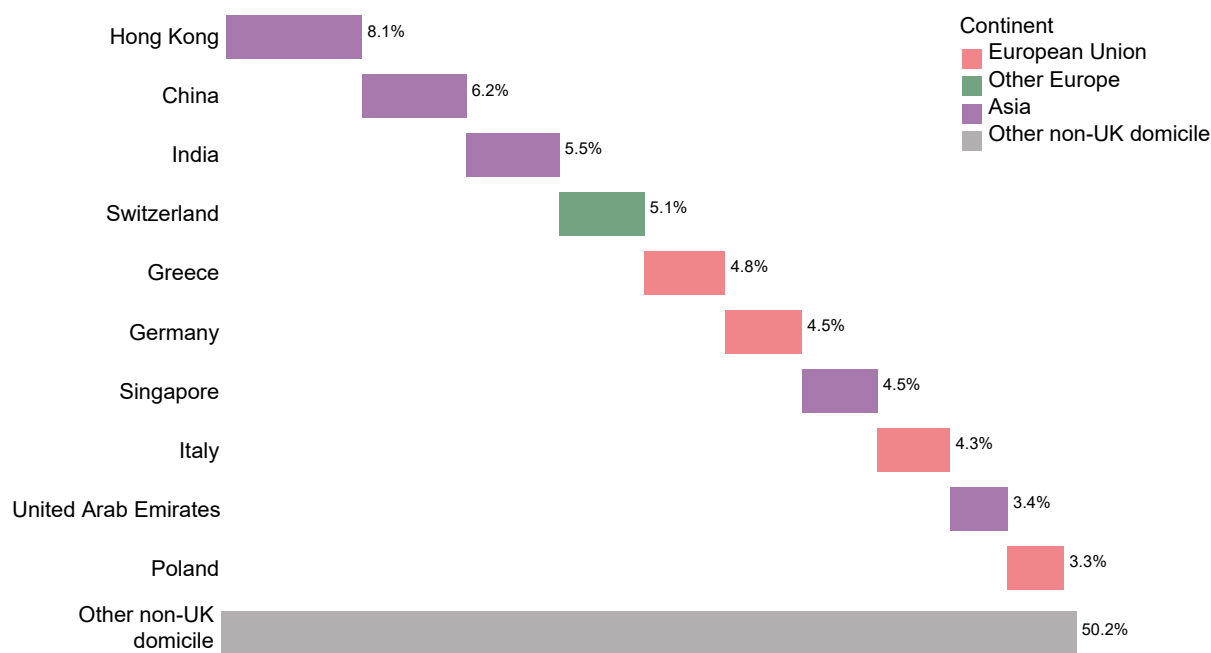
Region of domicile for UK domiciled students

Increasing the level of granularity in the data, we can see more precise regions that UK domiciled students come from. Figure 6 shows the percentage of IB and A level students from each UK region. Comparing these numbers with population figures for 2019 published by the ONS reveals some interesting insights relating to IB students. The South East and London make up 27.1% of the UK population, but these regions account for 58.5% of UK domiciled IB students in 2018/19.

As most young people in the UK attend a school or college where A levels are the standard post-16 qualification (with the exception of Scotland where Highers are the most common), it comes as no surprise that the most populated regions account for the most A level students and that roughly continues as we go down to the least populated regions. Students domiciled from the north of England seem to be disproportionately less likely to have entered UK HE with an IB qualification than those from the south.

Figure 6 First year full-time first degree IB and A level students with a known UK domicile by region of domicile and entry qualification, 2018/19
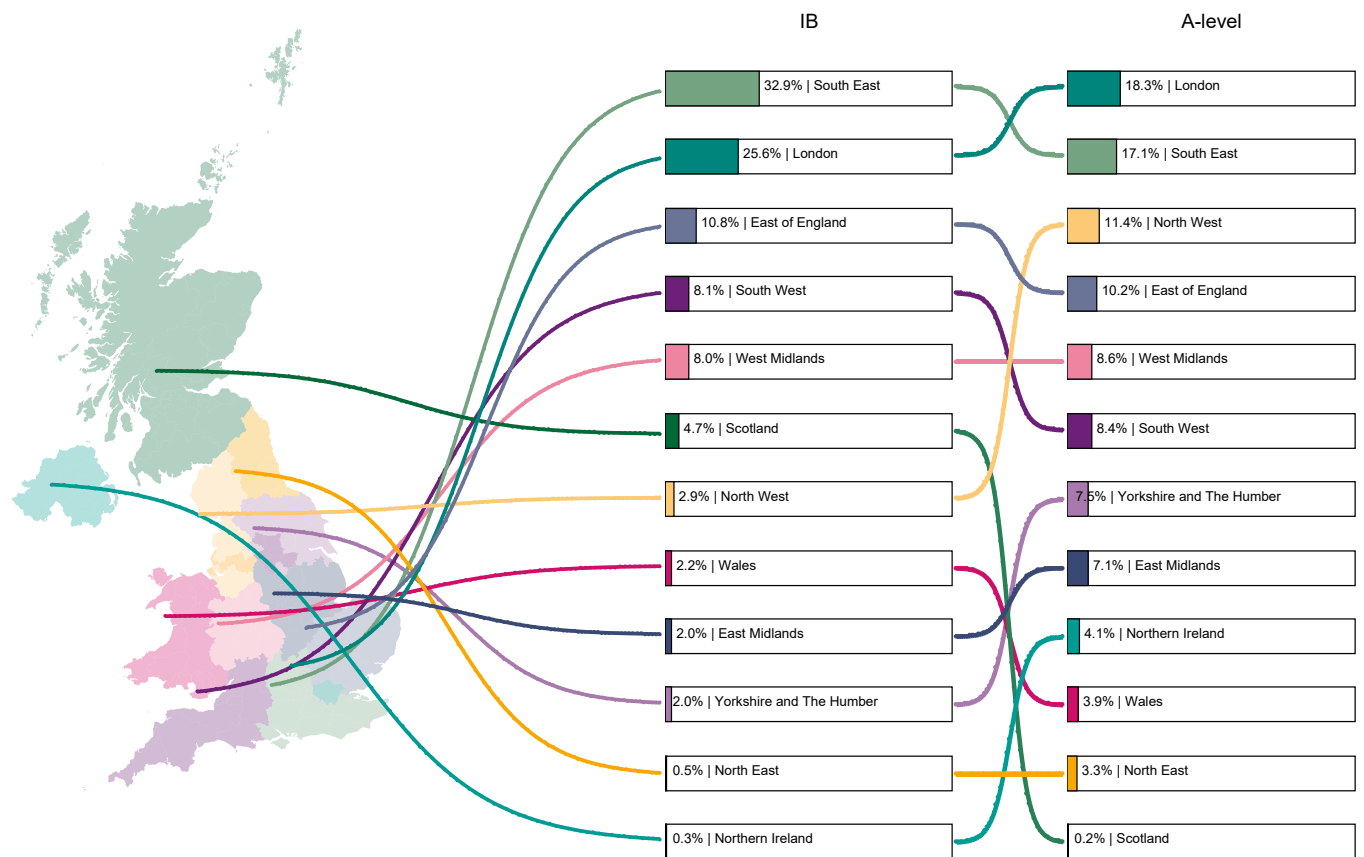
Equal opportunity and widening participation

This section concentrates on equal opportunity and widening participation background characteristics of IB and A level students, looking at participation of certain groups that are underrepresented in HE. Ethnicity, socio-economic classification, school type and low participation neighbourhood information is routinely collected only for UK domiciled students, so this section is restricted to students who were living in the UK prior to entering HE.

The proportion of IB and A level students from a black, Asian and minority ethnic (BAME) background has been increasing year on year between 2013/14 (20.9%) and 2018/19 (25.7%). The largest increase was seen amongst A level student, increasing 4.7 percentage points from 21.0% to 25.7%, which was higher than IB students (25.3% in 2013/14, 29.2% in 2018/19.

The least represented ethnicity is black, regardless of entry qualification, with overall numbers rising marginally from 4.3% in 2013/14 to 5.1% in 2018/19. The increase is driven amongst IB and A level students with black IB students rising from 5.5% in 2013/14 to 6.8% in 2018/19, and black A level students rising from 4.3% in 2013/14 to 5.1% in 2018/19.

The proportion of Asian students has also increased for all entry qualifications, arriving at 10.6% for IB students and 14.0% for A level students in 2018/19. Regardless of entry qualification, there has been a rise in the proportion of Asian students of 2.4 percentage points since 2013/14 (reaching 13.9% in 2018/19).

The proportion of other ethnicities (including those from a mixed or other ethnicity) has also risen for all entry qualifications.

Figure 7 UK domiciled first year full-time first degree students by entry qualification and ethnicity, 2013/14 to 2018/19
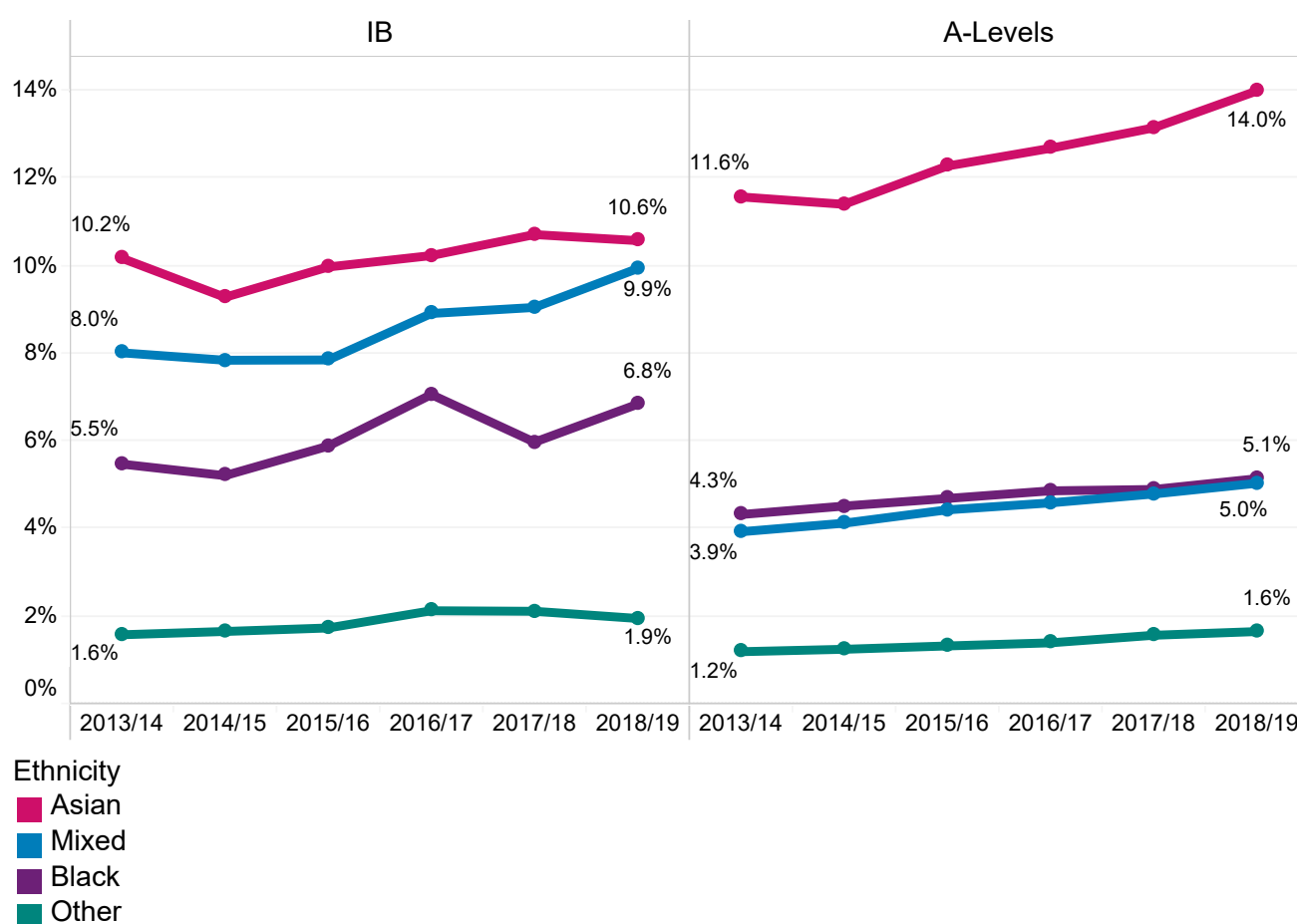
Information about the neighbourhood a student was living in prior to entering HE is based on the POLAR4 method developed by HEFCE. It is an update of POLAR3, using cohorts of students who were aged 15 at the start of academic years 2006/07 to 2011/12 and hence could have entered HE between 2009/10 and 2014/15. Students whose postcodes fall within wards with the lowest 20% of participation rates are denoted as being from a low participation neighbourhood.

Figure 8 shows there has been very little change among A level students, rising by 0.5 percentage points between 2013/14 and 2018/19. The proportion of the equivalent IB students from low participation neighbourhoods has decreased from 6.6% in 2013/14 to 5.8% in 2018/19.

Figure 8 UK domiciled first year full-time first degree students from low participation neighbourhoods (POLAR4) by entry qualification, 2013/14 to 2018/19

Entry qualification
- A-Levels
- IB
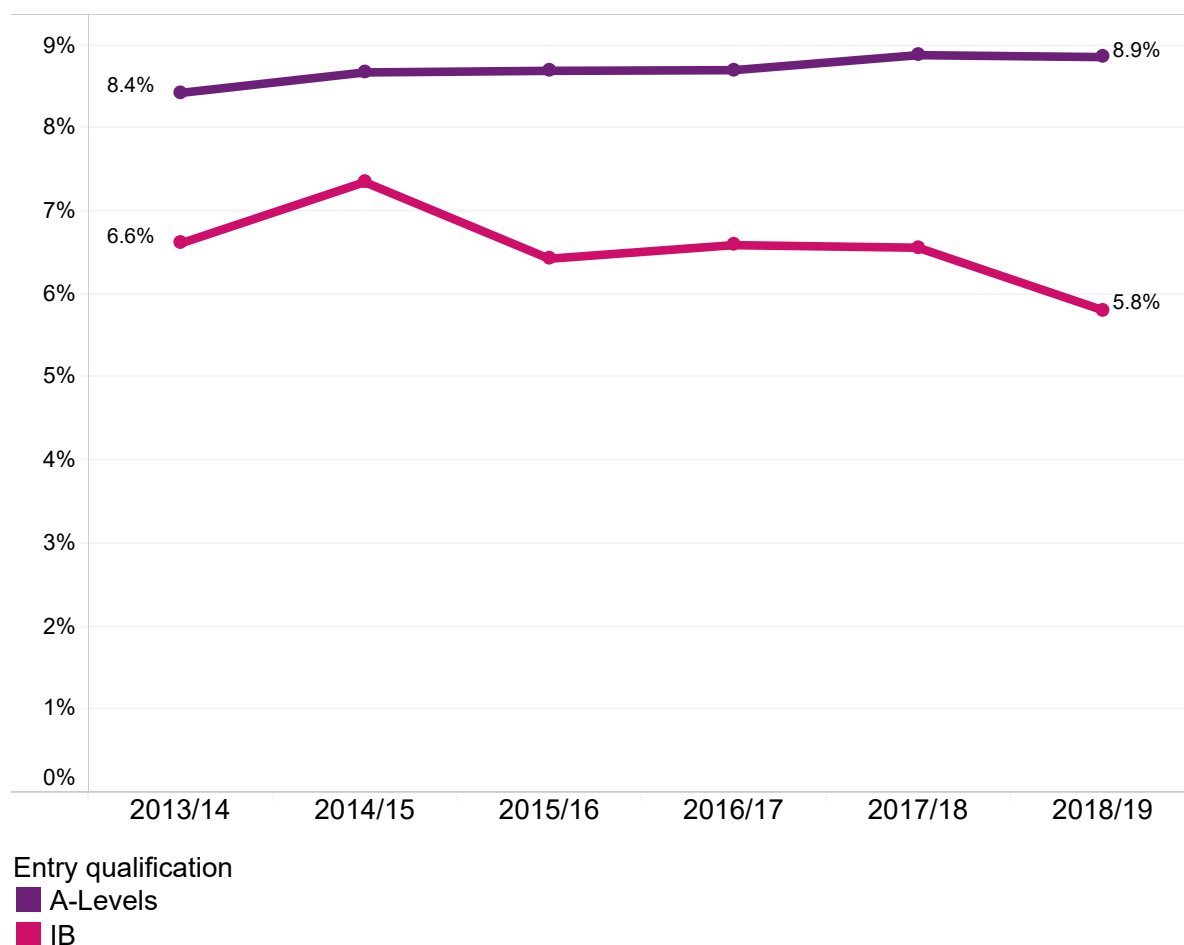
Socio-economic classification (SEC) of UK domiciled students aged under 21 refers to the occupation of their parent of guardian, whilst the data corresponds to their own occupation if they are aged 21 and over. SEC information is either not classified or unknown for between 6.8% and 8.5% of IB and A level students between the 2013/14 and 2018/19 academic years. These students have been excluded from further calculations regarding SEC.

In 2018/19, 'higher managerial and professional occupations' was the most common classification for all students regardless of entry qualification (47.3% IB and 32.2% A level).

Figure 9 shows a higher percentage of students are from higher socio-economic classification (1-3) than lower socio-economic classification (4-7) for both entry qualifications.

Figure 9 Proportion of UK domiciled first year full-time first degree students in socio-economic classification 1-3 by entry qualification, 2013/14 to 2018/19

Entry qualification
- A-Levels
- IB
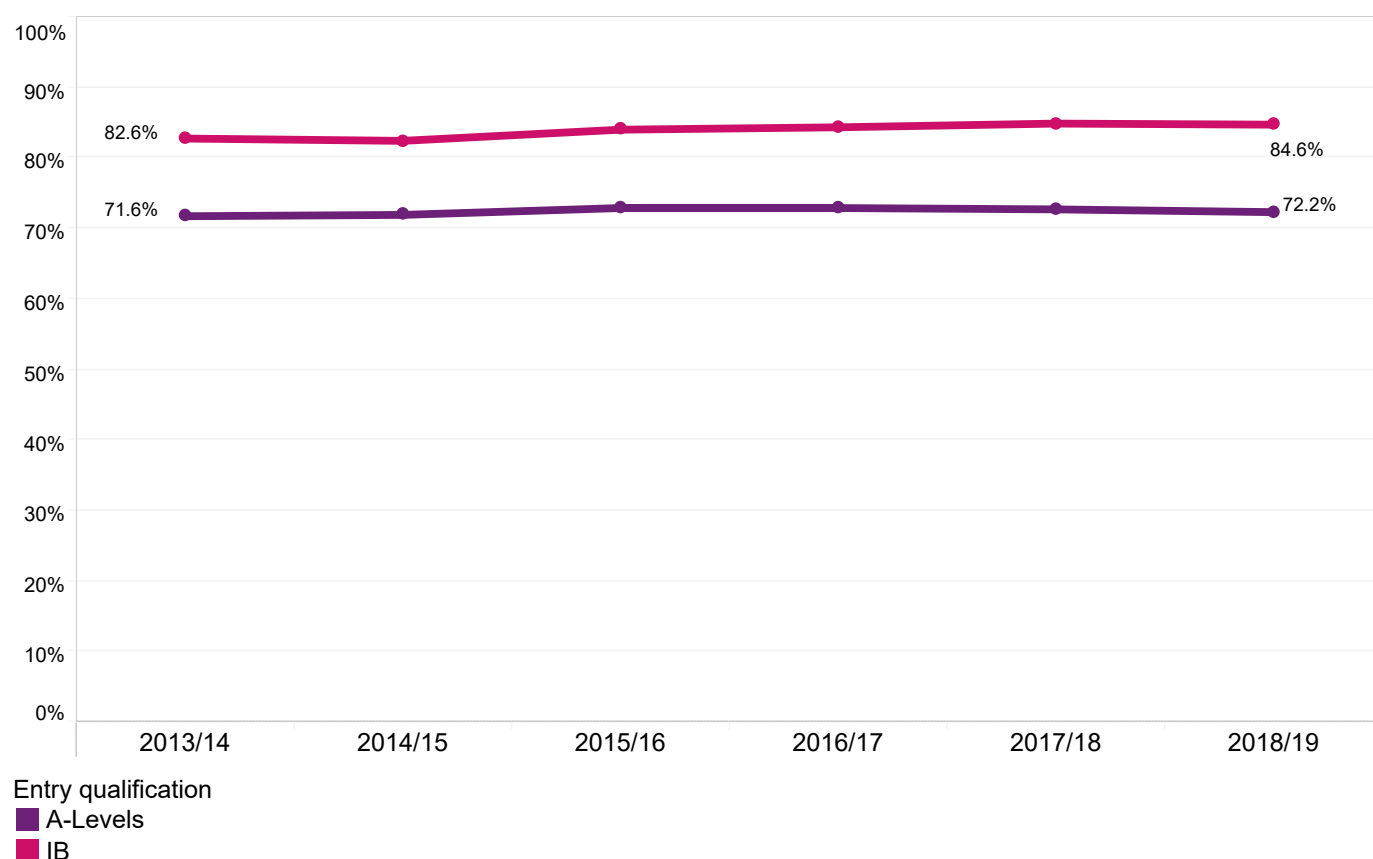
Undergraduate students entering HE through UCAS declare the school or college they have previously attended. Where known school codes have been returned and categorisation is applicable, they can be categorised into two types: state-funded schools (including colleges and publicly funded HE providers) and privately funded schools.

Figure 10 shows that there has been little change in the proportion of A level students who attended privately-funded schools, with 12.7% coming from these schools in 2018/19. Among IB students, there has been a rise in the proportion who attended privately-funded schools from 40.6% in 2013/14 to 46.1% in 2018/19.

There is a simple explanation to the proportion of IB students who attend private schools being so much higher than their A level counterparts. While A levels are offered by the vast majority of UK state and independent schools, just 96 schools in the UK currently offer an IB diploma programme; 24 are state-funded and 72 are privately funded[2]. It is therefore clear that these figures are influenced by the fact that IB qualifications are more frequently available in privately funded schools than in state schools.

Figure 10 - Proportion of UK domiciled first year full-time first degree students who previously attended a privately funded school by entry qualification, 2013/14 to 2018/19

Entry qualification
- IB
- A-Levels
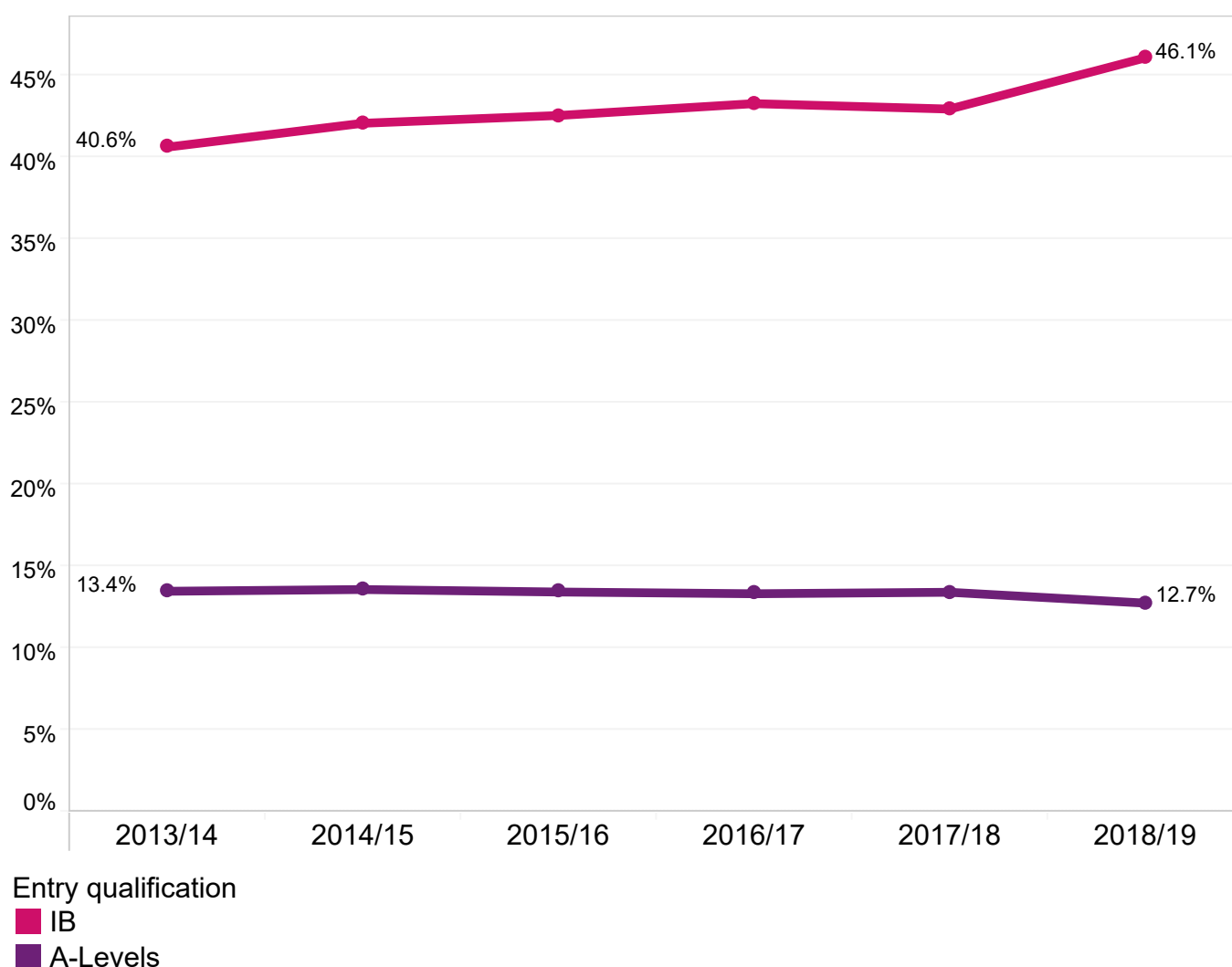
Student entry qualification achievement

IB students are awarded a point score based on their success in several components of the IB qualification. A level students are awarded grades (A* to E) for each qualification taken, which can be converted into a numerical tariff score. Using information available through UCAS[3] A level tariff score has been mapped to IB point score for this section and subsequent places where there is a comparison of entry qualification achievement.

Figure 11 shows the point scores of IB and A level students who previously attended a privately funded school (excluding students with a point score of 0 for the relevant qualification). For IB students, as the score increased, so did the proportion of students from a privately-funded school. This relationship becomes so strong for students with a score of 40 or more that the proportion of those from a privately funded school was greater than from a state-funded school or college (64.7 % from a privately funded school vs 35.3 % from a state-funded school or college).

A similar trend is seen among A level students who previously attended a privately funded school, though not to such an extreme level. Within the point score bands of A level students, there were never more than 21.2% of students from a privately funded school or college.

Figure 11 Percentage of first year full-time first degree students who previously attended a privately funded school by entry qualification and point score, 2018/19

	IB	
<24	18.2%
24-27	29.0%
28-31	38.7%
32-35	42.7%
36-39	47.8%
40-43	61.5%
44+	78.3%
	A-Levels	
<24	6.1%
24-27	7.7%
28-31	10.6%
32-35	14.9%
36-39	18.1%
40-43	19.3%
44+	21.2%
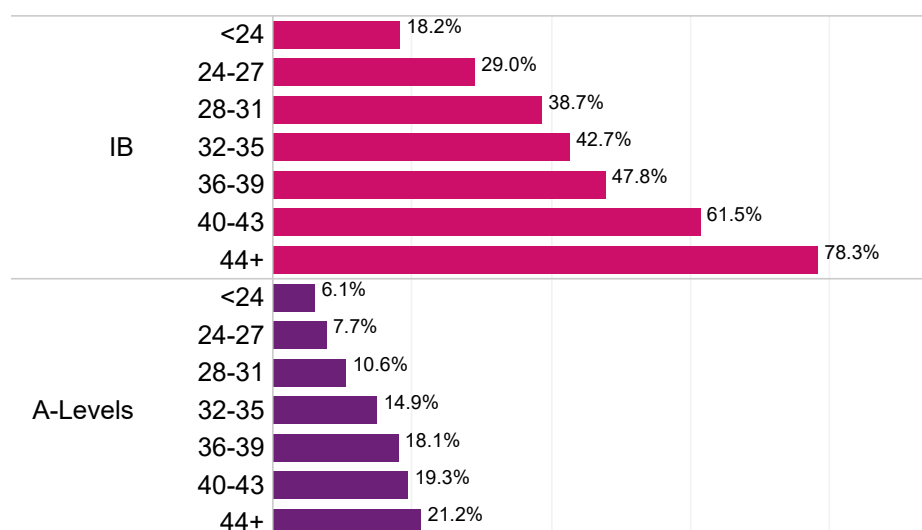
Region of HE provider

IB and A level students were enrolled at 160 HE providers around the UK. Of these providers, 129 were in England across 9 Government Office regions, 9 were in Wales, 18 in Scotland and 4 in Northern Ireland.

Figure 12 shows the proportion of IB and A level students by region of HE provider. The most popular location of HE provider for IB students was London (28.7%), followed by the South East (14.0%) and South West (11.2%). Over half of IB students chose to study in one of these three regions. The popularity of locations of HE providers was much more geographically spread around the UK for equivalent A level students; the most popular locations were the South East (14.1%), London (12.4%) and the North West (11.9%).

There appears to be a difference in the popularity of region of location of HE providers for EU domiciled IB students. London is the most popular region for IB students regardless of domicile (UK 18.7%; EU 32.7%; Non-EU 32.6%). Following this, the most popular locations of HE providers for UK and Non-EU domiciled IB students were the South East (15.1%; 12.6%) and South West (14.6%; 10.1%). For EU domiciled students, the second most popular region was Scotland (16.5%) followed by the South East (15.1%). Comparatively, Scotland was the fourth most popular location of HE provider for Non-EU domiciled IB students and sixth for UK domiciled students.

There are many reasons for a particular region of HE provider being more popular that another. This may include the number, the size or the reputation of HE providers in the region. As London is the capital of the UK, it may explain the popularity of attendance at HE providers within this region. London and the South East are also the most populated areas of the UK so these proportions could be weighted by students not wishing to travel too far from home for university. The popularity of Scotland with EU students may be due to the reduced fees charged at Scottish HE providers in comparison to other UK HE providers.

Figure 12 First year full-time first degree IB and A level students by region of HE provider and entry qualification, 2018/19
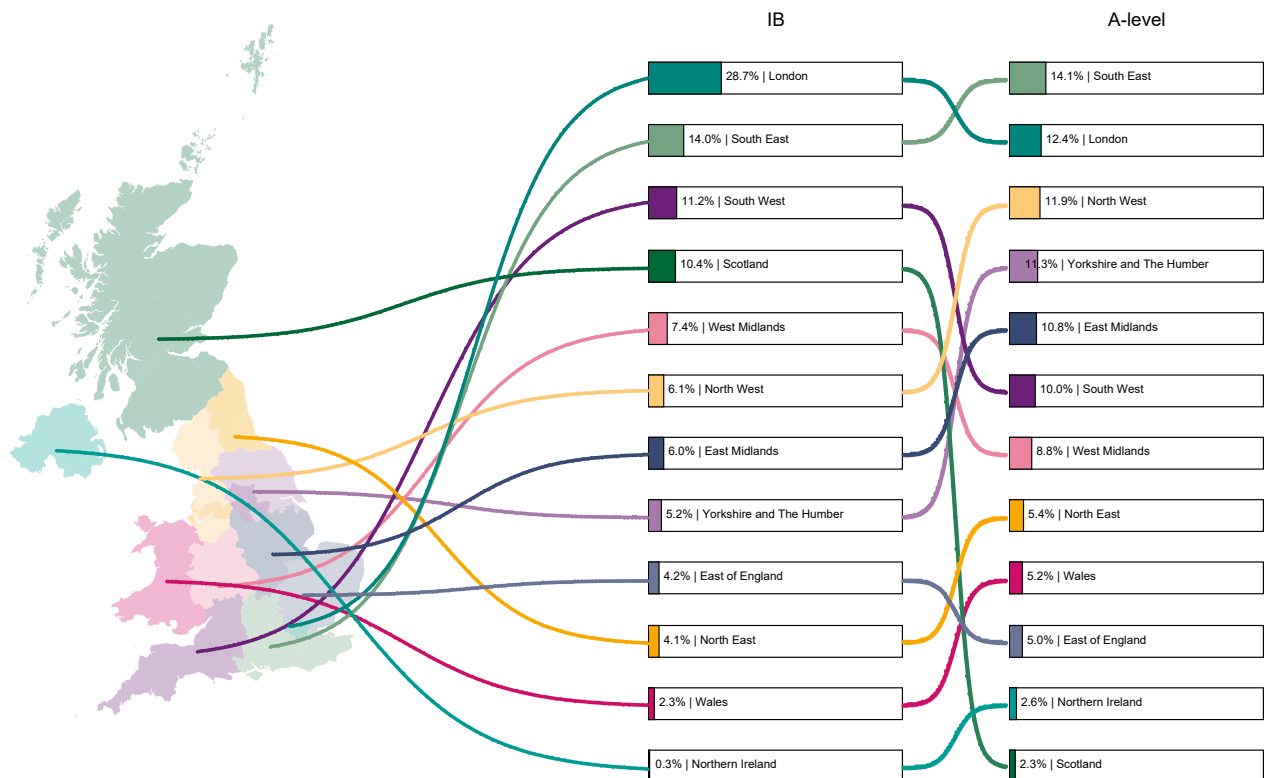
Top-ranked HE provider

A Top 20 HE provider list[4] was collated using The Complete University Guide League Table 2020, The Guardian University Guide 2020 and The Times University Guide 2020, taking into consideration the top providers across all three lists.

Figure 13 shows that in 2018/19, 45.0% of IB students were at a Top 20 HE provider compared to 27.2% of A level students. Analysing IB students at a more granular level, we see 47.1% of IB diploma students attended one of these providers, compared to 18.4% of IB course students.

Figure 14 shows that students were more likely to attend a Top 20 HE provider if they achieved higher grades in their IB or A level qualifications. Different HE providers have different entry requirements, and, as a general rule, the HE providers that are placed higher in the league tables have higher expectations of the students prior to enrolment.

Figure 13 Percentage of first year full-time first degree students at a Top 20 HE provider by entry qualification 2018/19
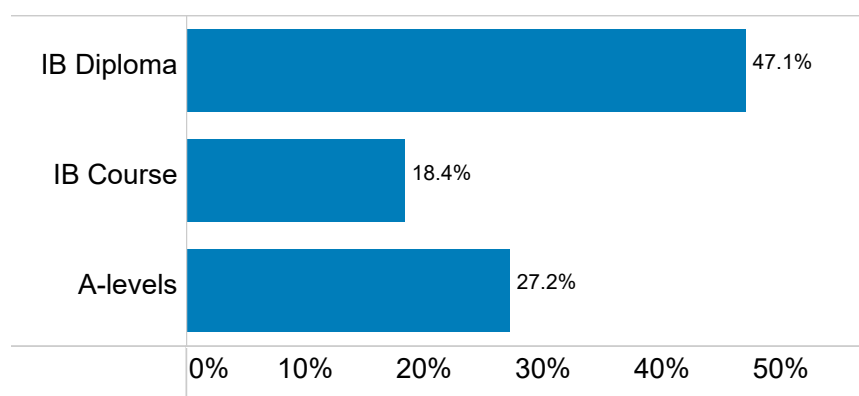
Figure 14 Percentage of first year full-time first degree students at a Top 20 HE provider by IB point score and entry qualification 2018/19

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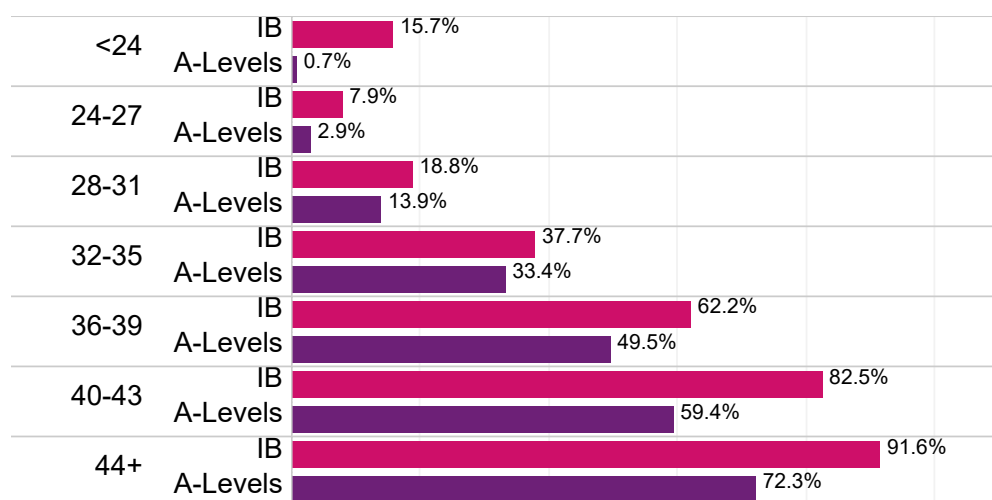
[4] The Top 20 HE provider list is provided in the definitions section at the end of the report.

Subject area

UK HE providers offer a wide range of subjects to study. Enrolment by subject area differed within, and between the cohorts of IB and A level students. Subject areas can be separated into two groups: STEM and non-STEM subjects. STEM subjects were more popular with A level students (45.5%) than IB students (39.7% of IB diploma students; 29.1% of IB course students).

Figure 15 shows the breakdown of subject areas by entry qualification for 2018/19. The most popular subjects studied by IB course students were business & administrative studies (24.8%) and creative arts & design (14.6%). The most popular subjects studied by IB diploma students were business & administrative studies (15.8%), social studies (15.5%) and biological sciences (11.7%). This was mirrored for A level students but ordered differently, the most popular being social studies (13.3%) followed by biological sciences (12.8%) and business & administrative studies (9.5%).

Law was more popular with IB diploma students than A level students (7.5% and 5.3% respectively), as was medicine & dentistry (5.0%, 3.2% respectively). A level students were more than twice as likely to study mathematical sciences compared to IB diploma students (3.9% and 1.6% respectively). Education (2.3% and 0.4% respectively) and subjects allied to medicine (7.3% and 4.6% respectively) were also notably more popular among A level students than IB diploma students.

Figure 15 First year full-time first degree students by subject area and entry qualification, 2018/19

Subject area	IB Diploma	IB Course	A-levels
1 Medicine & dentistry	5.0%	2.8%	3.2%
2 Subjects allied to medicine	4.6%	3.1%	7.3%
3 Biological sciences	11.7%	7.6%	12.8%
4 Veterinary science	0.5%	0.4%	0.4%
5 Agriculture & related subjects	0.5%	0.1%	0.6%
6 Physical sciences	4.3%	2.8%	6.3%
7 Mathematical sciences	1.6%	1.4%	3.9%
8 Computer science	4.0%	3.5%	3.6%
9 Engineering & technology	6.8%	7.7%	6.7%
A Architecture, building & planning	2.4%	2.1%	1.8%
B Social studies	15.5%	10.5%	13.3%
C Law	7.5%	5.8%	5.3%
D Business & administrative studies	15.8%	24.8%	9.5%
E Mass communications & documentation	2.1%	4.2%	2.4%
F Languages	5.3%	3.6%	6.8%
G Historical & philosophical studies	5.7%	2.7%	6.1%
H Creative arts & design	5.9%	14.6%	7.6%
I Education	0.4%	1.8%	2.3%
J Combined	0.4%	0.5%	0.2%

Figure 16 shows IB and A level students by subject area and domicile. There are some interesting differences between UK and non-UK domiciled students within subject areas regardless of entry qualification. Business & administrative studies were more popular with non-UK students than UK students for both IB (9.9% UK; 19.0% non-UK) and A level (9.3% UK; 17.3% non-UK) students. Languages stand out as being notably more popular among UK students (9.9% IB; 6.9% A level) than their non-UK counterparts (3.4%; 3.1%).

Figure 16 First year full-time first degree students by subject area, entry qualification and domicile, 2018/19

	IB		A-Levels	
	UK	Non-UK	UK	Non-UK
1 Medicine & dentistry	6.9%	4.0%	3.2%	3.0%
2 Subjects allied to medicine	5.7%	4.0%	7.4%	4.4%
3 Biological sciences	12.3%	11.1%	12.9%	8.2%
4 Veterinary science	0.5%	0.5%	0.4%	0.3%
5 Agriculture & related subjects	0.5%	0.4%	0.6%	0.2%
6 Physical sciences	4.8%	3.9%	6.3%	4.8%
7 Mathematical sciences	1.1%	1.8%	3.8%	8.1%
8 Computer science	3.6%	4.1%	3.5%	4.6%
9 Engineering & technology	4.2%	7.9%	6.5%	12.8%
A Architecture, building & planning	2.0%	2.5%	1.7%	2.9%
B Social studies	16.2%	14.7%	13.3%	13.6%
C Law	5.3%	8.1%	5.3%	6.3%
D Business & administrative studies	9.9%	19.0%	9.3%	17.3%
E Mass communications & documentation	1.4%	2.6%	2.4%	1.5%
F Languages	9.9%	3.4%	6.9%	3.1%
G Historical & philosophical studies	8.7%	4.2%	6.2%	2.7%
H Creative arts & design	5.7%	6.9%	7.7%	5.3%
I Education	0.9%	0.4%	2.3%	0.7%
J Combined	0.3%	0.4%	0.2%	0.2%

Non-continuation of students

The IB and A level students were linked from their first year of study into their second year of study to analyse non-continuation rates. Although there is some variation in the non-continuation rate across entry qualifications, the vast majority of students do continue their studies into the second year.

Figure 17 Percentage of first year full-time first degree students that left with no award by entry qualification, 2013/14 to 2017/18

Entry qualification
- IB Course
- A-levels
- IB Diploma
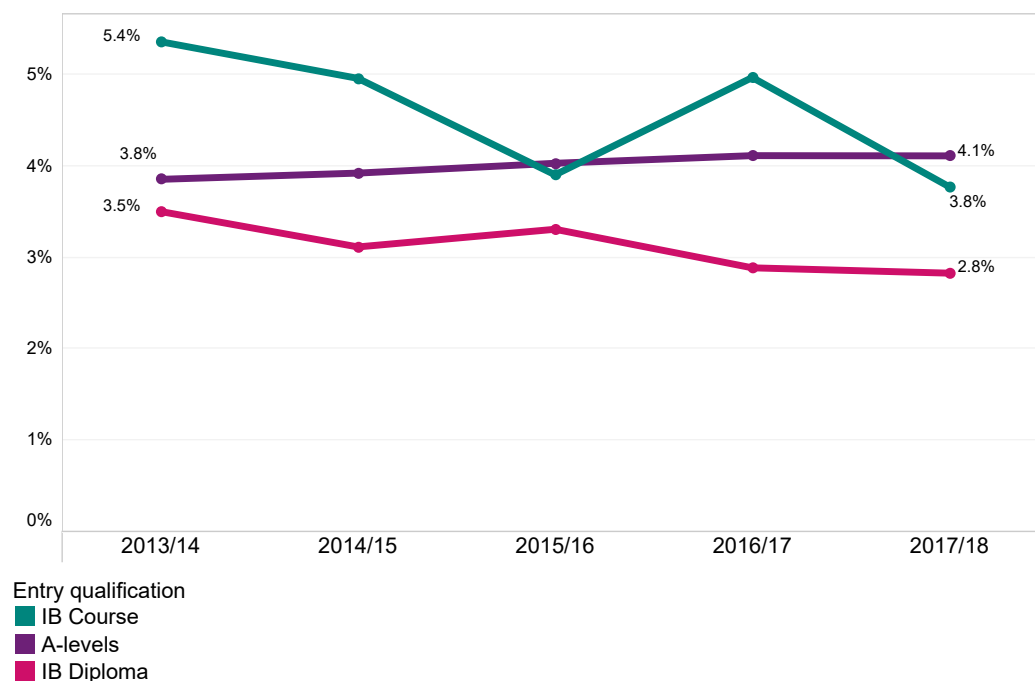
A similar proportion of IB diploma (92.8%) and A level students (92.3%) in 2017/18 continued or qualified at the same HE provider by 2018/19 compared to IB course students (89.2%)

A higher proportion of A level students (4.1%) left with no award in 2017/18 than IB course (3.8%) or IB diploma (2.8%).

Figure 18 shows that there was no difference in the proportion of students across STEM subjects and non-STEM subjects within the IB diploma student cohort who left with no award. IB course students studying STEM subjects (4.6%) were more likely to leave with no award than their non-STEM counterparts (3.4%). A level students studying STEM subjects (3.6%) were less likely to leave HE with no award than those studying non-STEM subjects (4.6%).

Figure 18 Percentage of first year full-time first degree students who left with no award by entry qualification and STEM subject marker, 2013/14 to 2017/18
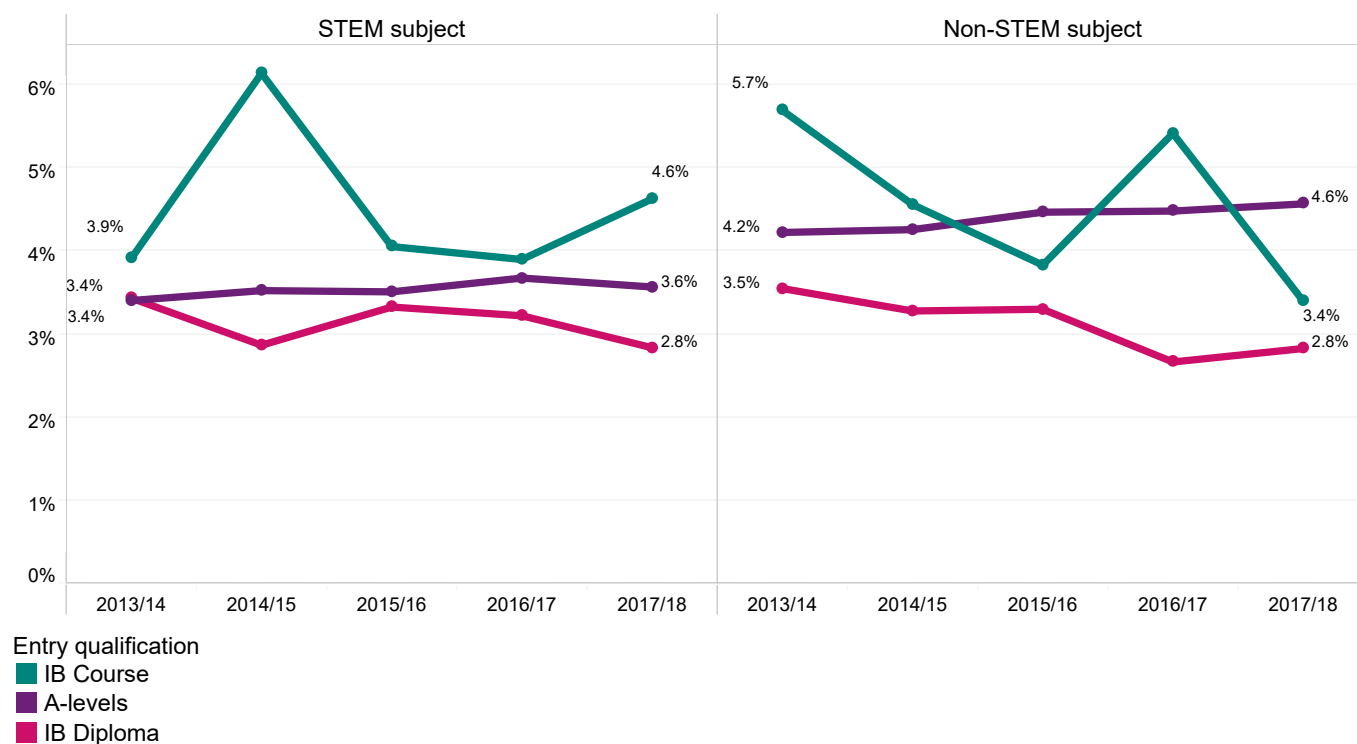
Due to the small number of IB course students within each subject area, further analysis of students who left without an award is not possible with the same breakdown of entry qualification and subject area. In Figure 19, these students have been excluded to account for this.

In 2017/18, Figure 19 shows the percentage of students who left with no award varied across subject areas and between the cohorts of A level and IB diploma students. All subjects had a lower proportion of IB students leaving with no award than A level students, except medicine & dentistry (1.1% A level to 1.5% IB diploma) and agriculture & related subjects (1.4% A level to 4.1% IB diploma). The largest difference between proportions of IB and A level students leaving with no award were from mathematical sciences (0.4% IB diploma, 4.2% A level).

Figure 19 Percentage of first year full-time first degree students who left with no award by entry qualification and subject area, 2017/18

Subject area	IB Diploma	A-levels
1 Medicine & dentistry	1.5%	1.1%
2 Subjects allied to medicine	2.6%	3.5%
3 Biological sciences	3.4%	3.6%
4 Veterinary science		0.7%
5 Agriculture & related subjects	4.1%	3.4%
6 Physical sciences	2.2%	3.5%
7 Mathematical sciences	0.4%	4.2%
8 Computer science	2.5%	4.9%
9 Engineering & technology	3.3%	3.5%
A Architecture, building & planning	4.6%	4.8%
B Social studies	3.0%	4.3%
C Law	1.7%	4.3%
D Business & administrative studies	3.0%	4.8%
E Mass communications & documentation	4.0%	6.9%
F Languages	3.0%	4.6%
G Historical & philosophical studies	2.2%	4.2%
H Creative arts & design	3.7%	4.5%
I Education		3.8%
J Combined	3.1%	3.5%

There were differences in the non-continuation rates of UK domiciled students by their background demographics. Figure 20 shows the non-continuation rates of students by entry qualification and selected background demographics.

A higher proportion of white IB course and A level students (6.0% and 4.3% respectively) left HE without an award than their BAME counterparts (5.9% and 3.9% respectively).

A greater proportion of IB diploma and A level students who attended a state-funded school or college (3.7% and 4.3% respectively) left with no award than those who attended a privately funded school (3.1% and 3.3%). Conversely for IB course students a higher percentage left with no award from those who attended a private school (6.6%) than their state-funded school or college counterparts (5.5%).

A higher proportion of students from a lower socio-economic classification (4-7) (3.6% IB diploma, 9.8% IB course, 4.9% A level) left with no award compared to students from a higher socio-economic classification (1-3) (2.9% IB diploma, 6.3% IB course, 3.8% A level).

A greater proportion of IB diploma and A level students from low participation neighbourhoods (6.1% and 5.0% respectively) left with no award than those from other neighbourhoods (3.1% and 4.1%).

Figure 20 Percentage of UK domiciled first year full-time first degree students who left with no award by entry qualification and background demographics, 2017/18

	IB Diploma	IB Course	A-levels
Black, Asian and minority ethnic (BAME)	3.7%	5.9%	3.9%
White	3.3%	6.0%	4.3%
Privately funded school	3.1%	6.6%	3.3%
State-funded school or college	3.7%	5.5%	4.3%
SEC 1-3	2.9%	6.3%	3.8%
SEC 4-7	3.6%	9.8%	4.9%
Low participation neighbourhood (POLAR4)	6.1%		5.0%
Other neighbourhood (POLAR4)	3.1%	6.3%	4.1%
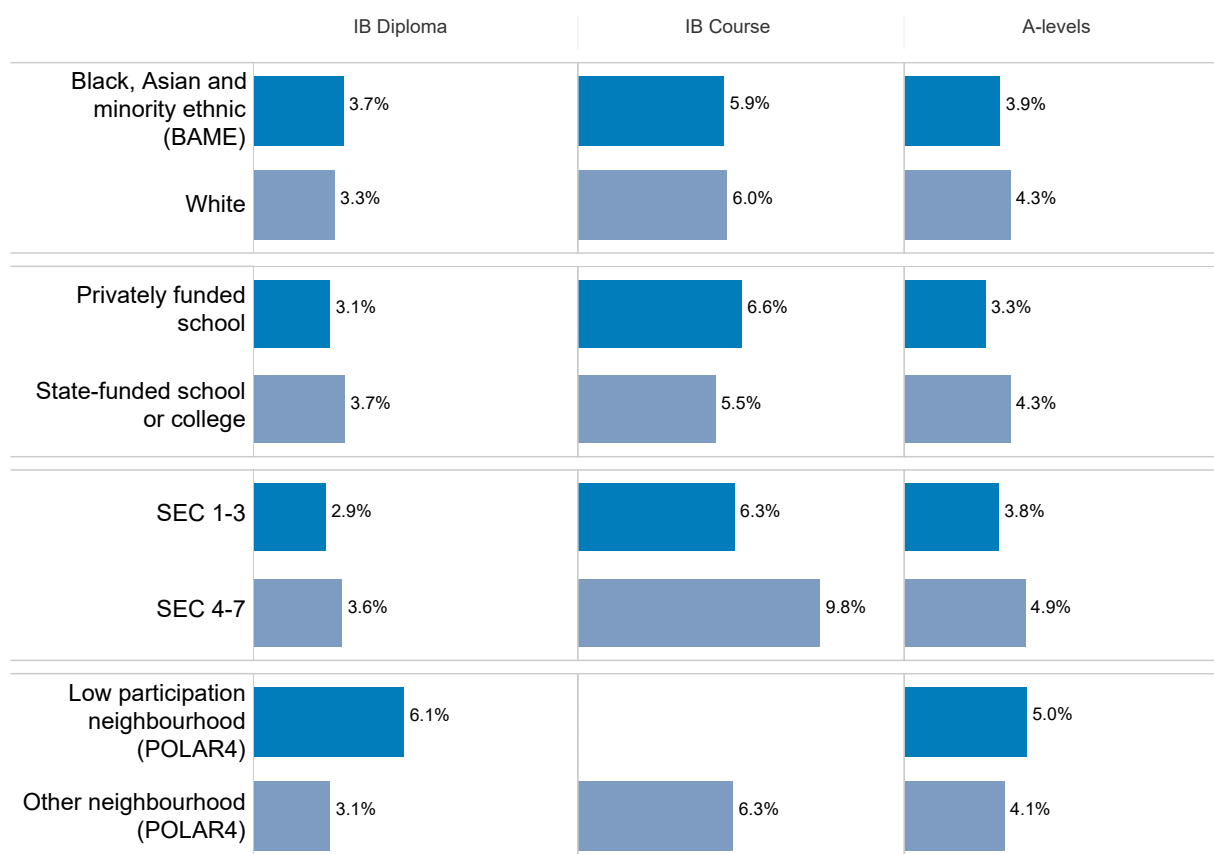
Time series of qualifier cohorts

Within the section regarding qualifiers from UK HE providers, defined as IB qualifiers/ A level qualifiers, are graduates who achieved (graduated) a full-time first degree at a UK HE provider, and who entered HE with an IB qualification or A level qualifications, respectively.

Figure 21 shows a time series of the number of qualifiers in the IB and A level cohorts.

Overall there has been a slight rise in the number of qualifiers between 2013/14 (183,540) and 2018/19 (190,605). Proportionately, the number of A level qualifiers increased the least (1.3%) from 178,265 to 180,510. IB qualifiers saw a much sharper rise of 91.3% (5,275 to 10,095) respectively. It can be noted that this trend is comparable to that which was seen with enrolments in Figure 1.

Figure 21 Time series of full-time first degree qualifiers by entry qualification, 2013/14 to 2018/19

Legend:
- A-levels
- Total
- IB
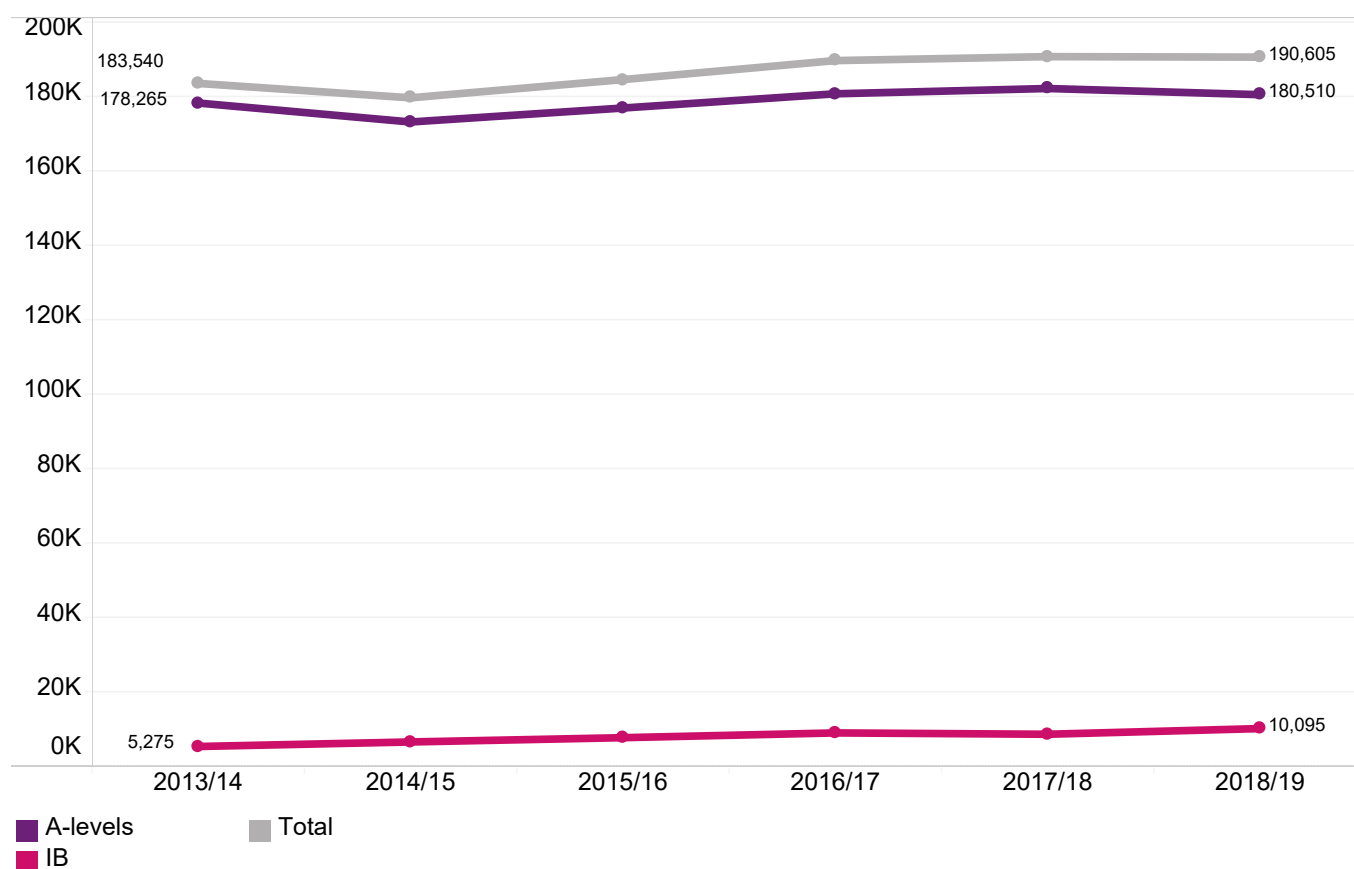
Achievement

In 2018/19, 9,490 IB diploma qualifiers, 605 IB course qualifiers and 180,510 A level qualifiers were identified in the HESA data. Figure 22 shows the proportion by entry qualification of qualifiers achieving first class or upper second class honours. Figure 23 shows further breakdown by class of first degree for 2018/19.

The year on year increases reflects the trend across the sector of an increasing percentage of qualifiers achieving first class or upper second class honours.[5].

Figure 22 Proportion of full-time first degree qualifiers achieving first or upper second class honours by entry qualification, 2013/14 to 2018/19

Entry Qualification
- IB Diploma
- IB Course
- A-levels
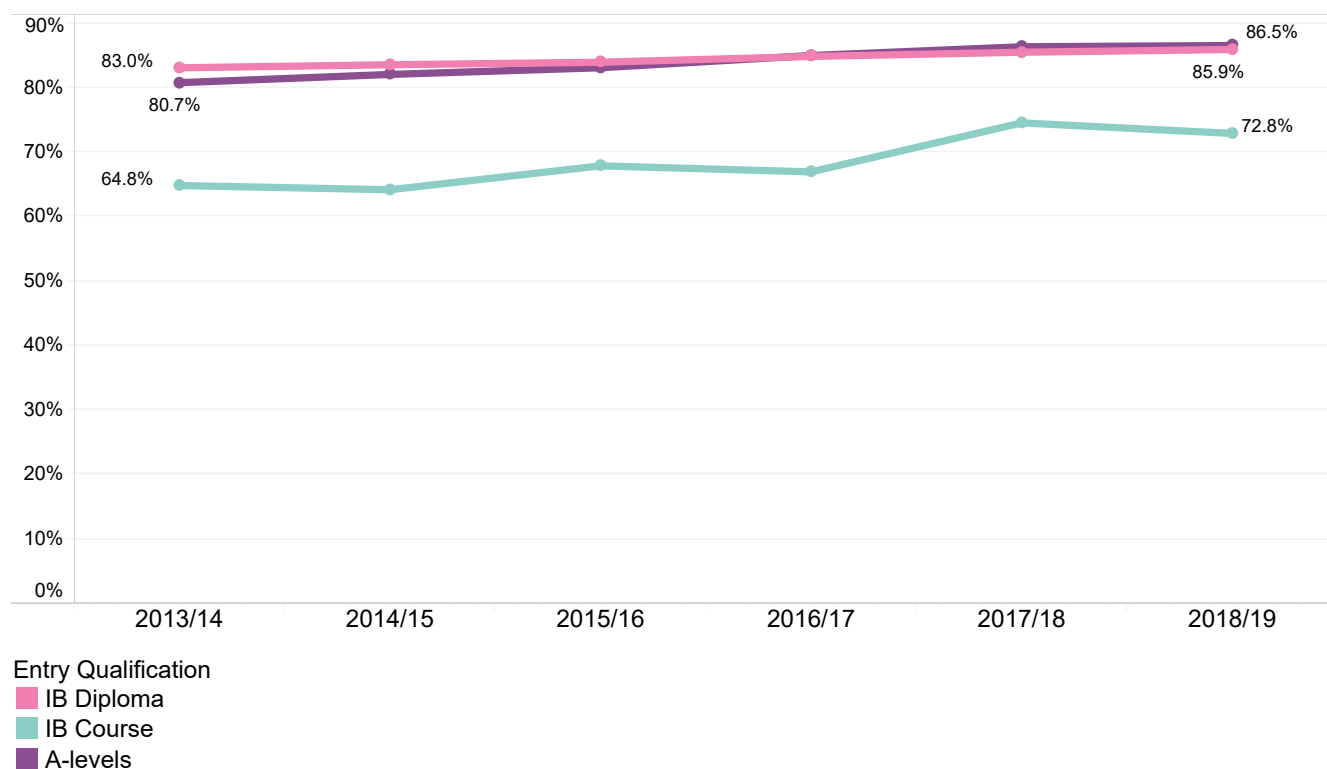
Figure 23 Percentage of full-time first degree qualifiers achieving first or upper second class honours by class of first degree and entry qualification 2018/19

5 **https://www.hesa.ac.uk/data-and-analysis/students/chart-9**
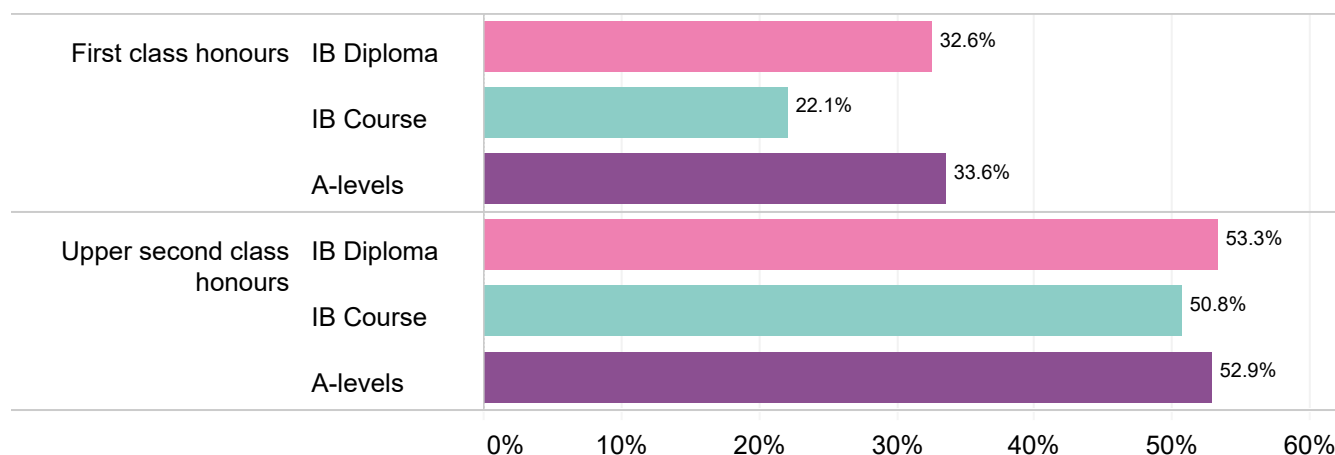
Figure 24 shows the class of first degree by subject area for 2018/19. IB course qualifiers have been omitted due to the small numbers within each subject area. IB diploma qualifiers in veterinary science have also been removed due to small values. More than 75% of IB diploma and A level qualifiers achieved an upper second class honours degree or better across all subject areas.

IB qualifiers achieved the highest proportion of first class honours degrees in mathematical sciences (57.4%), computer sciences (55.8%) and medicine and dentistry (52.3%). For A level qualifiers, the highest proportions of first class honours degrees were in computer science (50.4%), medicine and dentistry (47.3%) and engineering and technology (42.6%).

Figure 24 Full-time first degree qualifiers by class of degree, subject area and entry qualification, 2018/19

Subject area	Qualification	First class honours	Upper second class honours
1 Medicine & dentistry	IB Diploma	52.3%	42.6%
	A-levels	47.3%	45.3%
2 Subjects allied to medicine	IB Diploma	36.6%	52.0%
	A-levels	39.8%	46.7%
3 Biological sciences	IB Diploma	30.6%	53.4%
	A-levels	31.7%	55.6%
4 Veterinary science	IB Diploma		
	A-levels	37.6%	56.7%
5 Agriculture & related subjects	IB Diploma	35.3%	39.7%
	A-levels	34.3%	51.6%
6 Physical sciences	IB Diploma	42.8%	44.1%
	A-levels	37.2%	46.5%
7 Mathematical sciences	IB Diploma	57.4%	29.8%
	A-levels	41.1%	35.7%
8 Computer science	IB Diploma	55.8%	32.8%
	A-levels	50.4%	35.7%
9 Engineering & technology	IB Diploma	42.3%	43.2%
	A-levels	42.6%	42.8%
A Architecture, building & planning	IB Diploma	23.9%	54.7%
	A-levels	30.3%	51.6%
B Social studies	IB Diploma	30.5%	56.3%
	A-levels	27.7%	59.1%
C Law	IB Diploma	14.8%	67.0%
	A-levels	20.0%	62.4%
D Business & administrative studies	IB Diploma	31.0%	52.1%
	A-levels	37.9%	49.2%
E Mass communications & documentation	IB Diploma	26.2%	63.6%
	A-levels	29.6%	57.9%
F Languages	IB Diploma	32.6%	58.8%
	A-levels	27.5%	62.6%
G Historical & philosophical studies	IB Diploma	31.0%	61.5%
	A-levels	26.0%	64.8%
H Creative arts & design	IB Diploma	36.4%	48.0%
	A-levels	36.8%	50.3%
I Education	IB Diploma	23.5%	54.3%
	A-levels	31.3%	54.5%
J Combined	IB Diploma	28.9%	64.9%
	A-levels	37.3%	56.2%

Legend:
- First class honours, A-levels
- First class honours, IB Diploma
- Upper second class honours, A-levels
- Upper second class honours, IB Diploma

As expected, for both IB and A level qualifiers, there was a link between class of degree achieved and entry qualification point score. Figure 25 shows that the more points achieved by the qualifier in their entry qualification, the more likely the qualifier was to receive a first class honours degree (with the exception of IB qualifiers who gained fewer than 24 points towards their diploma).

Of the IB diploma qualifiers who had achieved 40-43 or 44+ points, 49.0% and 63.1% respectively were awarded a first class honours degree, compared to 41.8% and 47.9% for the equivalent A level qualifiers.

Figure 25 Full-time first degree qualifiers by class of first degree and point score, 2018/19

		First class honours	Upper second class honours
<24	IB	19.9%	45.2%
	A-levels	21.6%	51.4%
24-27	IB	15.8%	49.9%
	A-levels	25.8%	55.0%
28-31	IB	20.2%	56.8%
	A-levels	30.2%	55.3%
32-35	IB	26.9%	55.6%
	A-levels	31.7%	56.3%
36-39	IB	35.3%	56.6%
	A-levels	35.8%	55.0%
40-43	IB	49.0%	48.3%
	A-levels	41.8%	50.8%
44+	IB	63.1%	35.9%
	A-levels	47.9%	44.4%

Legend:
- Upper second class honours, IB
- Upper second class honours, A-levels
- First class honours, IB
- First class honours, A-levels

As with non-continuation rates, academic achievement differs by their demographic background. Figure 26 shows that white IB qualifiers tended to achieve a higher class of first degree than BAME qualifiers, with the exception of A level qualifiers achieving an upper second class honours degree (53.6% BAME to 52.9% white). A similar trend was seen when considering 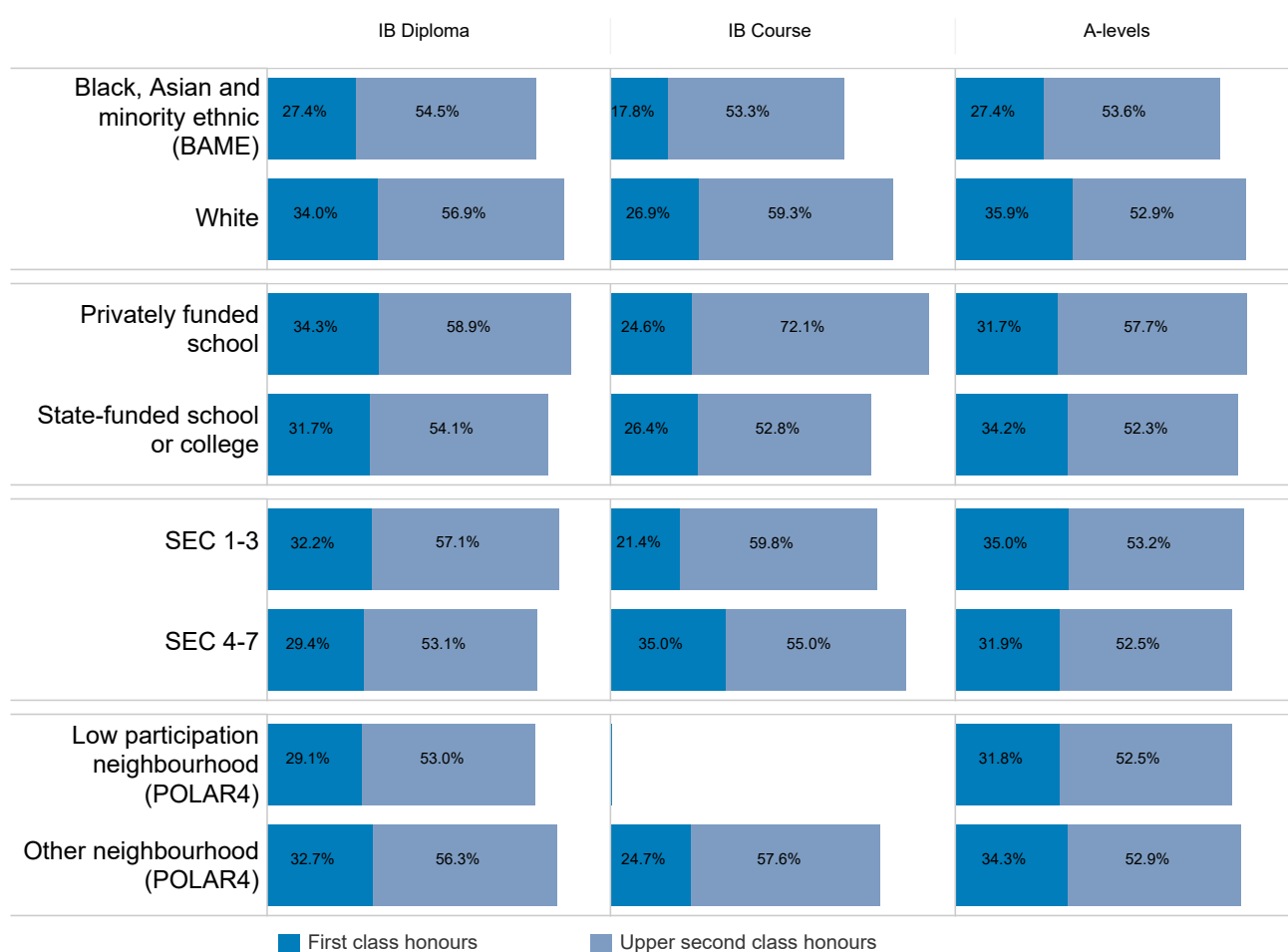socio-economic classification. Those from a higher socio-economic classification (1-3) performed better than those from a lower socio-economic classification (4-7).

IB diploma qualifiers who attended a privately funded school performed better than those who attended a state-funded school or college. This was not the case for IB course or A level qualifiers, where these qualifiers who attended a state-funded school or college were more likely to achieve a first class honours degree (IB course 26.4% to 24.6%; A level 34.2% to 31.7).

IB diploma and A level qualifiers who were from a low participation neighbourhood were less likely to obtain a first or upper second class honours degree than those from other neighbourhoods. There were not enough IB course qualifiers from a low participation neighbourhood to enable consideration of this qualification when looking at this demographic.

Figure 26 UK domiciled full-time first degree qualifiers by class of first degree, entry qualification and background demographics, 2018/19

	IB Diploma		IB Course		A-levels	
	First class honours	Upper second class honours	First class honours	Upper second class honours	First class honours	Upper second class honours
Black, Asian and minority ethnic (BAME)	27.4%	54.5%	17.8%	53.3%	27.4%	53.6%
White	34.0%	56.9%	26.9%	59.3%	35.9%	52.9%
Privately funded school	34.3%	58.9%	24.6%	72.1%	31.7%	57.7%
State-funded school or college	31.7%	54.1%	26.4%	52.8%	34.2%	52.3%
SEC 1-3	32.2%	57.1%	21.4%	59.8%	35.0%	53.2%
SEC 4-7	29.4%	53.1%	35.0%	55.0%	31.9%	52.5%
Low participation neighbourhood (POLAR4)	29.1%	53.0%			31.8%	52.5%
Other neighbourhood (POLAR4)	32.7%	56.3%	24.7%	57.6%	34.3%	52.9%

■ First class honours   ■ Upper second class honours

Time Series of DLHE cohorts

The HESA Destinations of Leavers from Higher Education (DLHE) survey was collected 6 months after graduation. The data was collected via a survey defined by HESA and managed by HE providers. The survey collected information about the activity of the graduates (referred to as leavers) and included details about their patterns of employment and further study or training undertaken. As DLHE was a survey, not all successful leavers responded. A major review of the data collected in the DLHE survey was undertaken which resulted in the new Graduate Outcomes survey. The final DLHE survey was in 2016/17. Data from the Graduate Outcomes survey is not included in this report.

Within the section regarding leavers from UK HE providers, references to IB leavers/ A level leavers are graduates who achieved a full-time first degree at a UK HE provider and completed the Destination of Leavers from Higher Education survey approx. 6 months after graduation, and who had entered HE with an IB qualification or A level qualifications, respectively.

In 2016/17, 79% of UK domiciled leavers responded to the survey and 60% of leavers from the EU. Because the non-EU response rate was a lot lower at 34%, this section only includes UK and EU domiciled leavers[6].

Figure 27 shows a time series of the number of UK and EU domiciled in the IB and A level cohorts who responded to the survey. There has been a reduction in the number of leavers responding to the DLHE survey from 140,415 in 2013/14 to 137,670 in 2016/17. This fall was driven by a decrease in the number of A level respondents (from 137,850 in 2013/14 to 133,990 in 2016/17) but compensated for by a rise in the number of responses from IB leavers, increasing by more than 40%.

Figure 27 Time series of UK and EU domiciled full-time first degree leavers by entry qualification, 2013/14 to 2016/17

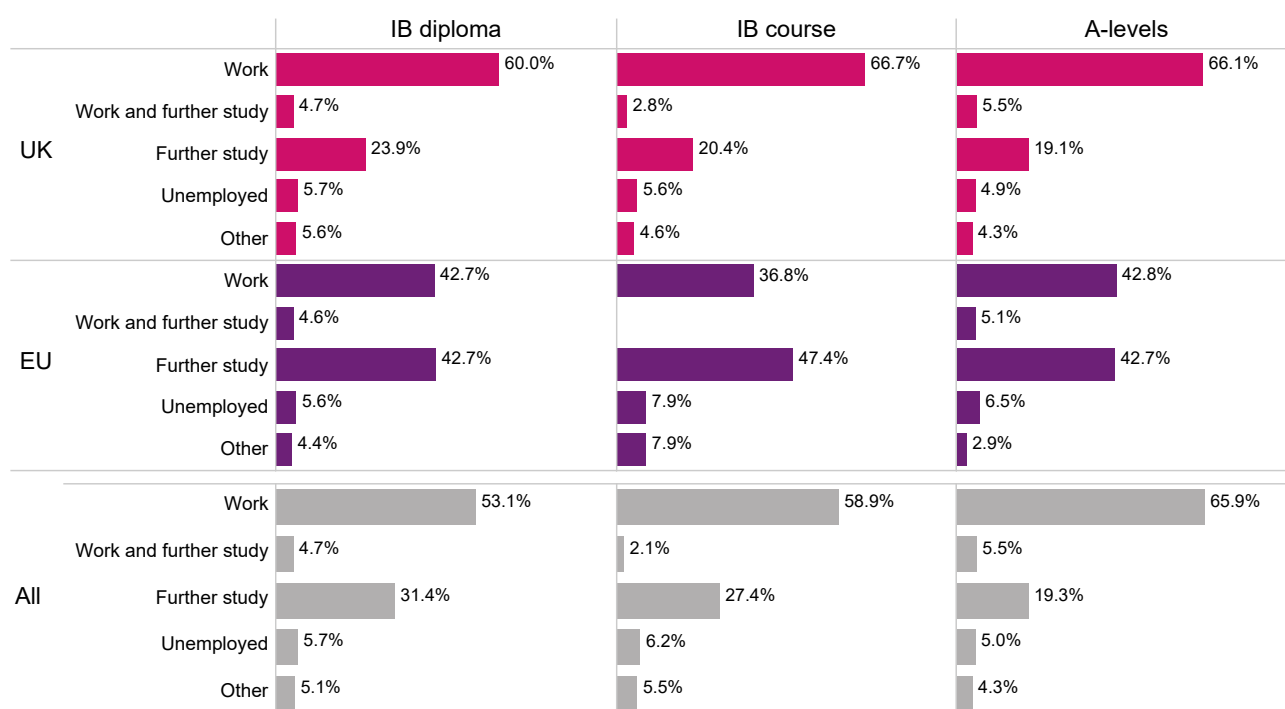

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6 **https://www.hesa.ac.uk/data-and-analysis/sfr250/figure-3**
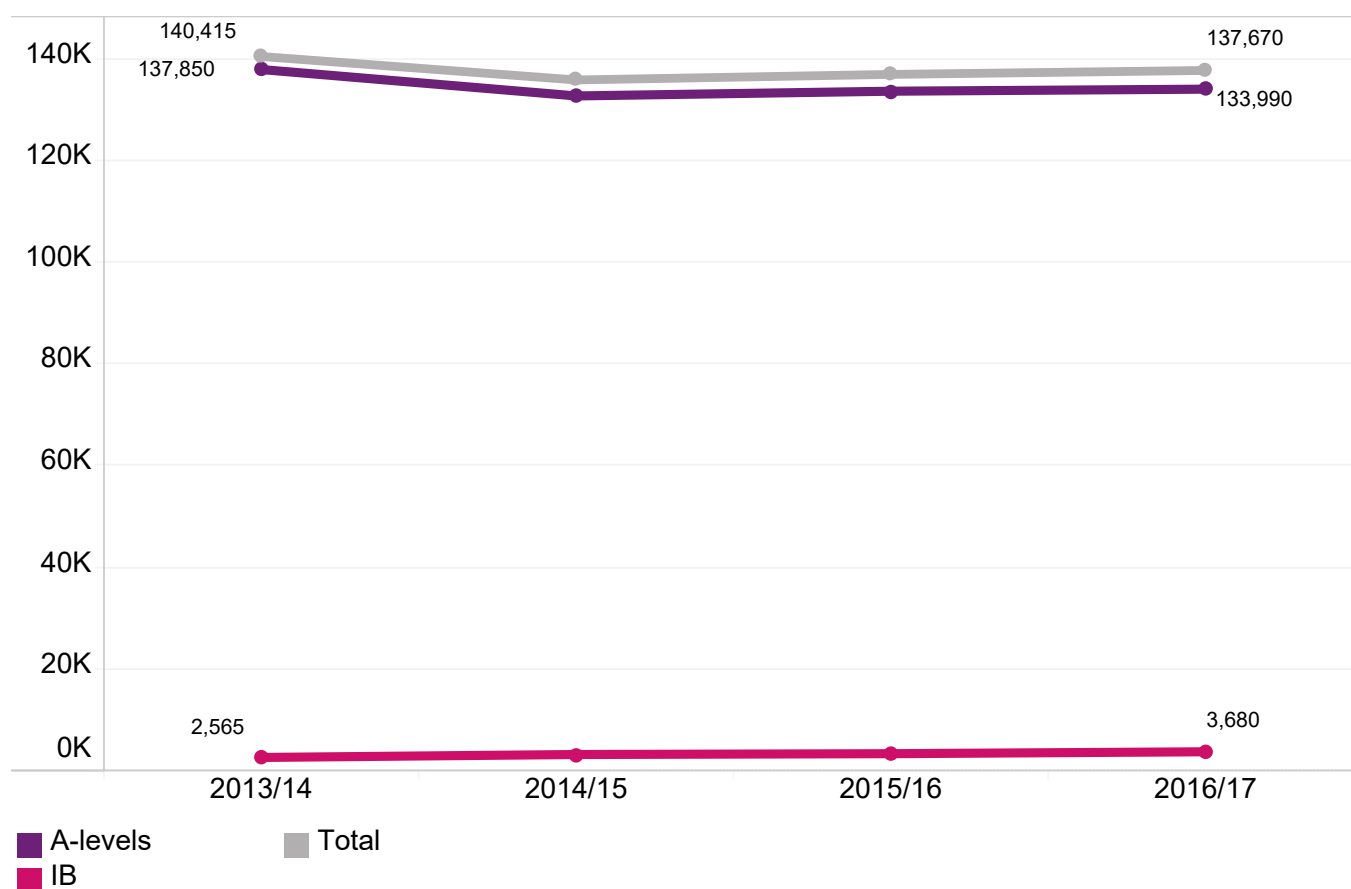
Activities of Leavers

Figure 28 shows the leavers' activity 6 months after completing their studies. Leavers may be engaged in multiple activities on the survey date; in what follows, work refers to leavers in full-time or part-time work, excluding those undertaking both work and further study. Similarly, leavers in further study excludes those in work and further study.

A higher percentage of UK and EU domiciled A level leavers (65.9%) were engaged in work than IB course leavers (58.9%) and IB diploma leavers (53.1%). A level leavers were considerably less likely to be engaged in further study (19.3%) than other qualifications (IB diploma 31.4%, IB course 27.4%. The unemployment rate was similar between the entry qualifications, with IB leavers slightly more likely to be unemployed than other leavers (IB course 6.2%, IB diploma 5.7%, A level 5.0%).

Figure 28 shows that EU domiciled leavers were more likely to be engaged in further study than UK leavers were across all entry qualifications, conversely UK domiciled leavers were more likely to be in work.

Figure 28 Full-time first degree leavers by entry qualification, domicile and activity, 2016/17

		IB diploma	IB course	A-levels
UK	Work	60.0%	66.7%	66.1%
	Work and further study	4.7%	2.8%	5.5%
	Further study	23.9%	20.4%	19.1%
	Unemployed	5.7%	5.6%	4.9%
	Other	5.6%	4.6%	4.3%
EU	Work	42.7%	36.8%	42.8%
	Work and further study	4.6%		5.1%
	Further study	42.7%	47.4%	42.7%
	Unemployed	5.6%	7.9%	6.5%
	Other	4.4%	7.9%	2.9%
All	Work	53.1%	58.9%	65.9%
	Work and further study	4.7%	2.1%	5.5%
	Further study	31.4%	27.4%	19.3%
	Unemployed	5.7%	6.2%	5.0%
	Other	5.1%	5.5%	4.3%

Due to the small numbers of IB course leavers within subject area, further analysis has been omitted. Within subject areas, more A level leavers were engaged in work than IB diploma leavers, except for those who studied education. The biggest differences between proportions of leavers in work were in subjects allied to medicine (52.3% IB diploma, 78.71% A level, mathematical sciences (33.8% IB diploma, 57.4% A level) and law (29.3% IB diploma, 48.7% A level).
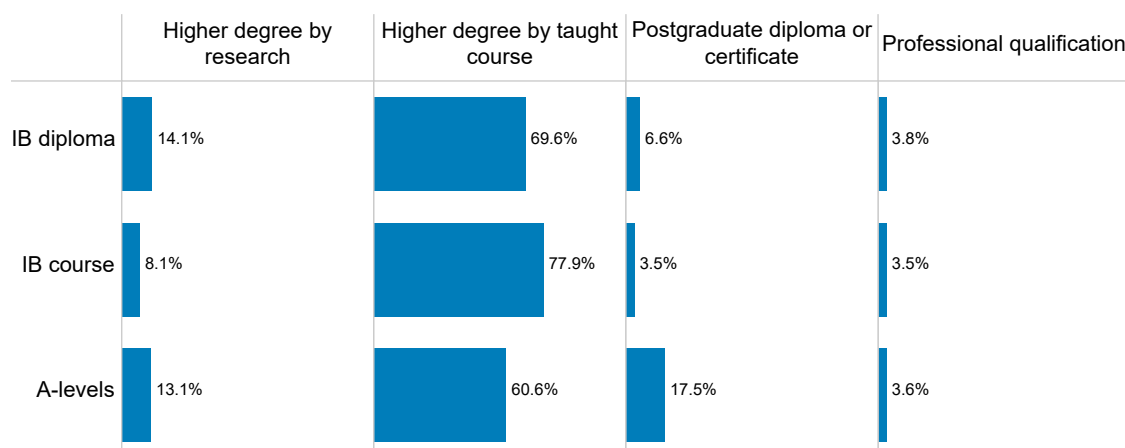
The IB diploma leavers who were most likely to be engaged in work had studied medicine and dentistry (89.2%), education (78.9%) and creative arts and design (70.6%). A level leavers were most likely to be engaged in work having studied medicine and dentistry (94.3%), veterinary science (94.2%) and subjects allied to medicine (78.7%).

For all subjects except education, more IB diploma than A level leavers were in further study, with the biggest differences in subjects allied to medicine (35.1% IB diploma, 12.0% A level), agriculture and related subjects (35.0% IB diploma, 14.8% A level) and law (51.8% IB diploma, 32.6% A level).

IB diploma leavers were most likely to be unemployed if they studied mass communications and documentation (12.3%), whereas A level leavers were most likely to be unemployed if they studied computer science (7.9%)[7].

Figure 29 shows leavers who were engaged in further study by the level of study. IB leavers were more likely than A level leavers to be enrolled on a higher degree by taught course (69.6% IB diploma, 77.9% IB course, 60.6% A level). More A level leavers were enrolled on a postgraduate diploma or course than other entry qualifications (17.5% A level, 6.6% IB diploma, 3.5% IB course).

Figure 29 UK and EU domiciled full-time first degree leavers entering further study by level of further study, 2016/17

	Higher degree by research	Higher degree by taught course	Postgraduate diploma or certificate	Professional qualification
IB diploma	14.1%	69.6%	6.6%	3.8%
IB course	8.1%	77.9%	3.5%	3.5%
A-levels	13.1%	60.6%	17.5%	3.6%

Occupations and industries of employed leavers

As part of the DLHE survey, leavers are asked to describe the types of jobs they are doing and the industry that they are working in. This information is then collated to give the Standard Industrial Classifications (SIC) and Standard Occupational Classifications (SOC) of each leaver.

Figure 30 shows the industry of employment of IB and A level leavers for 2013/14 to 2016/17. The 10 most popular industries for leavers with an IB diploma are split out, with the others grouped together. The plot shows that the industry in which leavers are employed varies between and within entry qualifications. There are also some notable changes over the time series.

Throughout the time series considered in Figure 30, IB diploma leavers were most likely to be employed in professional, scientific and technical activities. The proportion of leavers working in this industry decreased from 20.9% in 2013/14 to 19.1% in 2016/17, perhaps due to the substantial increase in the human health and social work activities (9.4% in 2013/14, 16.0% in 2016/17).

In 2013/14, the most popular industry for IB course leavers was wholesale and retail trade; repair of motor vehicles and motorcycles. In 2013/14, 17.9% of IB course leavers were employed in this industry, falling to 14.0% in 2016/17. In 2016/17, IB course leavers were most likely to be employed in professional, scientific and technical activities (17.4%).

Similar to IB course leavers, A level leavers were most likely to be employed in wholesale and retail trade; repair of motor vehicles and motorcycles in 2013/14 (15.5%), but by 2016/17 the most likely industry had become human health and social work activities.

For most industries there was a large amount of discrepancy between the proportion of leavers from each entry qualification entering that type of employment. The industry with the least discrepancy was construction where all qualifications were between 1.0% and 1.7%.

Figure 30 UK and EU domiciled full-time first degree leavers entering employment by industry and entry qualification, 2013/14 to 2016/17

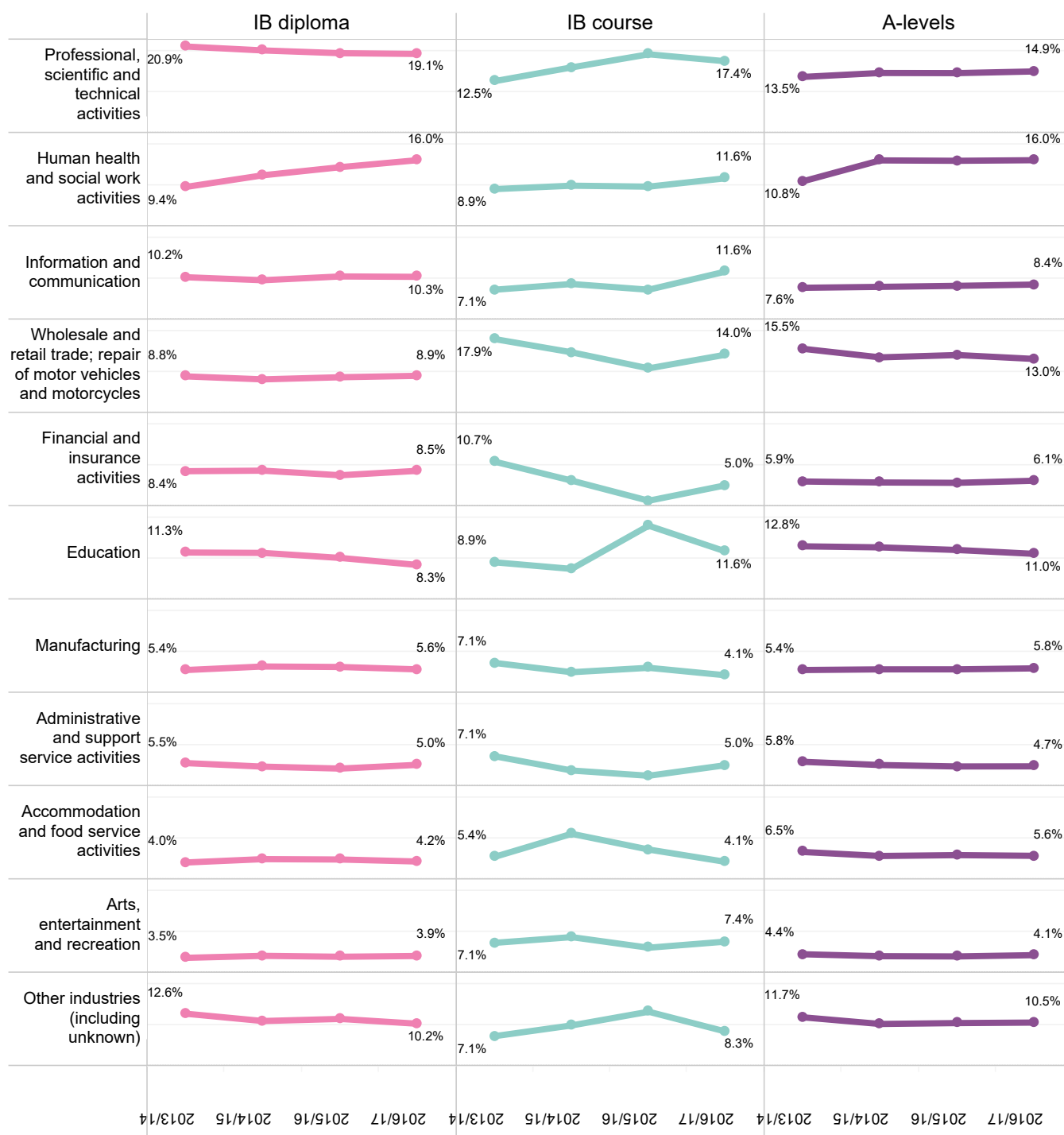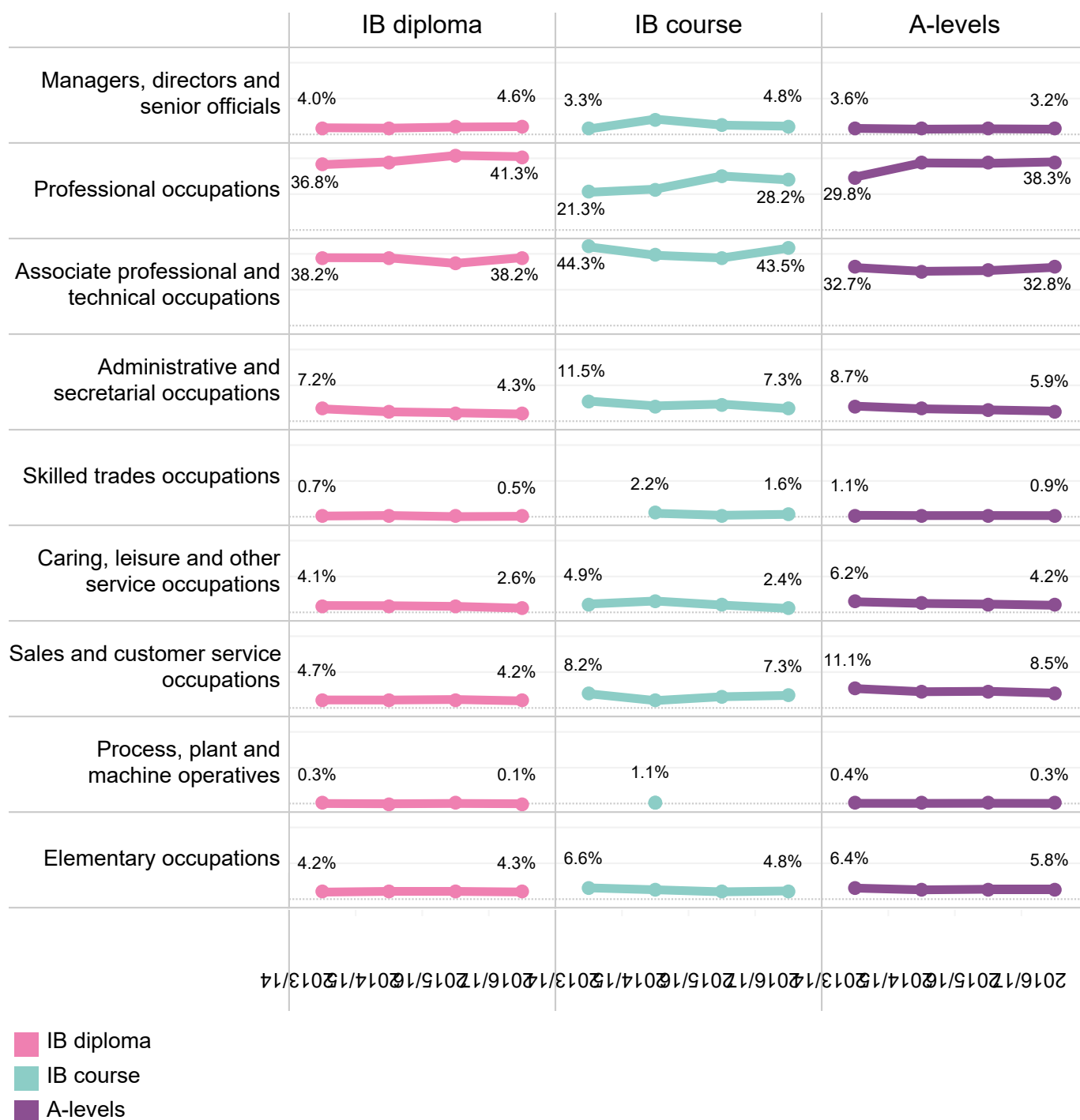|	IB diploma	IB course	A-levels
Professional, scientific and technical activities	20.9% → 19.1%	12.5% → 17.4%	13.5% → 14.9%
Human health and social work activities	9.4% → 16.0%	8.9% → 11.6%	10.8% → 16.0%
Information and communication	10.2% → 10.3%	7.1% → 11.6%	7.6% → 8.4%
Wholesale and retail trade; repair of motor vehicles and motorcycles	8.8% → 8.9%	17.9% → 14.0%	15.5% → 13.0%
Financial and insurance activities	8.4% → 8.5%	10.7% → 5.0%	5.9% → 6.1%
Education	11.3% → 8.3%	8.9% → 11.6%	12.8% → 11.0%
Manufacturing	5.4% → 5.6%	7.1% → 4.1%	5.4% → 5.8%
Administrative and support service activities	5.5% → 5.0%	7.1% → 5.0%	5.8% → 4.7%
Accommodation and food service activities	4.0% → 4.2%	5.4% → 4.1%	6.5% → 5.6%
Arts, entertainment and recreation	3.5% → 3.9%	7.1% → 7.4%	4.4% → 4.1%
Other industries (including unknown)	12.6% → 10.2%	7.1% → 8.3%	11.7% → 10.5%

Figure 31 shows the occupations of IB and A level leavers. For all entry qualifications, in all years, the most likely occupation type for a leaver to enter was either professional occupations or associate professional and technical occupations. A fall has been seen for the occupations of managers, directors and senior officials for A level leavers (3.6% in 2013/14 to 3.2% in 2016/17), but a rise for all other qualifications (IB diploma 4.0% to 4.6%; IB course 3.3% to 4.8%).
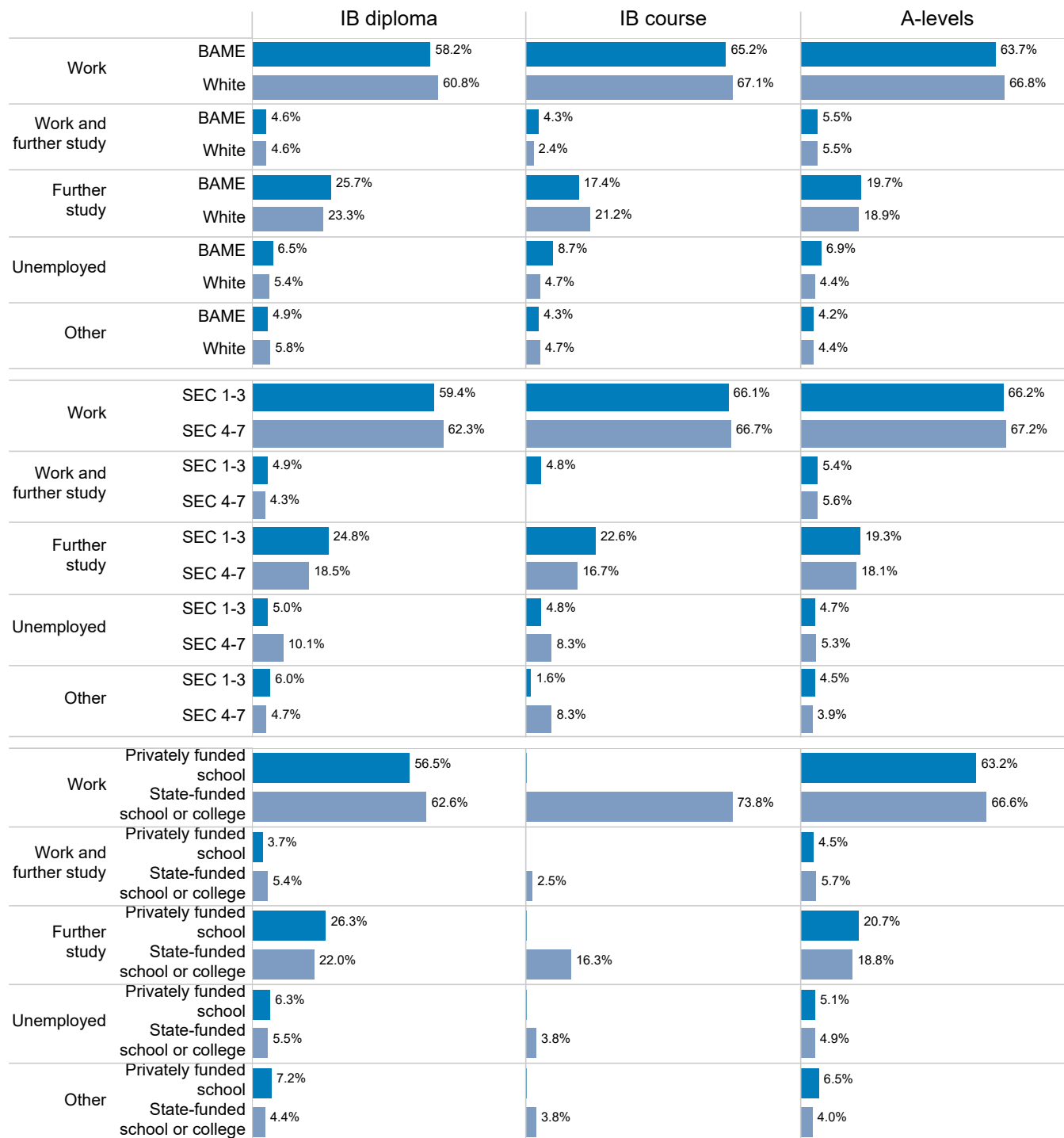
Figure 31 UK and EU domiciled full-time first degree leavers entering employment by occupation and entry qualification, 2013/14 to 2016/17

	IB diploma	IB course	A-levels
Managers, directors and senior officials	4.0% → 4.6%	3.3% → 4.8%	3.6% → 3.2%
Professional occupations	36.8% → 41.3%	21.3% → 28.2%	29.8% → 38.3%
Associate professional and technical occupations	38.2% → 38.2%	44.3% → 43.5%	32.7% → 32.8%
Administrative and secretarial occupations	7.2% → 4.3%	11.5% → 7.3%	8.7% → 5.9%
Skilled trades occupations	0.7% → 0.5%	2.2% → 1.6%	1.1% → 0.9%
Caring, leisure and other service occupations	4.1% → 2.6%	4.9% → 2.4%	6.2% → 4.2%
Sales and customer service occupations	4.7% → 4.2%	8.2% → 7.3%	11.1% → 8.5%
Process, plant and machine operatives	0.3% → 0.1%	1.1%	0.4% → 0.3%
Elementary occupations	4.2% → 4.3%	6.6% → 4.8%	6.4% → 5.8%

IB diploma
IB course
A-levels

As before, consideration can be made to the background demographics of UK domiciled leavers. The information is shown in Figure 32, excluding any unknown data. White leavers were more likely to be engaged in work than their black counterparts across all entry qualifications. Leavers with lower socio-economic classifications (4-7) were more likely to be engaged in work for all entry qualifications than higher socio-economic classifications (1-3) leavers, as were state-funded school or college leavers.

It should be noted that IB course leavers who attended a privately funded school have been excluded due to small numbers. For leavers entering further study, the demographics were completely the opposite.

Figure 32 UK domiciled full-time first degree leavers by entry qualification, activity and background demographics, 2016/17

| Activity	Group	IB diploma	IB course	A-levels
Work	BAME	58.2%	65.2%	63.7%
Work	White	60.8%	67.1%	66.8%
Work and further study	BAME	4.6%	4.3%	5.5%
Work and further study	White	4.6%	2.4%	5.5%
Further study	BAME	25.7%	17.4%	19.7%
Further study	White	23.3%	21.2%	18.9%
Unemployed	BAME	6.5%	8.7%	6.9%
Unemployed	White	5.4%	4.7%	4.4%
Other	BAME	4.9%	4.3%	4.2%
Other	White	5.8%	4.7%	4.4%
Work	SEC 1-3	59.4%	66.1%	66.2%
Work	SEC 4-7	62.3%	66.7%	67.2%
Work and further study	SEC 1-3	4.9%	4.8%	5.4%
Work and further study	SEC 4-7	4.3%		5.6%
Further study	SEC 1-3	24.8%	22.6%	19.3%
Further study	SEC 4-7	18.5%	16.7%	18.1%
Unemployed	SEC 1-3	5.0%	4.8%	4.7%
Unemployed	SEC 4-7	10.1%	8.3%	5.3%
Other	SEC 1-3	6.0%	1.6%	4.5%
Other	SEC 4-7	4.7%	8.3%	3.9%
Work	Privately funded school	56.5%		63.2%
Work	State-funded school or college	62.6%	73.8%	66.6%
Work and further study	Privately funded school	3.7%		4.5%
Work and further study	State-funded school or college	5.4%	2.5%	5.7%
Further study	Privately funded school	26.3%		20.7%
Further study	State-funded school or college	22.0%	16.3%	18.8%
Unemployed	Privately funded school	6.3%		5.1%
Unemployed	State-funded school or college	5.5%	3.8%	4.9%
Other	Privately funded school	7.2%		6.5%
Other	State-funded school or college	4.4%	3.8%	4.0%

Salary of leavers

As part of the DLHE survey, leavers are asked to provide an estimate of their total yearly earnings before tax to the nearest thousand (in British pounds). From this information, the median salaries of leavers can be compared. Figure 33 shows a box plot of the median salaries of leavers by entry qualification. IB diploma leavers had the highest median salary at £24,000, although the range was much larger, ranging from £10,000 to £42,000.

Figure 34 shows a box plot of the median salaries of leavers by entry qualification and STEM subject marker. For all entry qualification, the median salary was higher for leavers who studied a STEM subject. IB diploma leavers who had studied a non-STEM subject had a higher median salary than other entry qualifications (£23,000).

Figure 33 Salary distribution of UK and EU domiciled full-time first degree leavers in paid employment in the UK by entry qualification, 2016/17
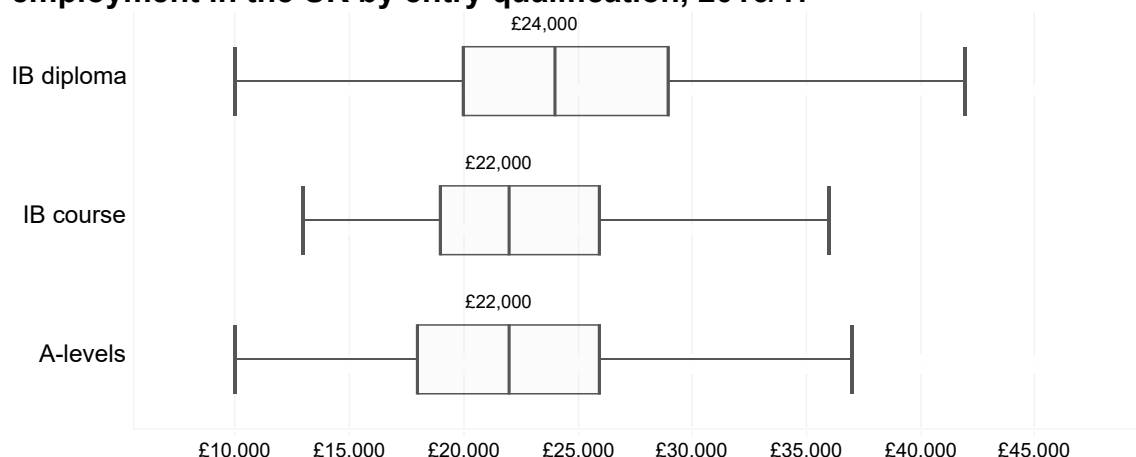
Figure 34 Salary distribution of UK and EU domiciled full-time first degree leavers in paid employment in the UK by entry qualification and STEM subject marker, 2016/17
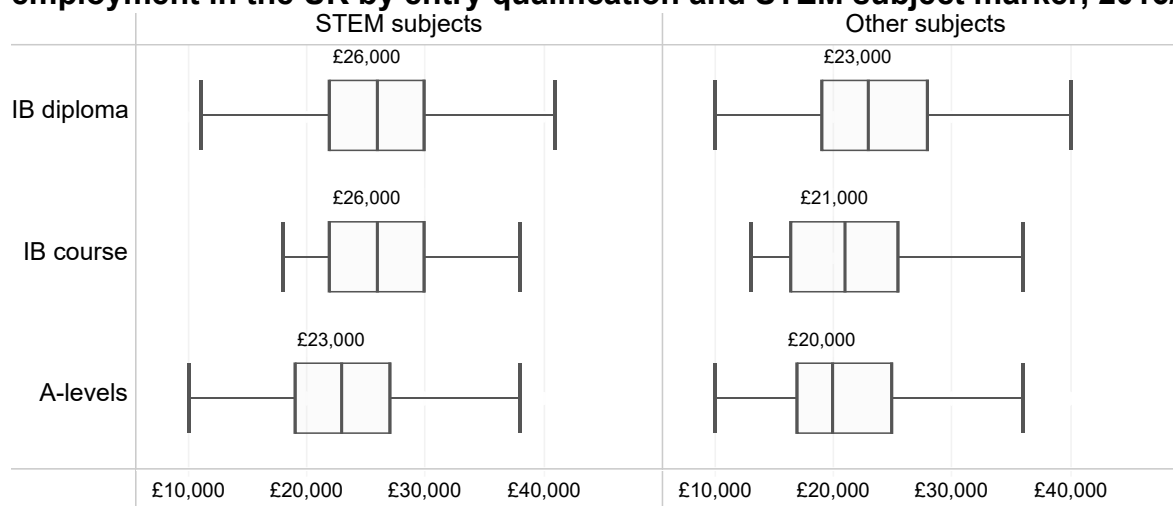
Due to the small number of IB course leavers in each subject area, these qualifications have been omitted from further analysis by subject. Figure 35 shows box plots of median salary for each subject area for IB diploma and A level leavers, together with the number of leavers from each subject. Subjects in which there are fewer than 22.5 leavers are excluded from the calculations and analysis[8]. IB diploma leavers have a higher median salary across all subject areas than their A level leaver counterparts, apart from medicine and dentistry where both qualifications recorded a median salary of £31,000.

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[8] Following the HESA rounding strategy: **https://www.hesa.ac.uk/about/regulation/data-protection/rounding-and-suppression-anonymise-statistics**

For both entry qualifications, medicine and dentistry offered the highest salary for leavers at £31,000. For IB diploma leavers the next highest median salaries were for those having studied computer science (£28,000) and engineering and technology (£27,000). The next highest median salaries for A level leavers were for those having studied veterinary science (£30,000) and engineering and technology (£26,000), though it should be noted that veterinary science was one of the subjects excluded for IB diploma leavers due to the small numbers.

The lowest median salary for IB diploma leavers was £20,000 for those who studied creative arts and design. For A level leavers, the lowest median salary was £18,000 for those who studied creative arts and design and mass communications and documentation.

The greatest difference between median salaries of IB diploma and A level leavers was seen for those who studied law (£23,500 IB diploma, £19,000 A level). Biological sciences, physical sciences, computer science, business and administrative studies and historical and philosophical studies all saw IB diploma leavers earn a median salary of £3,000 more than A level leavers.

Figure 35 Salary distribution of UK and EU domiciled full-time first degree leavers in paid employment in the UK by entry qualification and STEM subject marker; including total number of leavers, 2016/17

STEM subjects

1 Medicine & dentistry	IB diploma	£31,000	105
	A-levels	£31,000	2,605
2 Subjects allied to medicine	IB diploma	£23,000	65
	A-levels	£22,000	6,300
3 Biological sciences	IB diploma	£22,000	80
	A-levels	£19,000	5,030
4 Veterinary science	IB diploma		5
	A-levels	£30,000	305
5 Agriculture & related subjects	IB diploma		5
	A-levels	£21,000	440
6 Physical sciences	IB diploma	£25,000	60
	A-levels	£22,000	3,180
7 Mathematical sciences	IB diploma		10
	A-levels	£25,000	1,825
8 Computer science	IB diploma	£28,000	30
	A-levels	£25,000	2,035
9 Engineering & technology	IB diploma	£27,000	80
	A-levels	£26,000	3,935
A Architecture, building & planning	IB diploma		20
	A-levels	£22,000	1,005

£20K   £40K

Other subjects

B Social studies	IB diploma	£23,000	155
	A-levels	£22,000	5,880
C Law	IB diploma	£23,500	35
	A-levels	£19,000	1,960
D Business & administrative studies	IB diploma	£25,000	145
	A-levels	£22,000	6,940
E Mass communications & documentation	IB diploma		15
	A-levels	£18,000	1,330
F Languages	IB diploma	£22,000	90
	A-levels	£20,000	3,530
G Historical & philosophical studies	IB diploma	£23,000	70
	A-levels	£20,000	2,690
H Creative arts & design	IB diploma	£20,000	40
	A-levels	£18,000	3,495
I Education	IB diploma		20
	A-levels	£22,000	2,185
J Combined	IB diploma		5
	A-levels	£21,000	115

£20K   £40K

Section 2. The impact of achieving an IB diploma on higher education enrolment and outcomes (compared to A level qualifications)

The descriptive statistics in Section 1 have shown that the cohorts of IB and A level students, qualifiers and leavers differed both in size and on background demographics across all academic years of linked data. It is of interest to investigate if there were significant differences between IB and A level student, qualifier and leaver outcomes.

In an ideal world, a randomised control trial would be undertaken, prior to undertaking the entry qualification, to randomly assign students to either an IB (the treatment) or A level (the control) study programme. A randomised control trial ensures that the students are only randomly different to each other on all background variables (Stuart, 2010), so significant differences between the two qualifications can be estimated. Randomised control trials are not always possible due to ethical or financial reasons; as a consequence, observational data is used to estimate the effects.

Difficulty arises in the estimation of effects from observational data due to imbalance or lack of overlap between treatment and control groups. D'Agostino and D'Agostinto (2007) note that this imbalance between treatment and control groups can lead to biased estimate of treatment effects and Stuart (2010) comments that regression models used to estimate treatment effects can perform poorly where there is insufficient overlap. It has been noted that the background demographics of IB and A level students, qualifiers and leavers are very different; for example, attendance at a state-funded school or college compared to a privately funded one could be associated with both the entry qualification (treatment/control of interest) and the attendance at a Top 20 HE provider (an outcome of interest). The pre-HE school type is an example of a potential confounder and there may be other examples of this. A confounder is a variable which is associated with both the outcome and the independent variable (Hosmer and Lemeshow, 2000, p.70). Not taking into account confounding variables can provide misleading effects. A solution to this problem is to use a statistical technique known as propensity score matching (PSM).

Methods

PSM enables the comparison of a treatment and a control group in order to estimate the average effect of a treatment on an outcome using observational data (Rosenbaum and Rubin, 1983). Section 1 has shown that the IB and A level students, qualifiers and leavers differ greatly in size across all years and in their background characteristics and demographics. It has already been noted that differences in background characteristics of groups can lead to biased treatment effects, such that a difference in outcome may be due to a difference in a background characteristic rather than the study programme that they undertook. Consequently, PSM is conducted to counteract this. In order to investigate difference in student outcomes in HE, PSM selects a group of IB students who are similar in size and balanced with good overlap in their background characteristics to a group of A level students. By creating similar groups of IB and A level students, the background characteristics should not have an impact on the outcome and so analysis of the effect of studying an IB qualification on the outcome can be conducted. Note that PSM is implemented twice more to create a similar group of IB and A level qualifiers and a similar group of IB and A level leavers.

Nearest neighbour PSM was implemented, without replacement, to provide matched 1:1 comparison groups for IB and A level student, qualifier, and leaver cohorts. The matched comparison groups were used to analyse the effect of undertaking an IB on several outcomes within the student, qualifier and leaver cohorts. All outcomes were dichotomous, such that the student either achieved or did not achieve the outcome of interest. Outcomes of interest for the student cohort were attendance at a Top 20 HE provider, enrolment on a STEM subject and continuation from first year to second year of study. Outcomes of interest for the qualifier cohort were focussed on achievement after attendance and course completion at a HE provider; specifically, the achievement of a first class honours degree and, achieving at least an upper second class honours degree or better. For the leaver cohort, surveyed six

months after leaving their HE provider, outcomes of interest include whether they were engaged in work or further study.

The matched groups of students, qualifiers and leavers were created to be similar on background demographics: sex, socio-economic classification, ethnicity, state school marker and low participation marker, as shown in Table 1. As noted in the first part of the report, the majority of this demographic data is not returned to HESA for anyone who is non-UK domiciled; consequently, the matched groups are restricted to those with a UK domicile only to prevent matching students, qualifiers or leavers with missing data within the analysis. Consequently, any reference to IB and A level students, qualifiers and leavers in this analysis refers to those who are UK domiciled only. Students, qualifiers or leavers with unknown or unclassified information for any of the background characteristics or outcomes were omitted from PSM, which represented approximately 20% of the data in each cohort. Unknown or unclassified information can be due to genuine unknown information (which is a valid return) or when the data has not been returned (NULL value), some information is not compulsory for a HE provider to return to HESA. The latter mainly occurs for those with a non-UK domicile.

As noted in Section 1, the IB and A level qualifications have a different grading system. A levels are awarded individual grades. There is no limit to the number of A levels that can be taken but typically it is 3 or 4, and HE providers usually make offers on 3 A levels. UCAS created the concept of tariff score, which translates post-16 qualification grades to a numerical value[9]. The purpose of tariff score is to specify entrance requirements for some UK HE providers but also allows broad comparisons to be made about a wide range of entry qualifications. The recent A level qualification reforms in 2017 use a new tariff mapping which has a 1-1 mapping to the old tariff, throughout this report both the old and new tariff mappings have been used where applicable. (https://www.ucas.com/file/63536/download?token=sxmdfCS-).

As there were small numbers of IB course students, qualifiers and leavers in the data, the analysis was restricted to those who had achieved an IB diploma only. The point threshold for an IB diploma is 24, which is equivalent to 260 UCAS tariff points (old tariff) or 104 (new tariff). To ensure comparability in terms of academic achievement, only A level students, qualifiers and leavers were included in the analysis with grade combinations equivalent to at least 240 tariff points (old tariff) or 96 tariff points (new tariff). Due to licensing restrictions for the use of postcode mapping to low participation neighbourhoods; Northern Irish domiciled students, qualifiers and leavers have been removed.

Tariff score is not used as an entrance criterion by all HE providers; some HE providers specify entrance criteria for each qualification. Taking into consideration tariff mappings across qualifications and the distribution of scores in the data, a grouping of IB point scores and A level grade combinations was created -specifically 3 groups: academic ability group 1 - those with lower graded tariff scores, academic ability group 2 - those with a mid-level graded tariff scores and academic ability group 3 - those with the higher graded tariff scores. Appendix D contains further information about the groupings suggested between the IB diploma and A level qualifications and the number of students, leavers and qualifiers within each group.

Table 1- Background characteristics used in PSM

Socio-economic classification (SEC)	1. Higher managerial & professional occupations 2. Lower managerial & professional occupations 3. Intermediate occupations 4. Small employers & own account workers 5. Lower supervisory & technical occupations 6. Semi-routine occupations 7. Routine occupations
Sex	1. Male 2. Female

State-school marker	1. State-funded school or college
	2. Privately funded school
Low participation marker	1. Low participation neighbourhood (POLAR4)
	2. Other neighbourhood (POLAR4)
Ethnicity	1. White
	2. Black
	3. Asian
	4. Mixed
	5. Other

The PSM methodology for each of the cohorts is as follows. The propensity scores are calculated by fitting a logistic regression model to the complete IB diploma and A level data with the dependent variable as the qualification marker (IB diploma/ A level), and the independent variables being the background demographics: sex, SEC, ethnicity, state school marker and low participation marker. The propensity scores are the fitted values from this model. The nearest neighbour approach matches an IB diploma individual to an A level individual with the closest propensity score. After this, analysis can be conducted on the matched IB diploma and A level cohorts.

There is debate in the literature about whether or not the paired nature of the data needs to be accounted for in the follow-up analysis (Austin, 2008; Stuart, 2010). As the matched pairs have not been made based on the outcomes of interest, it is not a case-control study, and so the paired nature of the data is not accounted for in the follow-up analysis. Stuart (2010) notes that after the matched samples have been formed, the same outcome analysis that would have been run on the full data can be run on the matched data. Therefore, a logistic regression model is fitted to the IB diploma and A level matched data to estimate the effect of undertaking the IB diploma on the outcomes of interest and its statistical significance. All analysis was conducted in R. The PSM was conducted using the MatchIt package (**http://cran.rproject.org/web/packages/MatchIt/MatchIt.pdf**).

PSM for the student cohorts

The student cohorts were restricted to UK domiciled first year full-time first degree students enrolled at UK HE providers. Table 2 shows 236,875 records containing missing or unknown data was removed across all academic years, which represents 20.2% of the total population.

Table 2: Missing or unknown data in the unmatched student cohorts by entry qualification

	IB diploma	A level
Number	6,855	230,020
Percentage	34.2%	20.0%

After the missing or unknown data were removed and the additional restrictions applied, 13,165 IB diploma students remain with known background characteristics compared to 924,085 A level students, Table 3 shows the time series distribution of the data.

Table 3: Time series of the unmatched student cohorts by entry qualification, 2013/14 to 2018/19

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
IB diploma	1,730	2,070	2,370	2,420	2,170	2,405
A level	153,585	149,595	162,240	161,175	153,830	143,655

Prior to matching, the background demographics of the IB diploma and A level students were very different for several variables; this is shown in Figure 36. The proportion of IB diploma students from higher socio-economic categories (specifically SEC 1-2), was larger than the A level students (considerably so for SEC 1). The percentage of students previously at a state school or from a low participation neighbourhood was larger for A level students than for IB diploma students. The majority of students were white across both cohorts, with a slightly higher proportion for A level students.

Figure 36- Balance statistics for unmatched student cohorts by entry qualification
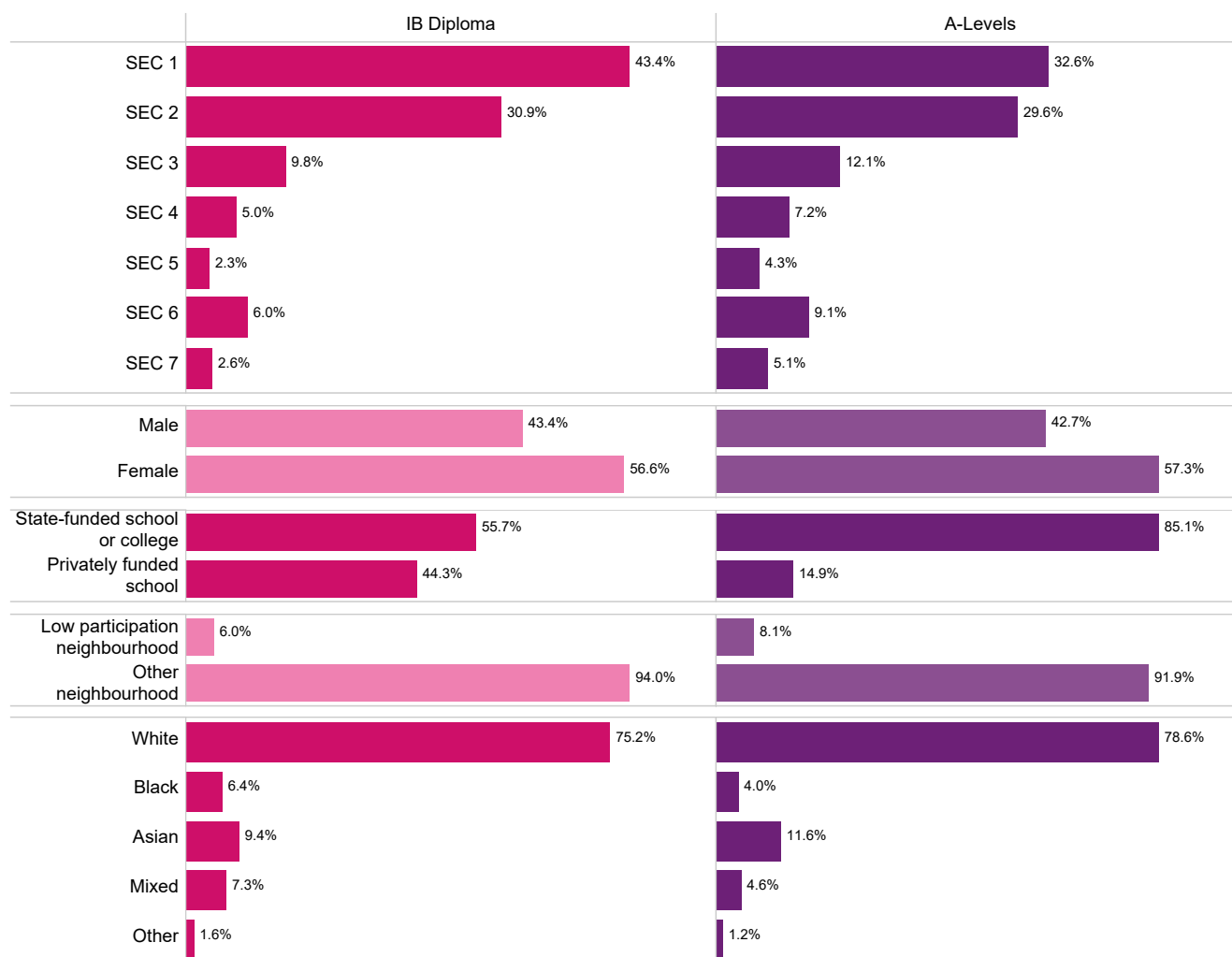
After matching, the 13,165 IB diploma students were matched to an equivalent 13,165 A level students. The balance of the background characteristics between the two groups greatly improved, so much so that the matched A level students had exactly the same background characteristic distribution as the IB diploma students. This is due to the large number of A level students available to match with the IB diploma students and the limited number of background characteristics. Plots of the distribution of the propensity scores before and after PSM can be found in Appendix A: Histogram and jitter plot of the propensity scores of the student data. It is not necessary to adjust the logistic regression outcome model for these demographic variables as there are no remaining differences between the two samples in the balance of these variables (Imai, King and Stuart, 2008).

PSM relies on an assumption of ignorability; this means that there are no unobserved differences between the IB diploma and A level student matched samples, given the background characteristics that have been considered. One difference between the two groups which would have an impact on any outcome analysis is the academic ability of the students within the matched samples. A measure of academic ability available is the IB point score or A level grades achieved by the student prior to entering HE. As the IB point score and A level grades have been influenced by the entry qualification, they cannot be incorporated into PSM.

Appendix D: Comparison of IB diploma and A level students within each tariff grouping, contains information on the methodology used to find equivalences between the two entry qualifications. The academic ability of a student is a confounding variable, as it is associated with the entry qualification undertaken, and any outcomes considered. For example, the grade achieved prior to entering HE is dependent on the qualification that they undertook and is associated with the attendance at a Top 20 HE provider (Top 20 HE providers tend to have higher entry requirements than other HE providers). As a consequence of this, the academic ability groupings have been included in the outcome analysis to control for differences in the academic ability between the two samples.

Figure 37 shows the balance of the equivalent academic ability groups between the matched samples.

Figure 37- Academic ability balance for matched student samples by entry qualification
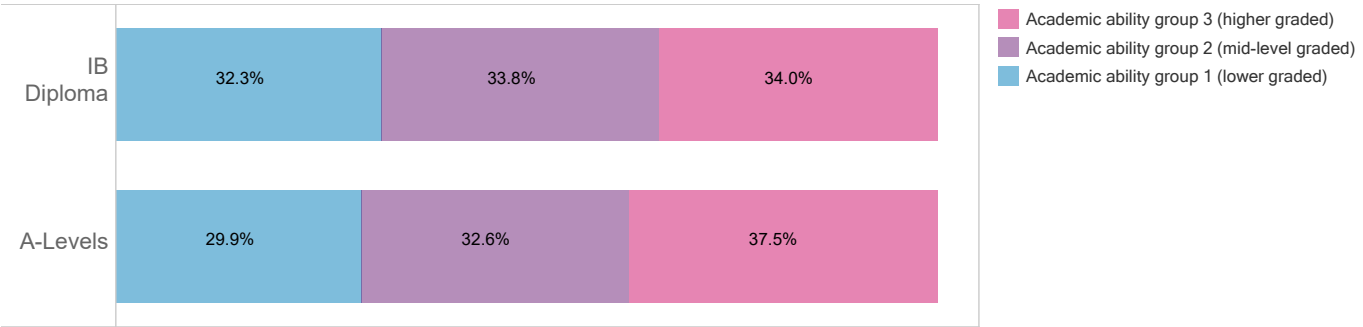
Logistic regression models were fitted to the matched IB diploma and A level student samples to investigate the effect of entry qualification on several outcomes of interest. Throughout this report, the entry qualification is included as a dichotomous variable and the academic ability is included as a 3- level categorical variable. For the qualification variable, IB diploma was coded as '1' and A level was coded as '0'. For the academic ability variable, dummy labels were created: academic ability group 1 was coded as '1', academic ability group 2 was coded as '2', and academic ability group 3 was coded as '3'. Note that the model output does not provide a coefficient for academic ability group 1 as this is the reference level, to which academic ability group 2 and 3 are compared. Interaction terms were included in the model where appropriate.

It is important to assess how well the models fit the data before reporting the results. The likelihood ratio test compares fitting a model to the data using the variables of interest to fitting a model to the data using no variables at all (the null model).

The outcomes of interest were:

1. Is the entry qualification associated with attendance at a Top 20 HE provider?
2. Is the entry qualification associated with enrolment on a STEM subject at HE?
3. Is the entry qualification associated with continuation from first year of study into the second year of study?

1. Enrolment at a Top 20 HE provider

Figure 38 shows the percentage of the matched IB diploma and A level student samples attending a Top 20 HE provider by academic ability group. Within the matched student sample, a higher percentage of IB diploma students attended a Top 20 HE provider compared to the A level students not accounting for any differences in academic, ability between the two samples.

The relationship continues when academic ability is taken into consideration. IB diploma students are more likely to attend a Top 20 HE provider than A level students, controlling for the same academic ability group. Attendance at a Top 20 HE provider increases as academic ability increases regardless of the entry qualification.

Figure 38- Attendance at Top 20 HE providers for matched student samples by entry qualification and academic ability group
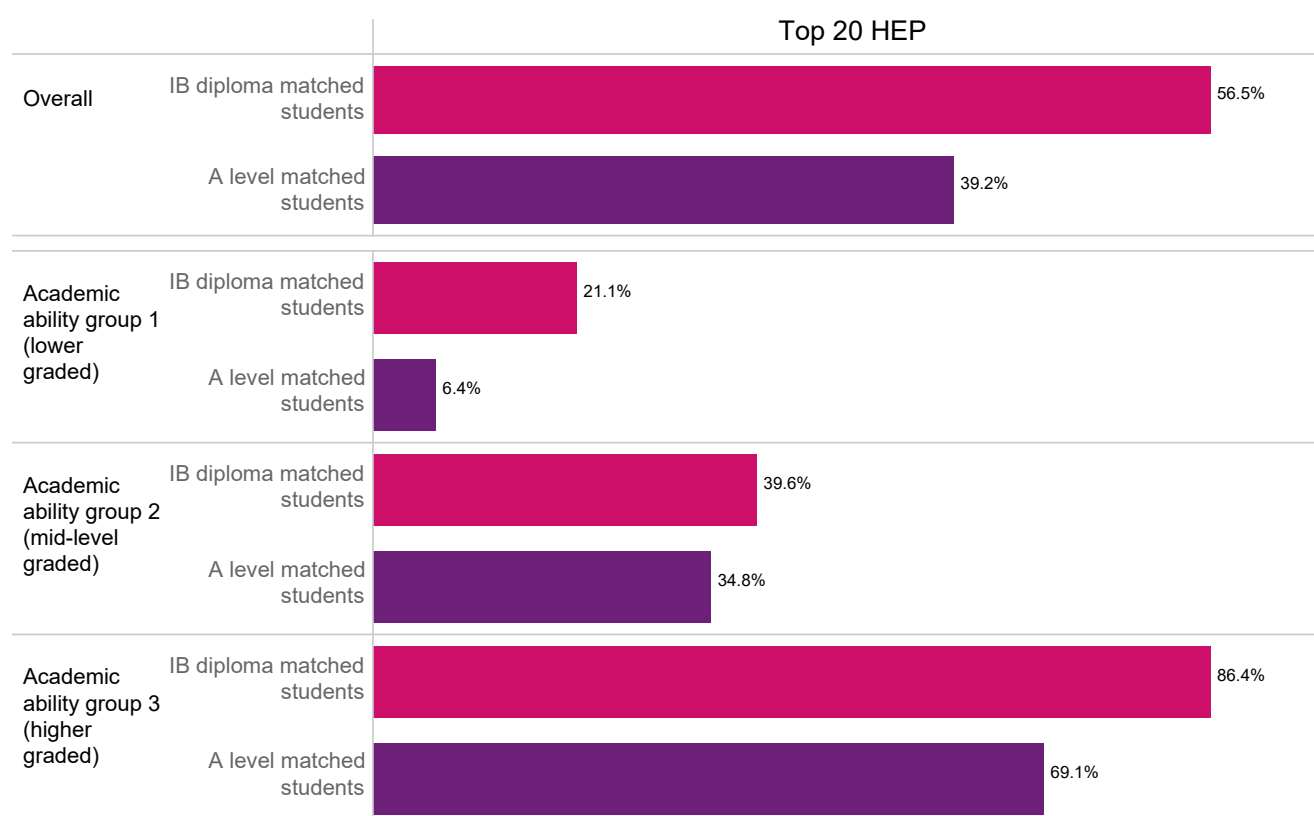
A logistic regression model was fitted to the matched IB diploma and A level student samples (balanced on background demographics) and the categorical variable was included to control for differences in academic ability. Table 4 shows the logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of each outcome, alongside some model fit statistics.

Table 4- Logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of the effect of entry qualification on student outcomes

Variable	1. Top 20 HE provider		2. STEM subject enrolment		3. Continuation status	
	Coefficient	Odds ratio	Coefficient	Odds ratio	Coefficient	Odds ratio
Entry qualification (IB diploma)	1.05*	3.02 (2.84,3.21)	-0.44*	0.64 (0.58,0.71)	0.19*	1.21 (1.04,1.40)
Academic ability group 2 (mid-level graded)	1.84*	6.30 (5.83,6.81)	-0.02	0.98 (0.89,1.08)	0.45*	1.57 (1.32,1.87)
Academic ability group 3 (higher graded)	3.28*	26.61 (24.49,28.95)	0.44*	1.55 (1.41,1.70)	0.98*	2.67 (2.19,3.26)
Pre-HE STEM marker	-	-	1.89*	6.65 (6.03,7.33)	-	-
Entry qualification: Academic ability group 2 (mid-level graded)	-	-	0.02	1.03 (0.90,1.17)	-	-
Entry qualification: Academic ability group 3 (higher graded)	-	-	-0.50*	0.61 (0.54,0.69)	-	-
Model fit statistics						
Likelihood Ratio Test	9016 (3df p<2.2e^{-16})		2086.9 (6df p<2.2e^{-16})		106.39 (3df p<2.2e^{-16})	
Goodness-of-fit Test	1.31 (2df p>0.05)		0.02 (5df p>0.05)		0.69 (2df p>0.05)	

Note: *p<0.05

The analysis showed that the entry qualification was significantly associated with attending a Top 20 HE provider, such that an IB diploma student was 3.02 times more likely (Odds ratio: 3.02, 95% Confidence interval: [2.84,3.21]) to attend a Top 20 HE provider after controlling for differences in academic ability than A level students. As to be expected, academic ability also had a significant effect on attending a Top 20 HE provider. Those with mid-level academic ability (Group 2) were 6.30 times more likely (Odds ratio: 6.30, 95% Confidence interval [5.83, 6.81]) to attend a Top 20 HE provider than those with lower graded academic ability. Those with high academic ability (Group 3) were 26.61 times more likely (Odds ratio: 25.64, 95% Confidence interval [24.49, 28.95]) to attend a Top 20 HE provider than were those with the lowest graded academic ability.

2. Enrolment on a STEM subject at HE

Figure 39 shows the percentage of the matched IB diploma and A level student samples enrolled on a STEM subject in HE. A higher percentage of A level students than IB diploma students were enrolled on a STEM subject, not accounting for differences in academic ability and pre-HE STEM enrolment between the two samples.

Figure 39 also takes into account differences in academic ability, not accounting for pre-HE STEM enrolment, the proportion of IB diploma students with higher graded entry qualifications enrolled on a STEM subject was less than the proportion of A level students. This relationship was reversed for those with a lower graded or mid-level graded entry qualifications, with a higher proportion of IB diploma students enrolled on a STEM subject. Interestingly, the proportion of IB diploma students enrolled on a STEM subject decreased as their IB point score increased, yet the opposite was true for A level students.

Figure 39- Enrolling on a STEM subject at HE for the matched student samples by entry qualification and academic ability group
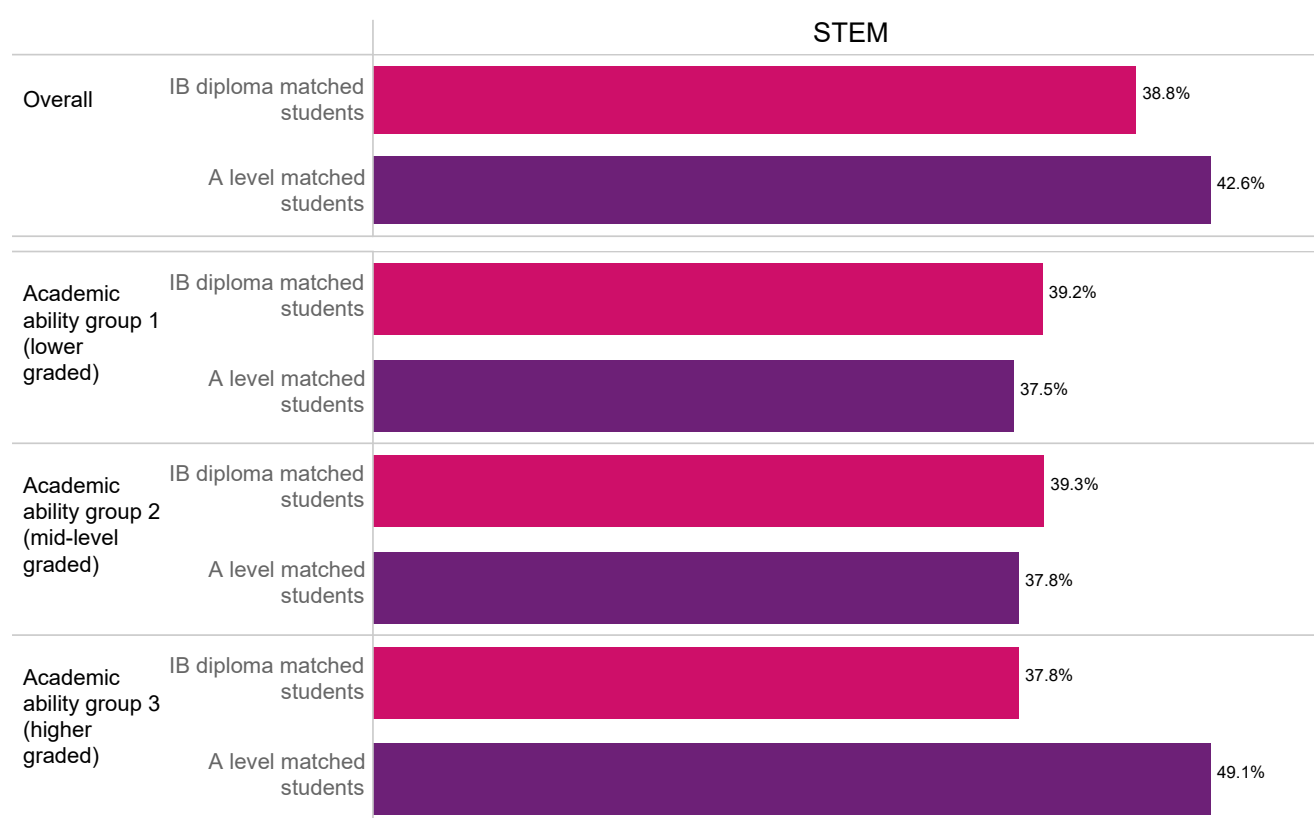
Another observable characteristic which differs between the matched student samples, and is related to this outcome, is the types of subjects studied during the IB diploma and A level qualification. The IB diploma has compulsory STEM subject elements throughout the course, in the matched student sample 100% of IB diplomas students had a pre-HE STEM subject. However, there is no obligation for A level students to undertake any subjects with a STEM element, in the matched student samples. If an A level student studied a STEM subject pre-HE it was 50/50 whether they would go on to study a STEM subject at HE level. Additionally, it is unlikely that an A level student having studied no STEM subjects at pre-HE would enrol on a STEM subject at HE as they would not have the necessary entry requirements. A STEM subject variable cannot be incorporated in the PSM as it is a variable influenced by the entry qualification. Due to this, an additional variable is included, to account for STEM subject study during the IB diploma and A level qualification, in the logistic regression model. Students who had successfully studied a STEM subject as part of their IB diploma or as one of their A levels were identified as having pre-HE STEM.

An interaction between entry qualification and academic ability was included in the model, which proved a better fit to the data.

The model output implies that there was a significant association between entry qualification and subject of study at HE. IB diploma students were 36% less likely (Odds ratio:0.64, 95% Confidence interval [0.58,0.71], Table 4) to enrol on a STEM subject at HE than A level after controlling for differences in academic ability and pre-HE STEM subject. The academic ability of a student was also significantly associated with enrolment on a STEM subject at HE as the academic ability of a student increased from a lower to a higher graded, they were more likely to enrol on a STEM subject at HE. As to be expected, the pre-HE STEM marker was also significantly associated with enrolment on a STEM subject at HE, those students with a pre-HE STEM qualification were more likely to enrol on a STEM subject at HE. As the academic ability of an IB diploma student increased from a lower to a higher graded they were significantly less likely to enrol on a STEM subject at HE compared to an A level student whose academic ability increased from a lower to a higher graded.

3. Continuation from first year to second year of study

The final outcome of interest is the continuation of students from their first year into the second year of study. The typical pathway of a student is to continue on the course that they have enrolled on or leave their course after gaining their intended award or higher. These can be seen as a positive outcome at the end of their first year. Other possible pathways include leaving their course, gaining another award, leaving with no award or going dormant. Figure 40 shows the percentage of the matched IB diploma and A level student samples by positive continuation status, not accounting for academic ability.

When accounting for academic ability in Figure 40, IB students had a marginally higher proportion with a positive continuation status than A level students. The proportion of students continuing did increase as academic ability increased regardless of entry qualification.

Figure 40- Continuation status for the matched student samples by entry qualification and academic ability group

		Continue at HE provider/ leave after gaining their intended award or higher
Overall	IB diploma matched students	97.6%
	A level matched students	97.2%
Academic ability group 1 (lower graded)	IB diploma matched students	96.2%
	A level matched students	95.9%
Academic ability group 2 (mid-level graded)	IB diploma matched students	97.8%
	A level matched students	97.1%
Academic ability group 3 (higher graded)	IB diploma matched students	98.7%
	A level matched students	98.2%
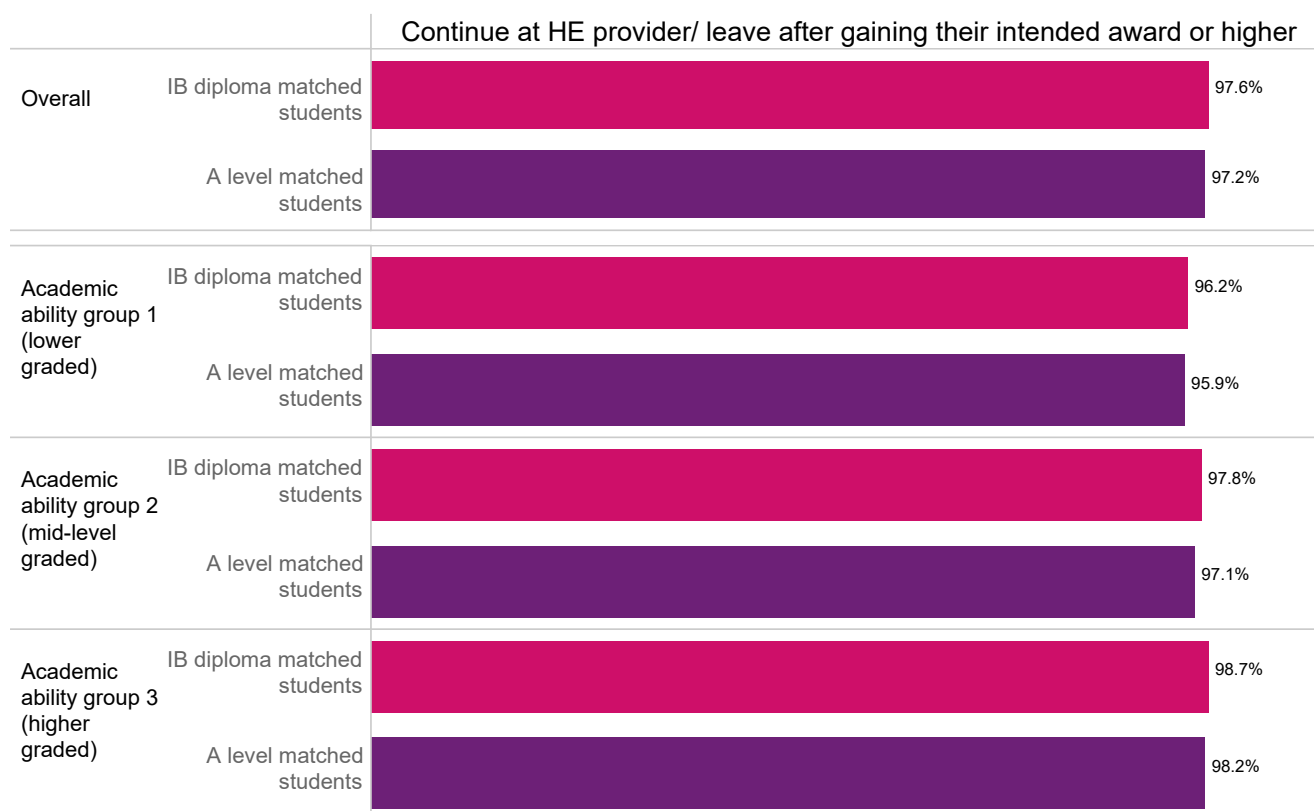
The analysis showed that the entry qualification was significantly related to a students' continuation status at a 95% confidence level to continue at HE provider/ leave after gaining their intended award or higher after controlling for differences in academic ability. IB diploma students were 21% more likely (Odds ratio:1.21, 95% Confidence interval [1.04,1.40], Table 4) than A level students to continue at HE provider/ leave after gaining their intended award or higher. As to be expected, academic ability also had a significant effect on continuation status those with mid-level or high academic ability were more likely to continue at HE provider/ leave after gaining their intended award or higher than were those with the lowest graded academic ability.

As mentioned earlier, PSM relies on the assumption of ignorability, implying that there are no unobserved differences between the matched samples and that there are no unobserved variables which are related to both the treatment and the outcome, given the background characteristics that have been considered. If a variable of this type existed, it would violate the assumption of ignorability and lead to biased significant treatment effects. In a randomised control trial, this is not an issue as a student (from a large comparable group) is randomly assigned an entry qualification to study, and so they would have the same probability of studying either an IB diploma or A level qualifications. Consequently, the groups of students are comparable if the only difference between them is the entry qualification they are studying and the effect of this entry qualification on the outcome can be estimated (Rosenbaum, 2005a). As this report is a retrospective, observational study, the students have not been randomly assigned an entry qualification and PSM has been used to create comparable groups of students based on a selection of their background characteristics. Note that there are limited background variables that have been measured on the IB diploma and A level students, so it is likely that there are other variables which could have been measured and included which would alter a students' propensity score and thus improve PSM. An example of this could be a student's work ethic. Even though the students have been matched on some background characteristics, if a student's work ethic increases the odds of them being assigned the IB diploma over the A level qualifications, then it may have an impact on the outcomes of interest. This is a variable that has not been measured and is not accounted, for but it obviously violates our assumption of ignorability. Rosenbaum bounds is a method to assess the sensitivity of PSM to the presence of any unobserved differences in the matched samples that were not accounted for in PSM. This was implemented using the rbounds package in R (**http://cran.r-project.org/web/packages/rbounds/rbounds.pdf**).

The sensitivity analysis uses a sensitivity parameter, Γ (gamma). If there is no difference in which entry qualification is assigned, everyone would have the same odds of being assigned the IB diploma or A level qualification. Even if the students do not differ on the background variables we examined, there may still be an unobserved variable which increases the odds for a student to be assigned, say, the IB diploma over A levels. If $\Gamma=2$, then one student may be twice as likely as another to receive the IB diploma than A levels due to an unobserved variable. The Rosenbaum bounds sensitivity analysis examines how big Γ can be before conclusions from our study change.

Γ is unknown and so several values are used to see when the inference changes. Rosenbaum (2005b) indicates that if Γ is larger than 1 then the study is highly sensitive to hidden bias and is insensitive to change for large values of Γ.

Table 5 shows the results of the Rosenbaum bounds. An asterisk represents a Γ that does not affect the inference from the analysis. For example, if Γ=2 has an asterisk, it implies that the unobserved variable causes the student to be twice as likely to be assigned the IB qualification over the A level qualification, but this does not change the conclusions of the analysis.

Table 5- Rosenbaum bands for student PSM outcomes

Γ Coefficient	1. Top 20 HE provider	2. STEM subject enrolment	3. Continuation status
1.0	*	*	*
1.1	*	*	
1.2	*	*	
1.3	*		
1.4	*		
1.5	*		
1.6	*		
1.7	*		
1.8	*		
1.9	*		
2.0			

The results show that if the odds of a student being assigned the IB diploma were at least 2.0 times higher due to any unobserved variables (given that we have matched on a selection of background characteristics), then the conclusions about the impact that entry qualification has on the attendance at a Top 20 HE provider would change.

In contrast to this, the inference about enrolment on a STEM subject was more sensitive to unobserved variables. If the odds of a student being assigned the IB diploma over the A levels are at least 1.3 higher due to an unobserved variable, then the conclusions about the impact the entry qualification has on enrolment on a STEM subject at HE would change. An example of an unobserved difference between students with respect to enrolling on a STEM subject are HE subject requirements for future career plans prior to HE. This is a variable that has not been measured.

Continuation status was highly sensitive to unobserved variables, if the odds of a student being assigned the IB diploma were at least 1.1 times higher due to any unobserved variables, then the conclusions about the impact that entry qualification has on the continuation of a student at HE would change.

PSM for the qualifier cohorts

The qualifier cohorts were restricted to UK domiciled full-time first degree qualifiers enrolled at UK HE providers.

Table 6 shows 217,100 records containing missing or unknown data were removed across all academic years, which represents 21.4% of the total population.

Table 6: Missing or unknown data in the unmatched qualifier cohorts by entry qualification

	IB diploma	A level
Number	5,505	211,595
Percentage	33.1%	21.2%

After the missing or unknown data were removed and the additional restrictions applied, 11,120 IB diploma qualifiers remain with known background characteristics compared to 784,550 A level qualifiers.

Table 7 shows the time series distribution of the data.

Table 7: Time series of the unmatched qualifier cohorts by entry qualification, 2013/14 to 2018/19

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19
IB diploma	1,580	1,820	1,830	2,040	1,840	2,010
A level	138,535	125,920	127,405	129,080	131,540	132,075

Prior to matching, the background demographics of the IB diplomas and A level qualifiers were very different; this can be seen in Figure 41. Similar to the student cohorts, the proportion of IB diploma qualifiers from a higher socio-economic categories (specifically SEC 1-2) was larger than the A level qualifiers. The percentage of qualifiers previously at a state school or from a low participation neighbourhood was higher for A level qualifiers. The majority of qualifiers were white regardless of which entry qualification they had undertaken.

Figure 41- Balance statistics for unmatched qualifier cohorts by entry qualification
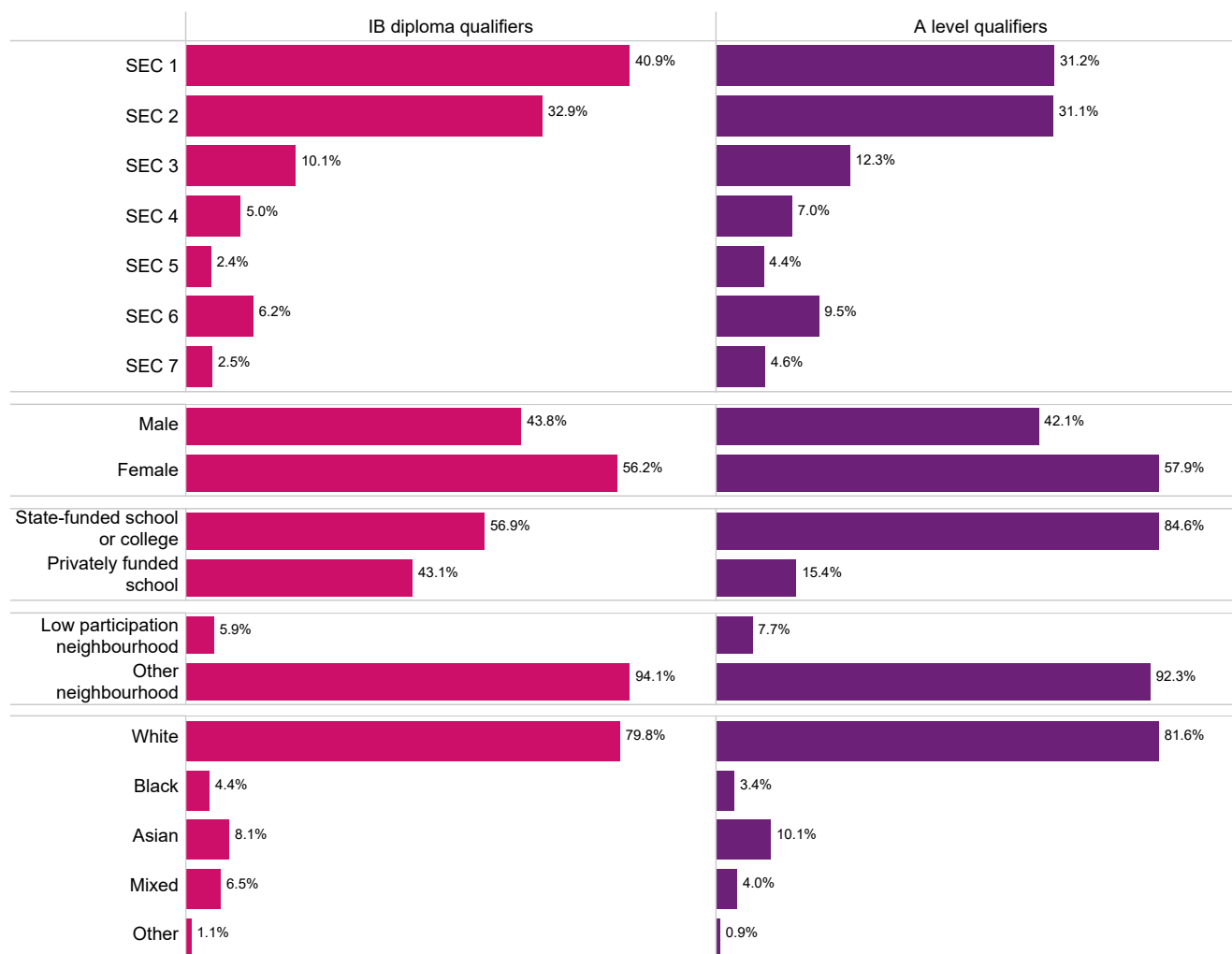
After matching, the 11,120 IB diploma qualifiers were matched to an equivalent 11,120 A level qualifiers. The balance of the background characteristics between the two groups has improved. The matched A level qualifiers had exactly the same background characteristics as the IB diploma qualifiers. Plots of the distribution of the propensity scores can be found in Appendix B: Histogram and jitter plot of the propensity scores of the qualifier data. The logistic regression models for the outcome analysis do not need to control for any remaining differences between the two samples as these variables are completely balanced.

As for the student cohort, academic ability was not taken into consideration in the matching procedure and, as a consequence, differs between the matched groups of qualifiers. Figure 42 shows the balance of the equivalent academic ability groups between the matched samples.

Figure 42- Academic ability balance for matched qualifier samples by entry qualification
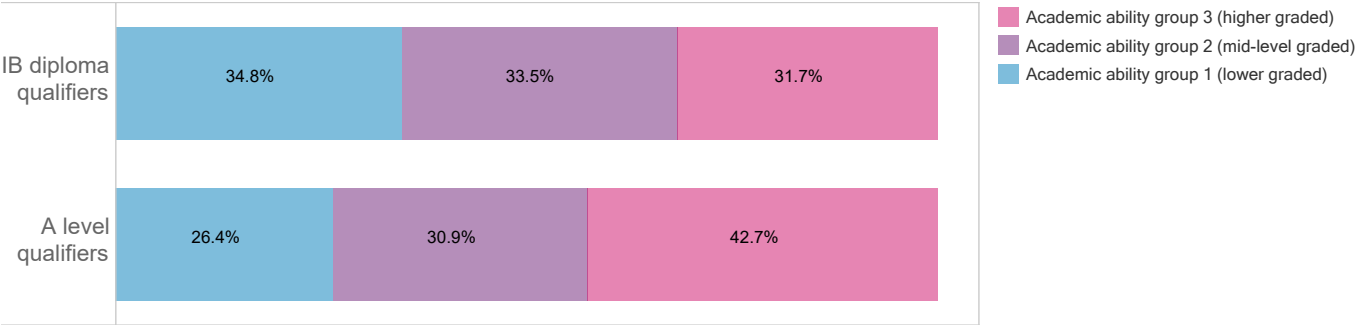
Logistic regression models were fitted to the matched IB diploma and A level qualifiers to investigate the effect of entry qualification on several outcomes of interest. These outcomes were focussed on the academic achievement gained at the end of the qualifiers HE qualification. The qualifiers cohort was restricted to those who had studied a first degree which were subject to degree classification and had been awarded a first class honours, upper or lower second class honours, third class honours or pass on completion of their first degree. The outcomes of interest were:

1. Is entry qualification associated with achieving a first class honours degree?

2. Is entry qualification associated with achieving an upper second class honours degree or better?

1. Achieving a first class degree compared to any other degree outcome

Figure 43 shows the percentage of the matched IB diploma and A level qualifier samples achieving a first class honours degree by academic ability. Within the matched qualifier samples, IB diploma qualifiers achieved a similar percentage of first class honours degrees as A level qualifiers, not accounting for any difference in academic ability between the two samples.

Figure 43 also shows the proportion of IB diploma and A level qualifiers with a first class honours degree after taking into consideration academic ability group. A higher proportion of IB diploma qualifiers with a mid-level or higher graded academic ability gained a first class honours degree than A level students with the equivalent academic ability. This relationship did not continue for IB diploma qualifiers with a lower graded academic ability; A level qualifiers with a lower graded academic ability had a higher proportion of first class honours degree than equivalent IB diploma qualifiers. As to be expected as the grade of the entry qualification increased from lower to higher graded, the proportion of qualifiers with a first class honours degree increased regardless of entry qualification.

Figure 43- Achievement of a first class honours degree in the matched IB diploma and A level qualifier samples by academic ability group
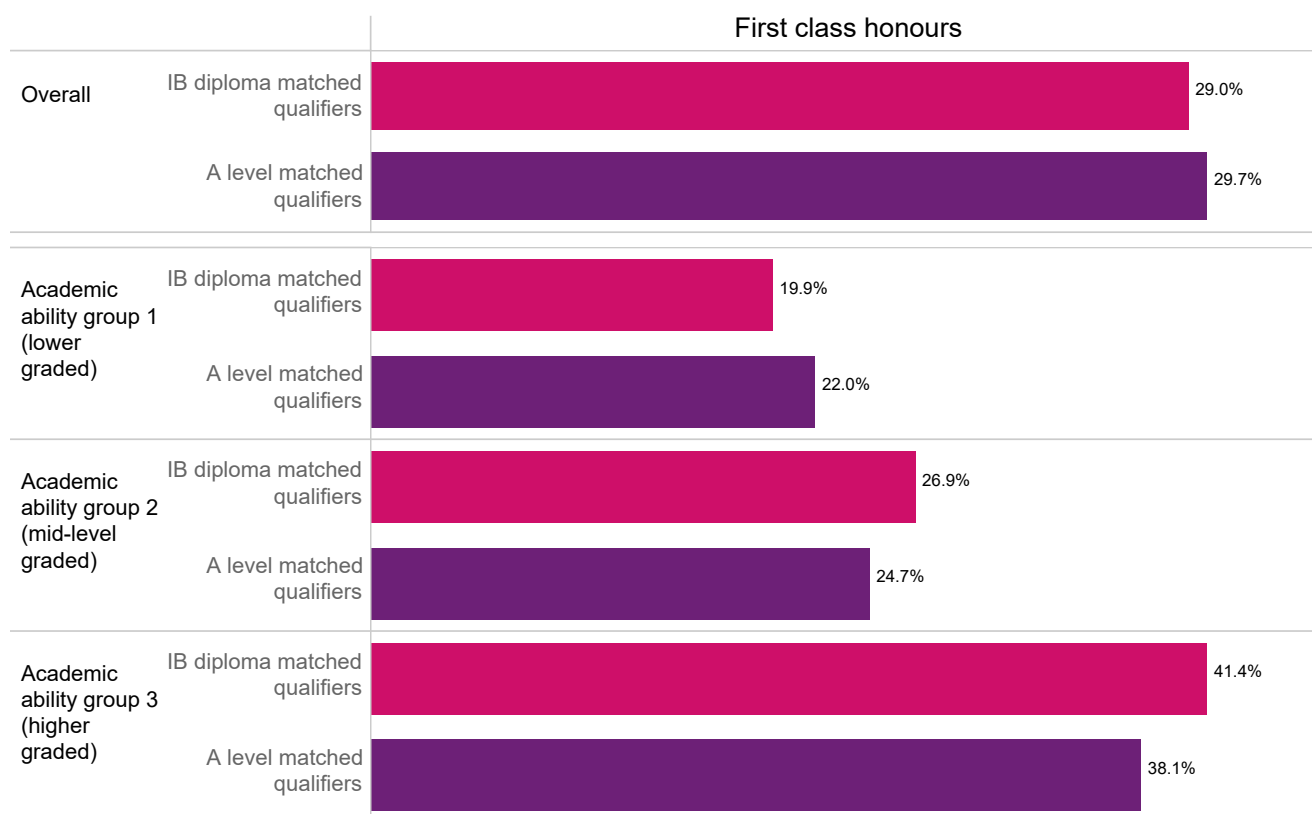
A logistic regression model was fitted to the matched IB diploma and A level qualifier samples (balanced on background demographics) and the categorical variable was included to control for differences in academic ability. Table 8 shows the logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of each outcome, alongside some model fit statistics.

Table 8- Logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of the effect of entry qualification on degree classification

Variable	1. Achieving a 1st class degree		2. Achieving a 2:1 or better degree	
	Coefficient	Odds ratio	Coefficient	Odds ratio
Entry qualification (IB diploma)	0.06*	1.07 (1.01,1.13)	0.33*	1.40 (1.29,1.52)
Academic ability group 2 (mid-level graded)	0.29*	1.33 (1.23,1.44)	0.79*	2.19 (2.00,2.41)
Academic ability group 3 (higher graded)	0.92 *	2.51 (2.33,2.70)	1.60*	4.96 (4.44,5.55)
Model fit statistics				
Likelihood Ratio Test	693 (3df $p<2.2e^{-16}$)		950.14 (3df $p<2.2e^{-16}$)	
Goodness-of-fit Test	2.53 (2df p>0.05)		28.33 (2df p<0.05)	

Note: *$p<0.05$

The analysis showed that the entry qualification was significantly associated with achieving a first class honours degree. IB diploma qualifiers were 7% more likely to achieve a first class honours degree compared to A level qualifiers (Odds ratio:1.07, 95% confidence interval [1.01,1.13]). As to be expected, academic ability was significantly associated with achieving a first class honours degree. Those with a mid-level or higher graded entry qualification were more likely to achieve a first class honours degree than those with a lower graded entry qualification.

2. Achieving an upper second class degree or better compared to any other degree outcome

Figure 44 shows the percentage of the matched IB diploma and A level qualifiers who achieved at least an upper second class honours, not accounting for any differences in academic ability. A higher percentage of IB diploma qualifiers achieved at least an upper second class honours degree than A level qualifiers.

Figure 44 also shows the percentage of IB diploma and A level qualifiers achieving at least an upper second class honours degree after taking into consideration academic ability group. The relationship observed continues, the proportion of IB qualifiers with at least an upper second class honours degree or above, is larger than the proportion of A level qualifiers with at least a second class honours degree. Again, as academic ability increases from a lower to higher graded entry qualification, the proportion of qualifiers with at least a second class honours degree increases.

Figure 44- Achievement of at least an upper second class honours degree in the matched IB diploma and A level qualifier samples by academic ability group

The analysis showed that there was a significant association between the entry qualification and achieving at least an upper second class honours degree, with IB diploma qualifiers 40% more than A level qualifiers to obtain at least an upper second class honours degree likely (Odds ratio: 1.40, 95% Confidence interval: [1.29,1.52], Table 8). Again, as to be expected, the qualifiers' academic ability was also associated with achieving at least an upper second class honours degree. Those with a mid-level or higher graded entry qualification was significantly associated with achieving at least an upper second class honours degree than those achieving a lower graded entry qualification.

Rosenbaum bounds was implemented to assess the sensitivity of PSM to the presence of any unobserved differences in the matched IB diploma and A level qualifiers that was not accounted for in the variables included in PSM.

Table 9 shows the results of the Rosenbaum bounds. An asterisk represents a Γ that does not affect the inference of the analysis. For example, if Γ=2 has an asterisk, it implies that the unobserved variable causes the qualifier to have been twice as likely to be assigned a specific qualification, but this does not affect the inference of the analysis.

Table 9- Rosenbaum bounds for qualifier PSM outcomes

Γ Coefficient	1. Achieving a first class degree compared to any other degree outcome	2. Achieving an upper second class degree or better compared to any other degree outcome
1.0		*
1.1		*
1.2		
1.3		
1.4		

The outcome of achieving a first class degree was only just significant in the model for the entry qualification so is extremely sensitive to hidden confounders.

The second outcome achieving an upper second class degree or better compared to any other degree is highly sensitive to hidden confounders; the odds of a qualifier having been assigned an IB diploma are 1.2 times higher due to an unobserved variable then our conclusions about the impact of an entry qualification on achieving at least a second class honours degree would change.

PSM for the leaver cohorts

The leaver cohorts were restricted to UK domiciled full-time first degree graduates from UK HE providers and who had completed the Destination of Leavers from Higher Education survey approx. 6 months after graduation. Table 10 shows 119,420 records containing missing or unknown data were removed across all academic years, which represents 21.5% of the total population.

Table 10: Missing or unknown data in the unmatched leaver cohorts by entry qualification

	IB diploma	A level
Number	2,760	116,660
Percentage	31.7%	21.3%

After the missing or unknown data were removed and the additional restrictions applied, 5,940 IB diploma leavers remain with known background characteristics compared to 429,890 A level leavers. Table 11 shows the time series distribution of the data.

Table 11: Time series of the unmatched leaver cohorts by entry qualification, 2013/14 to 2016/17

	2013/14	2014/15	2015/16	2016/17
IB diploma	1,280	1,530	1,515	1,620
A level	112,835	106,145	105,795	105,115

Prior to matching, the background demographics of the IB diploma and A level leavers were very different; this can be seen in Figure 45. The trends in the background characteristics that were seen in the unmatched student and qualifier cohorts continued through the leaver cohort.

Figure 45- Balance statistics for unmatched leaver cohorts by entry qualification
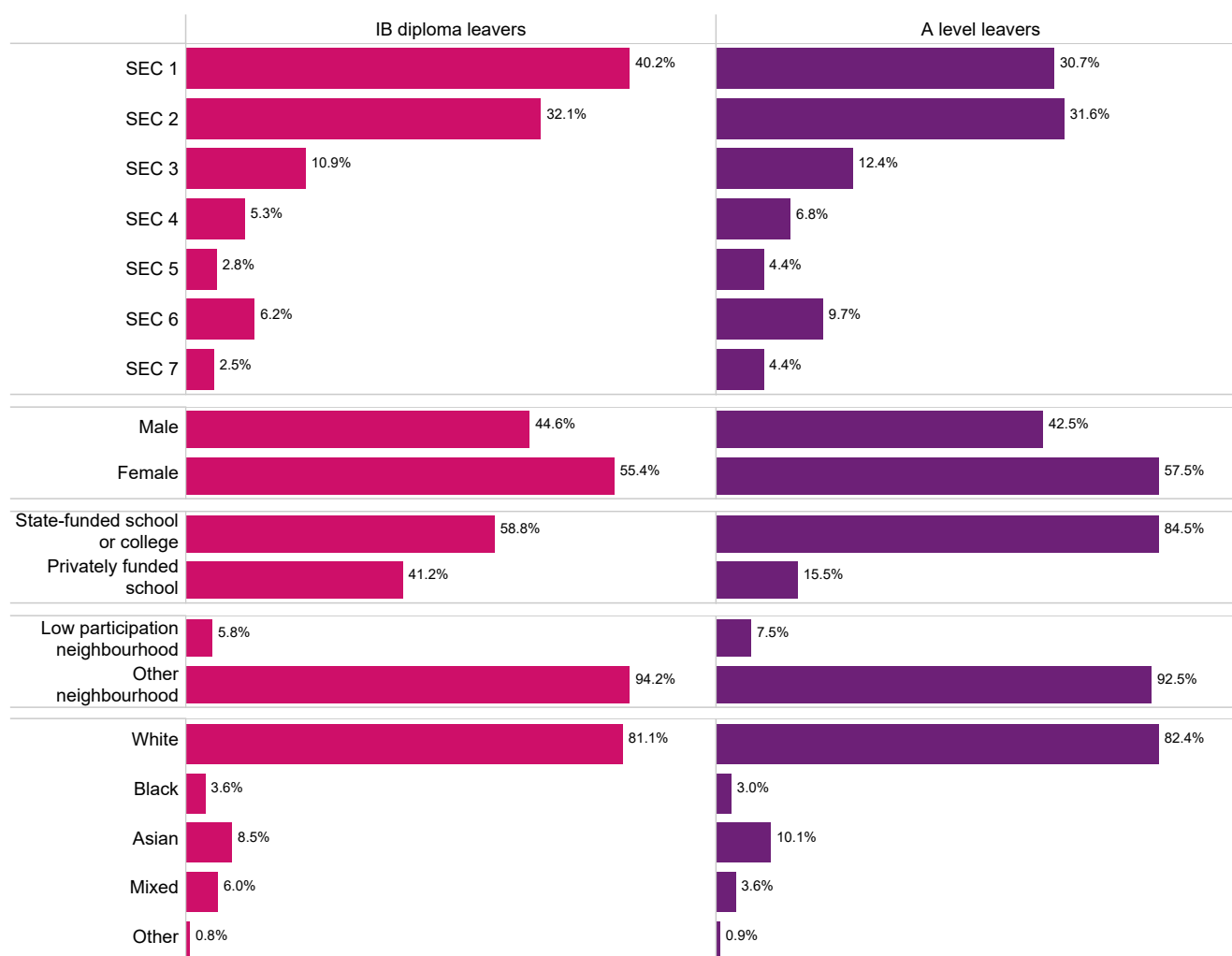
After matching, the 5,940 IB diploma leavers were matched to an equivalent 5,940 A level leavers. The balance of the background characteristics between the two groups had improved so much so that the matched leaver samples had exactly the same background characteristic distribution. Plots of the distribution of the propensity scores can be found in Appendix C: Histogram and jitter plot of the propensity scores of the leaver data. The logistic regression models for the outcome analysis do not need to control for any remaining differences in the background demographics as the matched samples were completely balanced and so the variables were omitted from the models.

As for the student and qualifier cohorts, the academic ability of the leavers was not taken into consideration in the matching procedure, and as a consequence, differs between the matched leaver samples. Figure 46 shows the balance of the equivalent academic ability groups between the matched leaver samples.

Figure 46- Academic ability balance between matched leaver samples
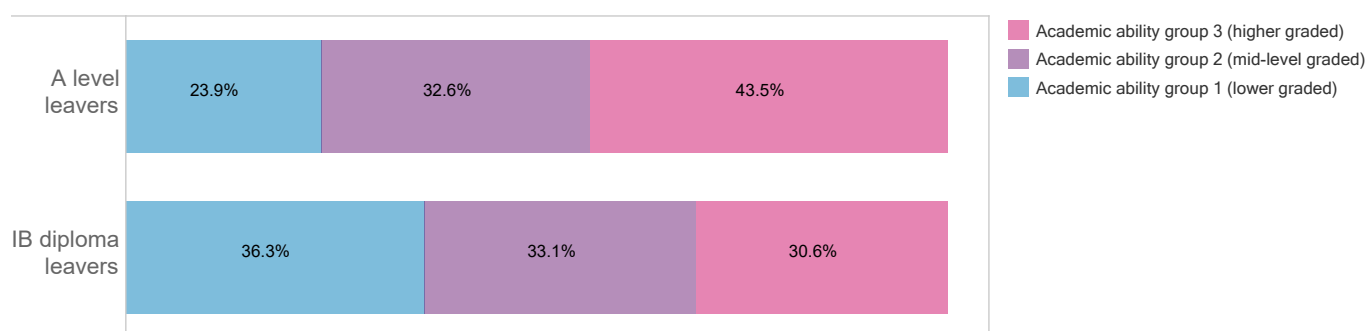
Logistic regression models were fitted to the matched IB diploma and A level leavers to investigate the effect of entry qualifications on several outcomes of interest. These outcomes were:

1. Is entry qualification associated with being engaged in an activity with a work element?

2. Is entry qualification with being engaged in an activity with a study element?

1. Engagement in an activity with a work element

Figure 47 shows the percentage of leavers engaged in an activity with a work element within the IB diploma and A level samples, not accounting for any differences in academic ability. A higher percentage of A level leavers were engaged in an activity with a work element compared to IB diploma leavers.

Figure 47 also shows the percentage of the matched IB diploma and A level leaver samples engaged in an activity with a work element after taking into consideration academic ability group. The relationship continues, the proportion of A level leavers engaged in an activity with a work element is greater than the proportion of IB diploma leavers regardless of the grade of their entry qualification. The percentage of leavers engaged in an activity with a work element decreases as the academic ability of a leaver increases from a lower to higher graded regardless of entry qualification. The higher achieving leavers were more likely to continue their education further, than lower academic abilities.

Figure 47- Engagement in an activity with a work element for matched leaver samples by entry qualification academic ability group
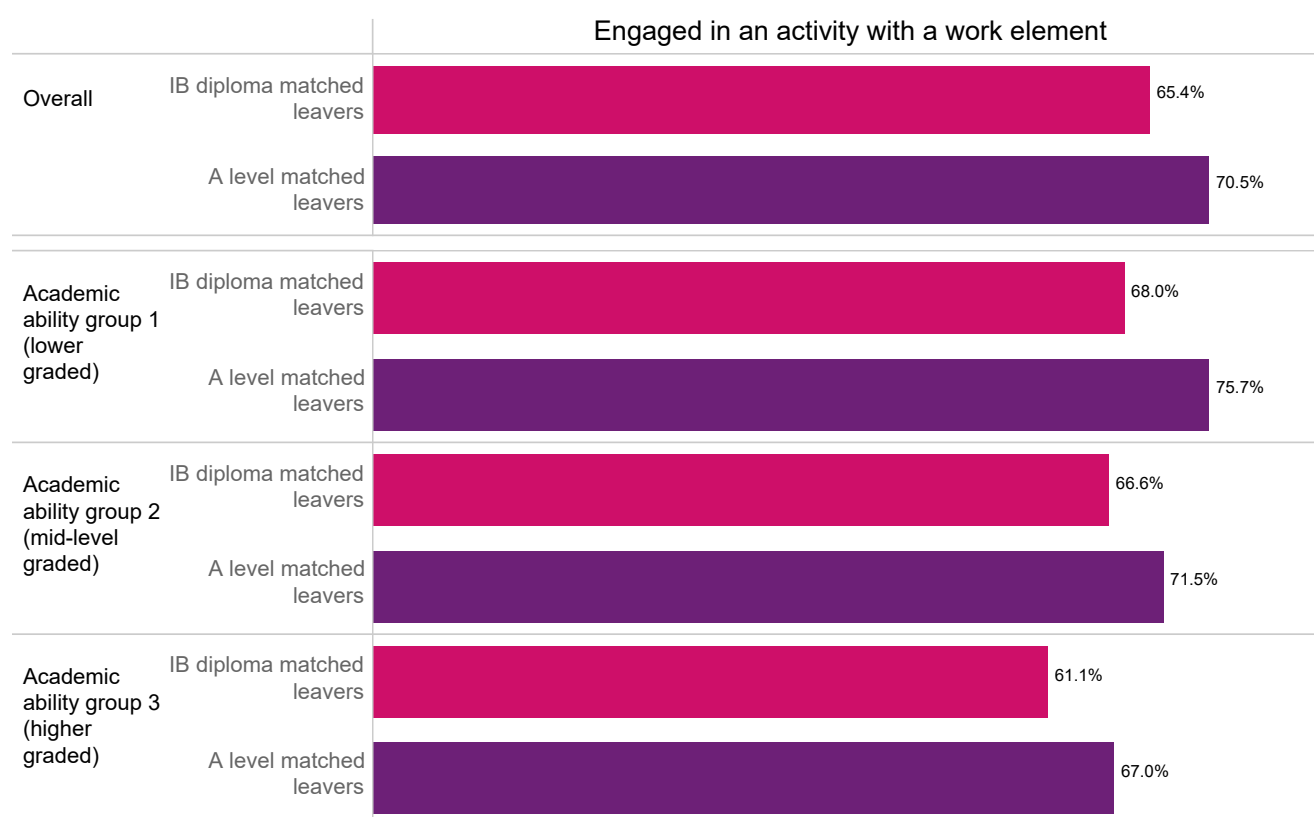
Table 12 shows the logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of each outcome.

Table 12- Logistic regression coefficients, odds ratios and odds ratios confidence intervals for the analysis of the effect of entry qualification on activity after graduation

Variable	1. Being engaged in an activity with a work element		2. Being engaged in an activity with a study element	
	Coefficient	**Odds ratio**	**Coefficient**	**Odds ratio**
Entry qualification (IB diploma)	-0.28*	0.75 (0.70,0.82)	0.32*	1.38 (1.27,1.5)
Academic ability group 2 (mid-level graded)	-0.12*	0.89 (0.80,0.98)	0.16*	1.18 (1.06,1.31)
Academic ability group 3 (higher graded)	-0.35*	0.70 (0.64,0.77)	0.35*	1.42 (1.28,1.57)
Model fit statistics				
Likelihood Ratio Test	91.46 (3df p<2.2e^{-16})		89.4 (3df p<2.2e^{-16})	
Goodness-of-fit Test	2.36 (2df p>0.05)		2.09 (2df p>0.05)	

Note: *p<0.05

A logistic regression model was fitted to the matched IB diploma and A level leaver samples, which have been balanced on background demographics and controlling for differences in academic ability. The analysis showed, in Table 12, that the entry qualification was significantly associated with being engaged in an activity with a work element. IB diploma leavers were 25% less likely (Odds ratio: 0.75, 95% Confidence interval: [0.70, 0.82]) to be engaged in an activity with a work element than A level leavers. The academic ability of a leaver was also significantly associated with being engaged in an activity with a work element as the academic ability of a leaver increased from a lower to a mid-level graded or higher graded, they were less likely to be engaged in an activity with a work element.

2. Engagement in an activity with a study element

Figure 48 shows the percentage of the matched IB diploma and A level leaver samples engaged in activity with a study element, not accounting for any differences in academic ability. As shown in Figure 28, unemployment and other engagement activities represent a small proportion of the leaver population, so leavers not engaged in activity with a work element are highly likely to be engaged in an activity with a study element. A higher percentage of IB diploma leavers were engaged in an activity with a study element than A level leavers.

Figure 48 also shows the engagement in an activity with a study element in the matched IB diploma and A level leaver samples after taking into consideration academic ability group. The overall relationship is followed within academic ability grouping; a larger proportion of IB diploma leavers are in an activity with a study element compared to A level leavers in all academic ability groupings. Regardless of entry qualification, the proportion of leavers in an activity with a study element increases as the entry qualification grade increases from a lower to higher.

Figure 48- Engagement in an activity with a study element for matched leaver samples by entry qualification and academic ability group
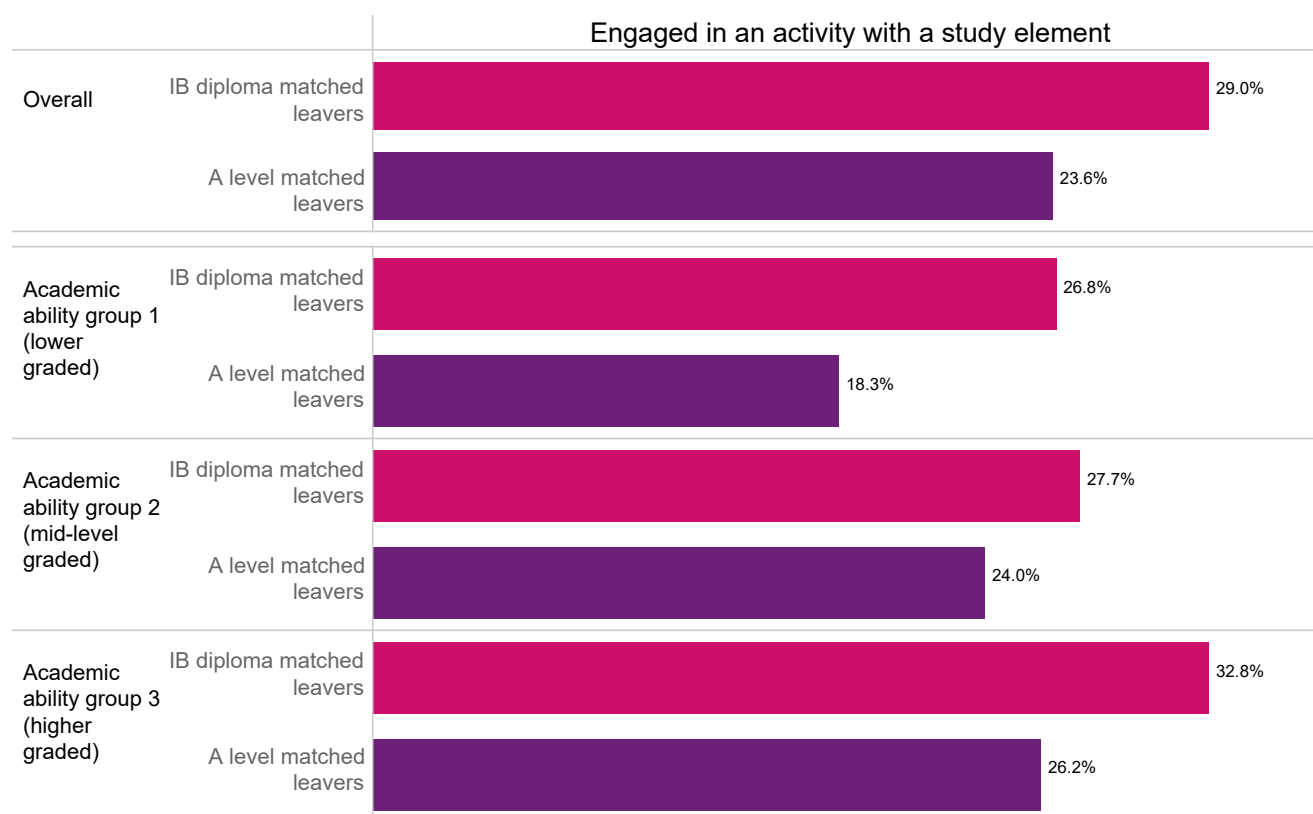
A logistic regression model was fitted to the matched IB diploma and A level leaver samples and including a categorical variable in the model to adjust for differences in academic ability groups.

Table 12 shows that the entry qualification was significantly associated with being engaged in an activity with a study element, such that IB diploma leavers were 38% more likely than an A level leaver to be engaged in an activity with a study element (Odds ratio: 1.38, 95% Confidence interval: [1.27, 1.50]). The academic ability of a leaver was also associated with being engaged in an activity with a study element; leavers with a mid-level or higher graded entry qualification were significantly more likely to be engaged in an activity with a study activity compared to those with a lower graded qualification.

Rosenbaum bounds was implemented to assess the sensitivity of PSM to the presence of any unobserved differences in the matched IB diploma and A level leavers that was not accounted for in the variables included in PSM.

Table 13 shows the results of the Rosenbaum bounds. An asterisk represents a Γ that does not affect the inference of the analysis.

Table 13- Rosenbaum bounds for leaver PSM outcomes

Γ Coefficient	1. Being engaged in an activity with a work element	2. Being engaged in an activity with a study element
1.0	*	*
1.1	*	*
1.2	*	*
1.3		
1.4		

The results show that the PSM for both outcomes are sensitive to hidden confounder variables. If the odds of a leaver being assigned the IB diploma are 1.3 times higher due to unobserved variables (given that we have matched on a selection of background characteristics) then our conclusions about the impact of the entry qualification on the engagement in an activity with a work element would change. Similarly, if the odds of a leaver being assigned the IB diploma are 1.3 times higher due to unobserved variables, then our conclusions about the impact of the entry qualification on the engagement in an activity with a study element would change.

In conclusion, the approach used in Section 2 is fairly robust, the sample size for A level students, qualifiers and leavers is large enough to provide accurate matching to IB diploma students, qualifiers and leavers. Caution should be used when analysing the results as confounding variables could be missing and underlying differences in background characteristics that have not been considered or are not captured in the data could be driving differences in the outcomes considered. In particular, the most uncertainty is found in the enrolment on a STEM subject at HE model, due to the compulsory STEM element in the IB diploma. Comparisons between IB diploma and A level students are less reliable for the STEM enrolment outcome. An outline of the results found in Section 2 are included in the Summary.

Summary

Student cohort: A level comparison to IB

All students in the report were full-time, first year students enrolled on a first degree course at a UK HE provider. The following bullet points summarise some of the findings for IB and A level students in 2018/19.

- The majority of A level students were UK domiciled, 97.0%, compared to 28.1% of IB students. Excluding the UK, the largest proportion of IB students were domiciled from within the EU, 36.8%, and Asia, 34.4%.
- Of those UK domiciled students, the majority with an IB qualification were from the South East, 32.9%, and London, 25.6%. The domicile of A level students was more spread throughout the UK with London, 18.3%, and the South East, 17.1%, having the largest proportions.
- Information about equal opportunities and widening participation background characteristics such as ethnicity and socio-economic classification are only routinely collected for UK domiciled students. The majority of UK domiciled IB and A level students were white (IB 70.7%, A level 74.2%). A higher proportion of UK domiciled IB students came from a higher socio-economic background (classification 1-3), 84.9%, than UK domiciled A level students, 72.2%. A higher proportion of UK domiciled A level students were from a low participation neighbourhood, 8.9%, than UK domiciled IB students, 5.8%. A higher proportion of UK domiciled IB students, 46.1% had previously attended a privately funded school compared to 12.7% of UK domiciled A level students.
- The most popular regions in the UK for IB students to study were London, 28.7%, and the South East, 14.0%. The popularity of study locations was more geographically spread for A level students, but was in agreement with the IB students, the South East 14.1% and London 12.4%.
- A higher proportion of IB diploma students attended a Top 20 HE provider, 47.1%, compared to 27.2% A level students and 18.4% IB course students. As to be expected, as pre-HE academic achievement improved (either by an increase in IB score points or tariff points) the proportion of students attending a Top 20 HE provider increased for both IB and A level students.
- The most popular subjects of study for IB diploma students were business & administrative studies, 15.8%, and social studies, 15.5%. The most popular subjects of study for A level students were social studies, 13.3%, and biological sciences, 12.8%. The most popular subjects of study for IB course students were business & administrative studies, 24.8%, and creative arts & design, 14.6%. A higher proportion of A level students studied a STEM subject, 45.5%, than IB diploma students, 39.7%, and IB course students, 29.1%.
- The continuation from first to second year or qualification at the same HE provider of IB diploma students, 92.8%, and A level students, 92.3%, were similar. This was greater than for the IB course students, 89.2%.

Propensity score matching in the student cohort: A level comparison to IB diploma

- Outcomes of interest for investigation in the matched IB and A level student samples were enrolment at a Top 20 HE provider, enrolment on a STEM subject at HE and continuation of students from first to second year of study. Differences in academic ability between the IB and A level students had not been accounted for in the propensity score matching and would impact on the effect on the outcome, so this was taken into consideration in the follow-up analysis (a confounding variable). Logistic regression models were fitted to the matched IB and A level student samples to investigate the effect of studying an IB qualification compared to A levels pre-HE on each of the outcomes of interest whilst adjusting for any differences in academic ability.

- The results showed that enrolment at a Top 20 HE provider was significantly associated with entry qualification, IB diploma students more likely than A level students (Odds ratio: 3.02, 95% Confidence interval: [2.84,3.21]). As to be expected, academic ability was also significantly associated with attendance at a Top 20 HE provider as academic ability increased.

- The second outcome of interest was enrolment on a STEM subject at HE. A lower proportion of IB diploma students were enrolled on a STEM subject at HE than A level students (Odds ratio:0.64, 95% Confidence interval [0.58,0.71]). Taking STEM subject at pre-HE into consideration also increased the likelihood of studying STEM at HE.

- The third outcome of interest was if the student had continued from first to second year or left after gaining their intended award or higher compared to another status. The proportion of IB diploma students were greater (Odds ratio:1.21, 95% Confidence interval [1.04,1.40]) than A level students for continuing or leaving after gaining their award or higher.

Qualifier cohort: A level comparison to IB

All qualifiers in the report had successfully completed a full-time, first degree course at a UK HE provider. The following bullet points summarise some of the findings for IB and A level qualifiers in 2018/19.

- The proportion of IB qualifiers who achieved a first class or upper second class honours degree was similar for A level qualifiers, 86.5%, and IB diploma qualifiers, 85.9%. Both IB diploma and A level qualifiers achieved a higher proportion of first class or upper second class honours degrees than IB course qualifiers, 72.8%.
- IB diploma qualifiers achieved a higher percentage of first class or upper second class honours degrees than A level qualifiers in all subjects except biological sciences, agriculture & related subjects, architecture, building & planning, law, business & administrative studies, creative arts & design and education.
- As to be expected, as academic achievement increased (increase in IB point score and UCAS tariff score) the percentage of qualifiers achieving a first class honours degree increased in general for both IB and A level qualifiers.

Propensity score matching in the qualifier cohort: A level comparison to IB diploma

- Outcomes of interest for investigation in the matched IB and A level qualifier samples were achieving a first class honours degree and achieving at least an upper second class honours degree or better. Differences in academic ability between the IB and A level qualifiers had not been accounted for in the propensity score matching and would impact on the effect on the outcome, so this was taken into consideration in the follow-up analysis (a confounding variable). Logistic regression models were fitted to the matched IB and A level qualifier samples to investigate the effect of studying an IB qualification compared to an A level pre-HE on each of the outcomes of interest whilst adjusting for any differences in academic ability.

- The results showed that achieving a first class honours degree was significantly associated with entry qualification, IB diploma qualifiers more likely than A level qualifiers (Odds ratio:1.07, 95% confidence interval [1.01,1.13]). As to be expected, academic ability was also significantly associated with achieving a first class honours degree as academic ability increased.

- The second outcome of interest showed that achieving at least a second class honours degree was significantly associated with entry qualification, IB diploma qualifiers more likely than A level qualifiers (Odds ratio: 1.40, 95% Confidence interval: [1.29,1.52]). As to be expected, academic ability was also significantly associated with achieving at least an upper second class honours degree as academic ability increased.

Leaver cohort: A level comparison to IB

All leavers in the report had successfully completed a full-time, first degree course at a UK HE provider and had completed the HESA Destinations of Leavers from Higher Education (DLHE) survey 6 months later. The following bullet points summarise some of the findings for IB and A level leavers in 2016/17.

- The proportion of A level leavers in work, 65.9%, was higher than the proportion of IB diploma leavers in work, 53.1%, and IB course leavers in work, 58.9%.
- The proportion of IB diploma leavers in further study, 31.4%, was higher than the proportion of A level leavers in further study, 19.3%, and IB course leavers in further study, 27.4%.
- Of those in further study, the majority of all leavers were enrolled on a higher degree by taught course; the highest of which was IB course leavers, 77.9%, followed by IB diploma leavers, 69.6%, and A level leavers, 60.6%. A higher percentage of A level leavers were enrolled on a Postgraduate diploma or certificate, 17.5%, than IB diploma leavers, 6.6%.

- Of those in work by industry type, IB diploma leavers were most likely to be employed in professional, scientific and technical activities, 19.1%, or human health and social work activities, 16.0%. Similarly, A level leavers were most likely to be employed in human health and social work activities, 16.0%, and professional, scientific and technical activities, 14.9%.
- Of those in work by occupation type the percentages were similar between IB and A level leavers across all of the occupation types, with the exception of professional occupations (IB diploma 41.3%, A level 38.3%) and associate professional and technical occupations (IB diploma 38.2%, A level 32.8%).
- The median salary for IB diploma leavers was £24,000, for IB course leavers was £22,000 and for A level leavers was £22,000.
- IB diploma leavers had a higher or equal median salary across all subject areas than A level leavers.
- The greatest difference between median salaries of IB diploma and A level leavers was seen in law (IB diploma £23,500, £19,000 A level).

Propensity score matching in the leaver cohort: A level comparison to IB diploma

- Outcomes of interest for investigation in the matched IB and A level qualifier samples were engagement in an activity with a work element and engagement in an activity with a study element.

- The results showed that those having studied an IB diploma were less likely to be engaged in an activity with a work element than A level leavers (Odds ratio: 0.75, 95% Confidence interval: [0.70, 0.82]).

- The results showed that being engaged in an activity with a study element was significantly associated with entry qualification, IB diploma leavers more likely than A level leavers (Odds ratio: 1.38, 95% Confidence interval: [1.27, 1.50]). As to be expected, academic ability was also significantly associated with being engaged in an activity with a study element as academic ability increased.

Appendices

The histograms and the jitter plots show the distribution of the propensity scores. The propensity scores are generated by fitting a logistic regression model to the complete dataset with the dependent variable as the qualification marker (IB diploma/ A level) and the independent variables as the background demographics. The propensity scores are the fitted values from this model.

For PSM, it is important that there is enough overlap between the treatment and the control groups, i.e. that their propensity scores overlap in order for matching to be successful. Another key feature of PSM is that the distribution of the variables must be balanced between the treatment and the control groups. Both the jitter plot and histogram are used to investigate these requirements.

Appendix A: Histogram and jitter plot of the propensity scores of the student data

The jitter plot refers to treatment units, the propensity scores of the IB diploma students, and the control units, the propensity scores of the A level students. Figure 49 shows the matched IB diploma and A level students have good overlap. There are no unmatched IB diploma students but there are a large number of unmatched A level students which is expected.

Black ethnicity, female students from a SEC 1 background who were living in a low participation neighbourhood and attending a private school had the largest propensity scores. White, male students from a SEC 4 background who were living in an 'other neighbourhood' and attending a state school had the smallest propensity scores.

**Figure 49- Jitter plot of student PSM propensity scores**
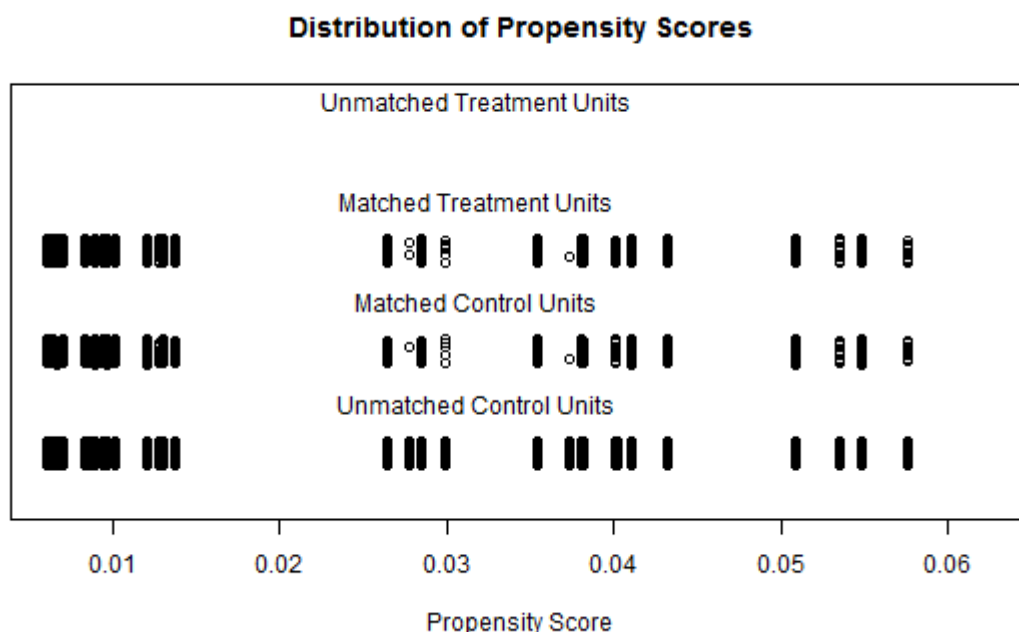
Figure 50 shows the distribution of the propensity score before and after matching. It must be noted that the plots are on a different scale. Prior to matching, the 'raw' treatment and controls had similar shaped distributions, but the A level students had a higher proportion of students with low propensity scores. After matching, the distributions are identical and so it can be concluded that the samples are balanced.
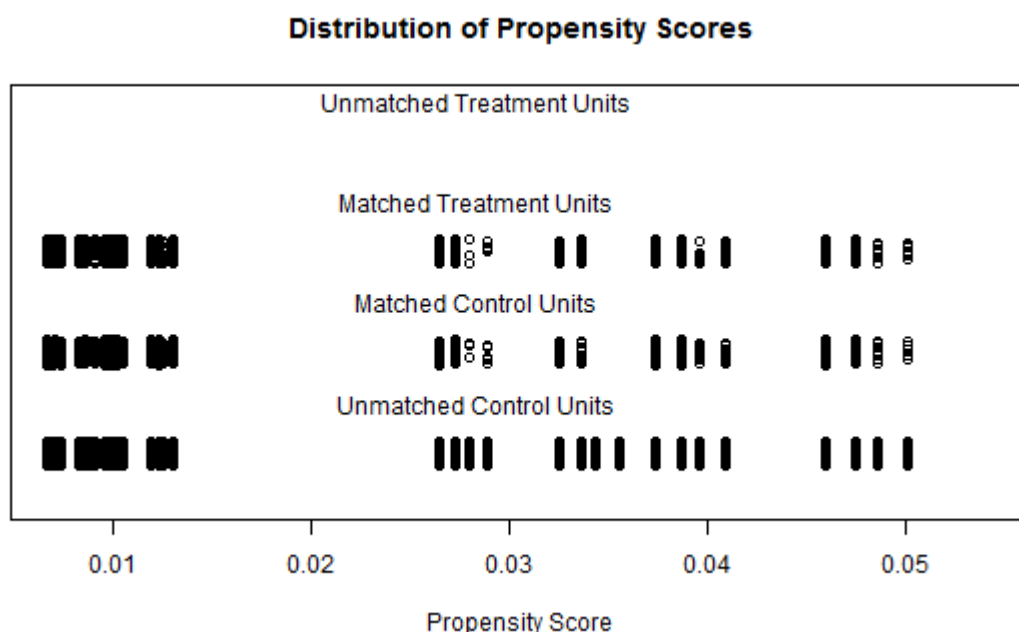
Figure 50- Histogram of student PSM propensity scores
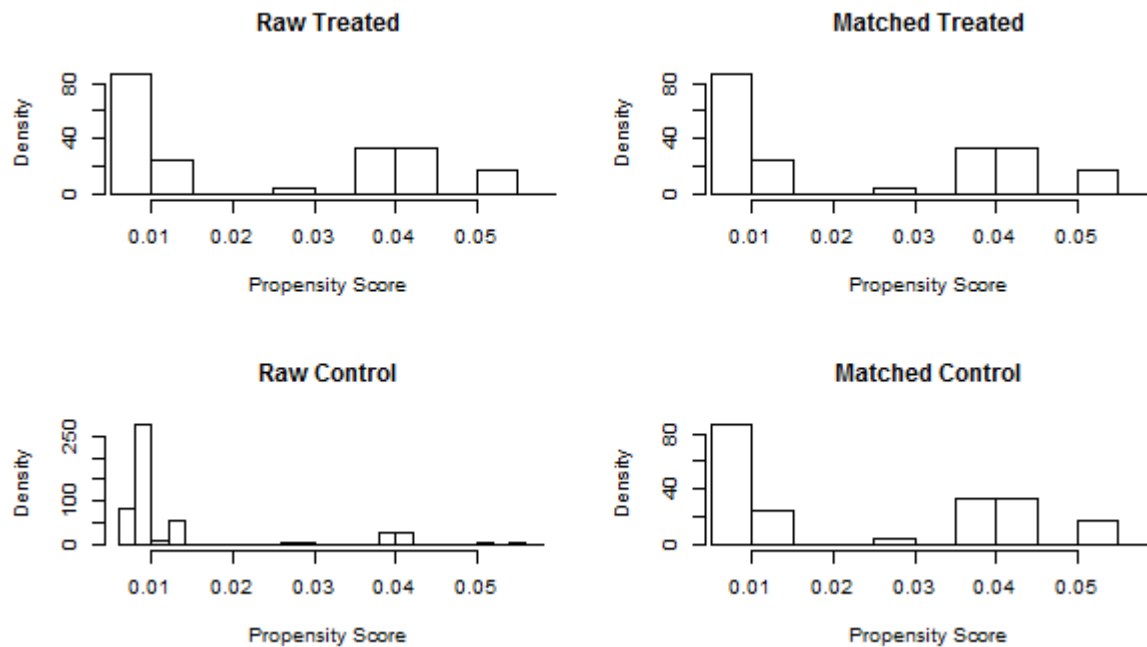
Appendix B: Histogram and jitter plot of the propensity scores of the qualifier data

The interpretation of the jitter plot and histogram in Figure 51 and Figure 52 follow closely to the interpretation of Figure 49 and Figure 50. Figure 51 shows the matched IB diploma and A level qualifiers have a good overlap of propensity scores. Asian ethnicity, female qualifiers from a SEC 1 background who were living in a low participation neighbourhood and attending a private school had the largest propensity scores. White, male qualifiers from a SEC 4 background who were living in an 'other neighbourhood' and attending a state school had the smallest propensity scores.

Figure 52 shows the 'raw' treatment and controls had similar shaped distributions prior to matching but the A level qualifiers had a higher proportion of students with low propensity scores. After matching, the distributions are identical and so it can be concluded that the samples are balanced.

Figure 51- Jitter plot of qualifier PSM propensity scores.

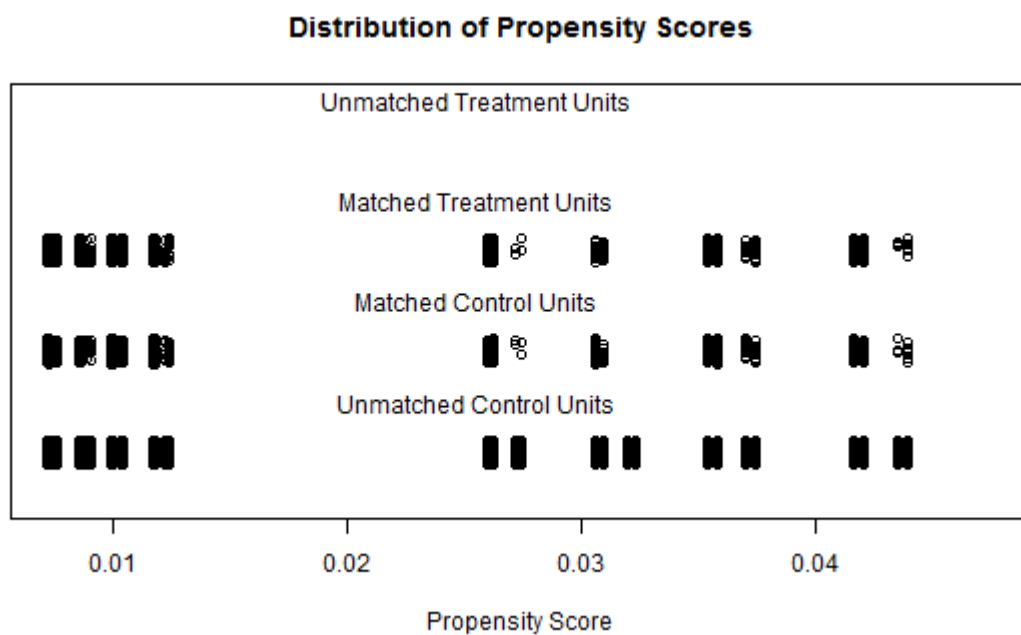**Figure 52- Histogram of qualifier PSM propensity scores.**
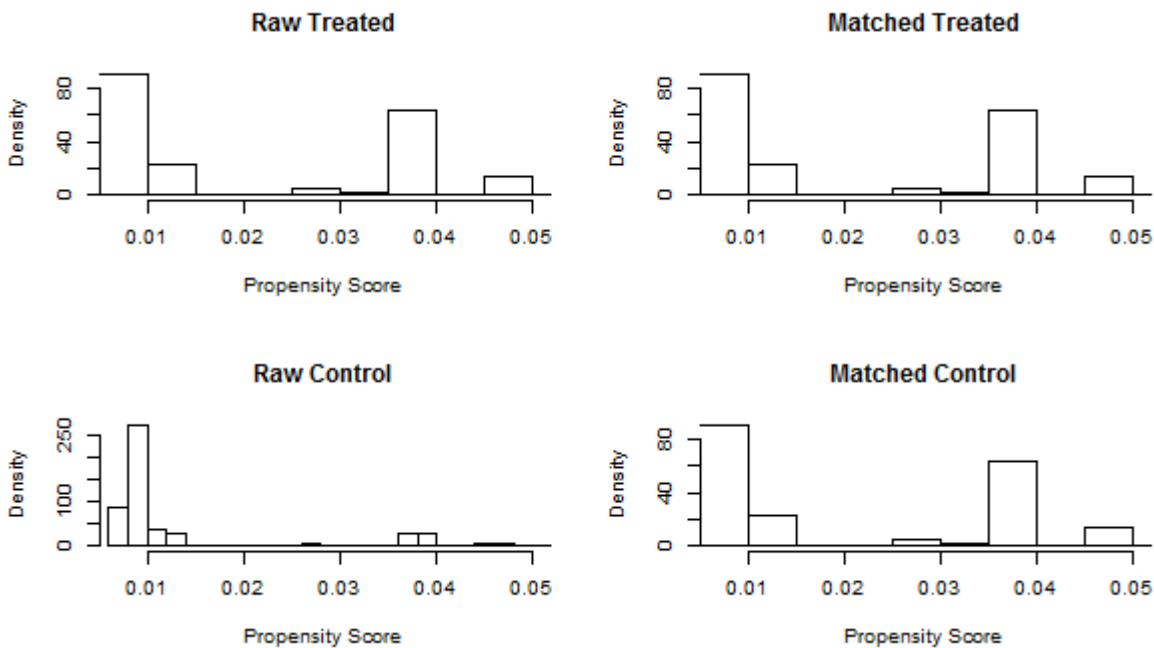
# Appendix C: Histogram and jitter plot of the propensity scores of the leaver data

Figure 53 shows the matched IB diploma and A level leavers have a good overlap of propensity scores. Asian ethnicity, female students from a SEC 1 background who were living in a low participation neighbourhood and attending a private school had the largest propensity scores. White, male students from a SEC 6 background who were living in an 'other neighbourhood' and attending a state school had the smallest propensity scores.

Figure 54 shows the 'raw' treatment and controls had similar shaped distributions prior to matching; the A level leavers had a slightly higher proportion of students with low propensity scores. After matching, the distributions are identical and so it can be concluded that the samples are balanced.

**Figure 53- Jitter plot of leaver PSM propensity scores.**

Figure 54- Histogram of leaver PSM propensity scores.
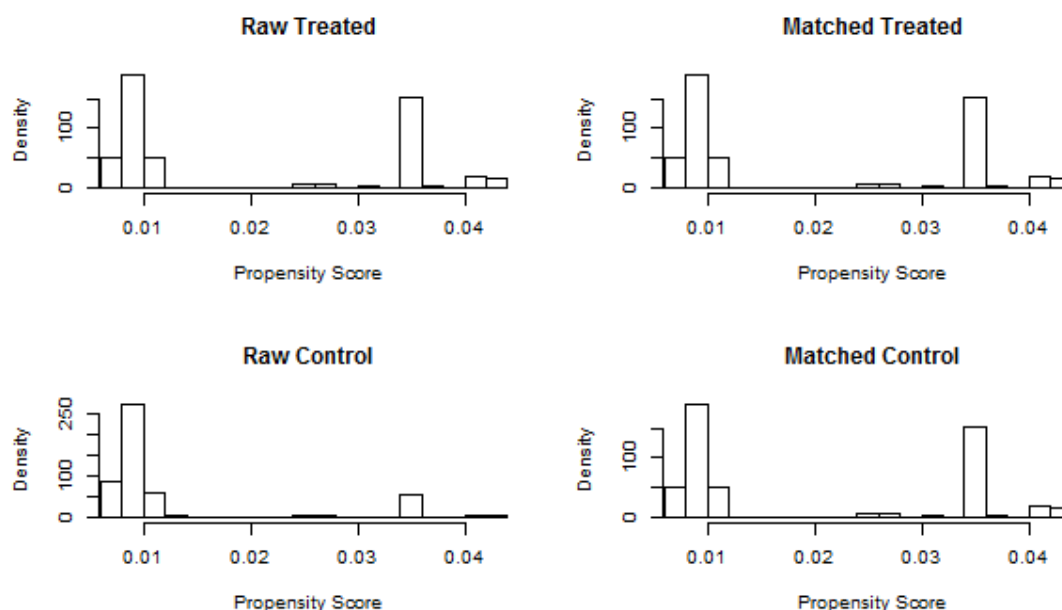
Appendix D: Comparison of IB diploma and A level students within each tariff grouping

Figure 55 shows the academic ability using the tariff points mapping for each entry qualification as a function of time. There are discrepancies across the years within each entry qualification and a disproportionate spread for academic ability across entry qualification, most noticeably in the 44+ band for A levels. A break in the time series can be seen in 2017/18 when new tariff was introduced, which has reduced some of the disparity previously mentioned. Thus, grade boundary groupings were decided upon after examining the histogram distribution of scores for each entry qualification unmatched data and splitting the academic ability in to 3 approximately equivalent groups.

Figure 55- Tariff mapped distribution: IB compared to A level
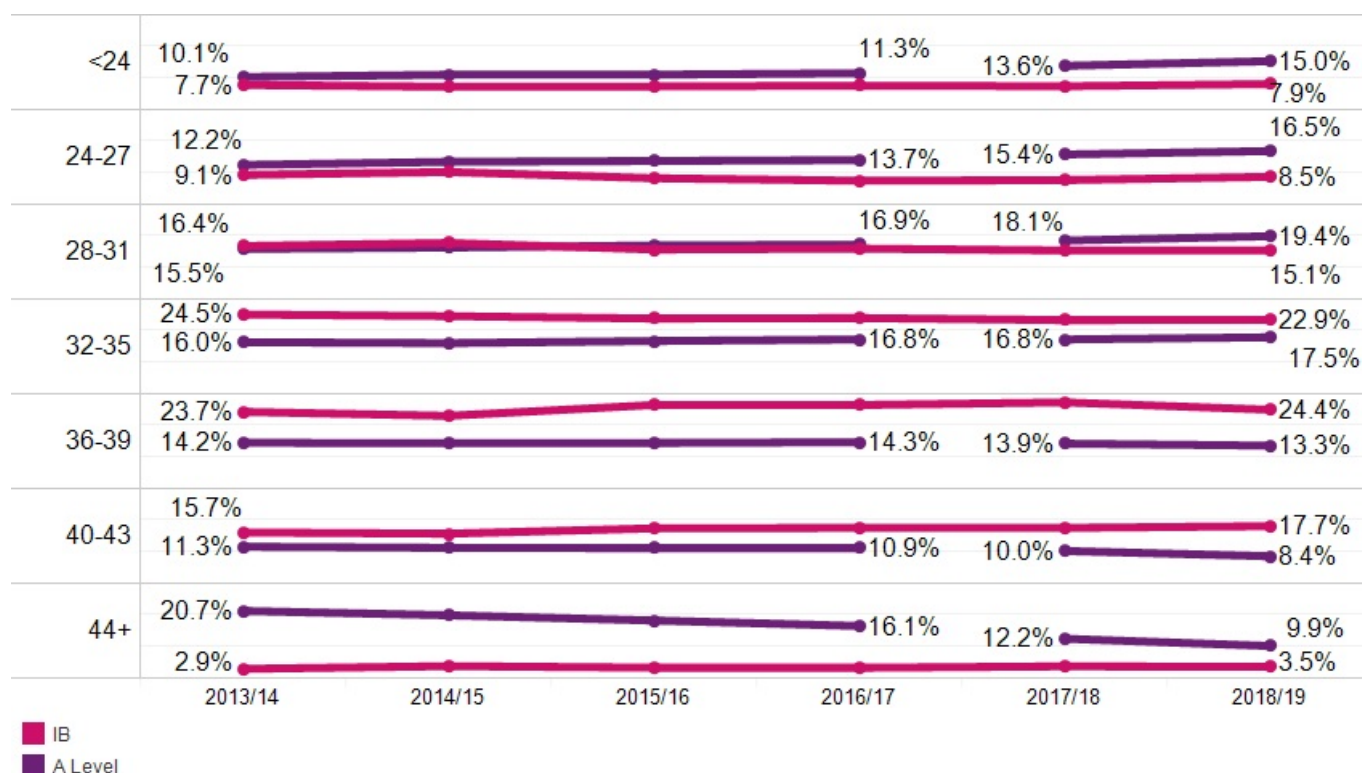
The entry qualification grades were grouped into three levels; a higher, middle and lower score grouping. This ensured a proportionally good overlap of students, qualifiers and leavers with similar academic ability, as can be seen in Table 14.

Table 14- Unmatched sample sizes for A level and IB comparison

Academic ability	IB diploma students	A level students	IB diploma qualifiers	A level qualifiers	IB diploma leavers	A level leavers
Group 1 (lower graded)	4,250	330,240	3,875	247,430	2,155	121,870
Group 2 (mid-level graded)	4,445	299,275	3,725	247,705	1,965	140,515
Group 3 (higher graded)	4,470	294,555	3,525	289,415	1,820	167,505
Total	**13,165**	**924,085**	**11,125**	**784,550**	**5,940**	**429,890**

Table 15 shows the scores used to segregate the data, highlighting the disparity across years within entry qualification, the higher graded boundary score of 400 for old tariff equates to **A and 152 for new tariff equates to *AA or 4 A levels of grade BBBB.

Table 15- Academic ability groupings

	A level old tariff score	A level new tariff score	Academic ability grouping
39+	400+	152+	Academic ability group 3 (higher graded)
34-38	320-399	128-151	Academic ability group 2 (mid-level graded)
24-33	240-319	96-127	Academic ability group 1 (lower graded)

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Definitions

A level students

A level students are those students whose highest qualification on entry is a level 3 qualification and are known to hold at least 3 A levels, double A levels (counted as two qualifications). Any student who holds an IB qualification in addition to an A level have been categorised as being an IB student.

Activity

Describes the activity of a leaver in the DLHE return. Work includes those who reported that they were in full-time paid work only (including self-employed), part-time paid work only plus voluntary/unpaid work only. Work and further study includes those who indicated that they were in either full-time or part-time work and were in one of full-time or part-time study, training or research. Further study includes those who were in full-time or part-time further study, training or research. Unemployed includes those who stated they were unemployed or due to start work. Other includes those who were taking time out to travel or doing something else.

Classification of first degree

The class obtained from first degree qualifications. Certain qualifications obtained at first degree level are not subject to classification of award, notably medical and general degrees. These, together with ordinary degrees and aegrotat qualifications have been included within Unclassified. Third class honours, fourth class honours and the pass have been aggregated as Third class/pass. Lower second and undivided second class honours have been aggregated as Lower second class.

Continuation status

This has been created for full-time first degree entrants prior to 2018/19 who, where possible, have been linked forward to the next academic year.

Continuing or qualifying at HE provider- defined as all students who are progressing into their following year of study at the same HE provider and fall within the HESA student population. It also includes those students who are not progressing into their following year of study and who have achieved a qualification in one of the two comparison years with that qualification deemed as being equivalent to or higher than the qualification aimed for. Gained other award- Those students who are not progressing into their following year of study and who have achieved a qualification in one of the two comparison years with that qualification deemed as being lower than the qualification aimed for. Left with no award- Those students who are not continuing into their following year of study and have not been awarded a qualification in either of the two comparison years. Dormant- Those students who have not obtained an award and are not active or have dormant or writing-up mode.

Country/ Region of HE provider

The allocation of a HE provider to a geographical region is done by reference to the administrative centre of that HE provider. Regions in this context are the nine England Regions (formerly Government Office Regions) and Wales, Scotland and Northern Ireland. There may be students registered at HE providers who are studying in regions other than that of the administrative centre of the HE provider.

DLHE

Destination of Leavers Survey

DLHE target and response

Eligible DLHE population includes those instances identified in the HESA Student record that met criteria within the DLHE target population based on location of study, mode of study, end date of instance and qualification awarded. Known destination includes leavers within the eligible DLHE population who replied to the DLHE questionnaire providing destination information. Explicit refusal includes leavers within the eligible DLHE population who replied to the DLHE questionnaire explicitly refusing to provide information. Response includes leavers who replied to the DLHE questionnaire (i.e. known destination plus explicit refusals). Response rate is the number of responses expressed as a percentage of the eligible DLHE population.

Domicile

Indicates the location of the student's permanent or home address prior to entry to the course. UK domicile students are those whose normal residence is in the UK, and for the purposes of this report includes Guernsey, Jersey and the Isle of Man. Other European Union domiciled students are those whose normal residence prior to commencing their programme of study was in countries which were European Union (EU) members as at 1 December of the reporting period. EU countries includes Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Gibraltar, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. Where European Union countries are shown separately, individual country figures exclude those domiciled in the Åland Islands, the Canary Islands, and the French overseas departments of French Guiana, Guadeloupe, Martinique and Réunion. These figures are included in European Union not otherwise specified. Other Europe includes Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Croatia, Cyprus (Non-European-Union), Faroe Islands, Georgia, Kosovo, Macedonia, Moldova, Monaco, Montenegro, Russia, San Marino, Serbia, Svalbard and Jan Mayen, Switzerland, Turkey, Ukraine, Vatican City and Europe not otherwise specified.

Ethnicity

Students domiciled in England, Wales, Scotland, Northern Ireland, Guernsey, Jersey and the Isle of Man are required to report their ethnic origin. Data on the ethnicity of students has therefore been restricted to UK domiciled students. The coding frame is that recommended by the Office for National Statistics (ONS) for UK-wide data collection.

White includes White, White - Scottish, Irish Traveller, Gypsy or Traveller, plus Other White background.

Black includes Black or Black British - Caribbean, Black or Black British - African, and other Black background.

Asian includes Asian or Asian British - Indian, Asian or Asian British - Pakistani, Asian or Asian British - Bangladeshi, Chinese, and other Asian background.

Other includes Arab, plus other ethnic background.

Mixed includes mixed - White and Black Caribbean, mixed - White and Black African, mixed - White and Asian, other mixed background

Not known includes not known and information refused. BME includes all non-white categories excluding not known.

First degree

First degrees (including eligibility to register to practice with a health or social care or veterinary statutory regulatory body), first degrees with Qualified Teacher Status (QTS)/registration with a General Teaching Council (GTC), enhanced first degrees, first degrees obtained concurrently with a diploma and intercalated first degrees.

Full-time students

Those normally required to attend an HE provider for periods amounting to at least 24 weeks within the year of study, on thick or thin sandwich courses, and those on a study-related year out of their HE provider. During that time students are normally expected to undertake periods of study, tuition or work experience which amount to an average of at least 21 hours per week. For qualifiers and leavers this includes writing-up status where the mode of study was previously full-time and students changing to dormant status previously full-time.

HESA DLHE population

Contains all United Kingdom (UK) and European Union (EU) domiciled students reported to HESA for the reporting period 1 August to 31 July as obtaining relevant qualifications. Awards from dormant status are not included in the population. DLHE data is based on an instance of engagement.

HESA qualifiers population

A count of student instances associated with the award of an HE qualification (excluding HE institutional credits) during the HESA reporting period 1 August to 31 July. This includes qualifications awarded from dormant, writing-up and sabbatical status, but excludes incoming visiting and exchange students.

HESA student population

A count of the number of HE student instances active at a reporting HE provider in the reporting period 1 August to 31 July. Dormant students (those who have ceased studying but have not formally de-registered); incoming visiting and exchange students; students where the whole of the programme of study is outside of the UK; students on sabbatical, and writing-up students are excluded from the population.

Higher education (HE) students

Students on courses for which the level of instruction is above that of level 3 of the Qualifications and Curriculum Authority (QCA) National Qualifications Framework (NQF) (e.g. courses at the level of Certificate of HE and above).

IB Points

The total number of points awarded from International Baccalaureate qualifications held by IB students. The maximum number of points awarded is 45. Students with 24 or more points may be eligible for an International Baccalaureate Diploma. Students with less than 24 points may be eligible for an International Baccalaureate Course qualification. This information is taken from either the IB data (TOTAL_SCORE for diploma candidates or sum SUBJECT_GRADE for certificate candidates) or the HESA data Total IB points (diplomas only).

IB qualification

International Baccalaureate (IB) students have been identified using data supplied by the International Baccalaureate Organization which has been linked to the HESA student data. Any student known to hold an IB qualification has been categorised as an IB student regardless of other qualifications they may hold. In addition, any students known to hold an IB according to the HESA student data have been categorised as an IB student. Diploma pass -In the IB dataset with a CATEGORY of 'DIPLOMA' (or 'RETAKE' as long as they have a 'DIPLOMA' record in a previous year) with a RESULT_CODE of 'B' or 'D' or in the HESA dataset they have a IB diploma with at

least 24 points and an IB Overall result of 'B' or 'D'. Diploma fail - In the IB dataset with a CATEGORY of 'DIPLOMA' (or 'RETAKE' as long as they have a 'DIPLOMA' record in a previous year) with a RESULT_CODE of 'F' or in the HESA dataset they have a IB diploma which has points >0 and IB Overall result of 'F'. Course pass - In the IB dataset with a CATEGORY of 'CERTIFICATE' or 'COURSE' and at least one SUBJECT_GRADE of 4 or more. Not identifiable in the HESA data. Course fail - In the IB dataset with a CATEGORY of 'CERTIFICATE' or 'COURSE' and no SUBJECT_GRADE is greater than 3. Not identifiable in the HESA data.

Level of study

This illustrates the study level undertaken by the student.

Low-participation neighbourhoods (POLAR4)

POLAR4 is based on the HE participation rates of people who entered a HE course in a UK higher education provider or English or Scottish further education college, aged 18 or 19, between academic years 2009-10 and 2013-14.

The POLAR4 classification is formed by ranking 2001 Census Area Statistics (CAS) wards by their young participation rates. This gives five quintile groups of areas ordered from '1' (those wards with the lowest participation) to '5' (those wards with the highest participation), each representing 20 per cent of UK young cohort. Students have been allocated to the neighbourhoods on the basis of their postcode. Those students whose postcode falls within wards with the lowest participation (quintile 1) are denoted as being from a low participation neighbourhood.

Postgraduate courses

Are those leading to higher degrees, diplomas and certificates (including Postgraduate Certificate in Education (PGCE at level M) (unless shown separately) and professional qualifications) which usually require a first degree as an entry qualification (i.e. already qualified at level H). Higher degree (research) includes doctorate (incorporating New Route PhD) and masters degrees studied primarily through research. Higher degree (taught) includes doctorate and masters degrees not studied primarily through research, and postgraduate bachelors degrees at level M. Masters in Teaching and Learning are included in this category. Other postgraduate includes postgraduate diplomas, certificates and professional qualifications, Postgraduate Certificate in Education (PGCE at level M), level 7 Diploma in Teaching in the Lifelong Learning Sector, HE provider postgraduate credits and non-formal postgraduate qualifications.

Rounding strategy

HESA implements a strategy in published and released tabulations designed to prevent the disclosure of personal information about any individual. This strategy involves rounding all numbers to the nearest multiple of 5. This rounding strategy is also applied to total figures, the consequence of which is that the sum of numbers in each row or column rarely matches the total shown precisely. Average values and proportions values prepared by HESA have been calculated on precise raw numbers. However, percentages calculated on populations which contain fewer than 22.5 FPE have been suppressed and represented as '..' as have averages based on populations of 7 or fewer. More information can be found here **https://www.hesa.ac.uk/support/definitions/students#rounding-and-suppression-strategy**.

Salary

Describes the annual salary to the nearest thousand pounds (£) before tax, for leavers employed in full-time paid work in the UK, excluding those who were self-employed, returned a zero salary or refused to give this information. Boxplots have been produced removing outliers that fall outside 1.5*IQR.

Sex

This records the sex of the student. Other is included for students whose sex aligns with terms such as intersex, androgyne, intergender, ambigender, gender fluid, polygender and gender queer.

Socio-economic classification (SEC)

SEC is used to identify the socio-economic classification of students participating in HE. This data is compulsory for undergraduate students entering through UCAS. 'Not classified' is a valid code and includes students; occupations not stated or inadequately described and not classifiable for other reasons. Percentages are based on those students with classified known SEC data. In line with the Performance Indicators (http://www.hesa.ac.uk/pi), SEC data has been grouped into categories with examples (Office for National Statistics, 2010) : SEC 1-3: 1 Higher managerial and professional occupations (e.g., Solicitors, Architects, Medical practitioners , Chief executives, Economists 2 Lower managerial and professional occupations (e.g., Social workers, Nurses, Journalists, Managers and directors in retail and wholesale, Teaching professionals (Further education/ Secondary education/ Primary and nursery/ Special needs)) 3 Intermediate occupations (e.g., Paramedics, Nursery Nurses and assistants, Police officers (sergeant and below), Bank and post office clerks, Graphic designers SEC 4-7: 4 Small employers and own account workers (e.g., Farmers, Shopkeepers and proprietors – wholesale and retail, Taxi and cab drivers and chauffeurs, Driving instructors, Window cleaners) 5 Lower supervisory and technical occupations(e.g., Mechanics, Chefs, Train and tram drivers, Plumbers, Electricians 6 Semi-routine occupations (e.g., Receptionists, Shelf fillers, Care workers and home carers, Telephonists, Fitness instructors 7 Routine occupations (e.g., Bar staff, cleaners and domestics, Butchers, Bus and coach drivers, Van drivers) 8 Never worked and long-term unemployed 9 Not classified.

Standard Industrial Classification (SIC)

Describes the employing organisations of those HE leavers who were employed, using the UK Standard Industrial Classification of Economic Activities 2007 (SIC 2007). Standard industry codes for economic activity are used to describe the relationship between the inputs and outputs of such activity. In cases where multiple activities take place, classification usually relates to the single most important activity. In the case of DLHE statistics, this will usually be the most important activity undertaken by an employer (or self-employed person). Economic activities are measured by enquiring into the nature of an employer's (or self-employed person's) business.

Standard Occupational Classification (SOC)

Describes the types of job of those HE leavers who were employed, using the SOC2010 Standard Occupational Classification.

State school marker

This is created for all students whose previous institution attended is returned. This data is compulsory for undergraduate students entering through UCAS, although generic unknown school type codes may be returned. Where the school type is known, the previous provider and last provider attended codes can be grouped up into state and independent. Students from sixth-form, further education colleges and HE providers are included as being from state schools: Privately funded school From state-funded school or college Unknown school type Percentages are based on those students with known school type.

STEM subject marker

Identifies students studying in Medicine & dentistry; Subjects allied to medicine; Biological sciences; Veterinary science; Agriculture & related subjects; Physical sciences; Mathematical sciences; Computer science; Engineering & technology; Architecture, building & planning. Non-STEM subject areas include: Social studies; Law; Business & administrative studies; Mass communications & documentation; Languages; Historical & philosophical studies; Creative arts & design; Education; Combined.

Subject areas/ FPE

Uses the Joint Academic Coding System (JACS) Version 3 subject coding frame (www.hesa.ac.uk/jacs3). Additionally, a procedure of apportionment is used. Under apportionment, each student instance is, where necessary, divided in a way that in broad-brush terms reflects the pattern of a split course. For split courses not involving an ITT component, institutions assign their own percentages based on a broad assessment of the relative contribution of subjects to a course, rather than detailed analysis of the contributions of subjects to individual students' courses of study. The recommended standard percentages are: 50% for each of the two subjects for balanced combinations; 67% and 33% for major – minor combinations and 34%, 33% and 33% for triple combinations. The sum of the percentages allocated to each subject studied on a course must equal 100%. 86 Initial Teacher Training (ITT) students at undergraduate level who also have specialism subjects recorded (typically, secondary ITT students) are apportioned 50% to the 'Education' subject area and the remaining 50% is further assigned according to the percentages recommended above. Where no subject other than education is recorded, or where the student is on a PGCE course, apportionment is 100% to the 'Education' subject area.

Tariff points

Tariff points obtained for the top 5 A level and double A level (with duplicate qualifications in the same subject removed). The tariff points as defined by UCAS (https://www.ucas.com/file/63536/download?token=sxmdfCS-). See points table for the points awarded for each grade:

Name	QUALGRADE	OLD POINTS	NEW POINTS
GCE Advanced level	A*	140	56
GCE Advanced level	A	120	48
GCE Advanced level	B	100	40
GCE Advanced level	C	80	32
GCE Advanced level	D	60	24
GCE Advanced level	E	40	16
GCE Advanced Double Award (A level (Double))	A*A*	280	112
GCE Advanced Double Award (A level (Double))	A*A	260	104
GCE Advanced Double Award (A level (Double))	AA	240	98
GCE Advanced Double Award (A level (Double))	AB	220	88
GCE Advanced Double Award (A level (Double))	BB	200	80
GCE Advanced Double Award (A level (Double))	BC	180	72
GCE Advanced Double Award (A level (Double))	CC	160	64
GCE Advanced Double Award (A level (Double))	CD	140	56
GCE Advanced Double Award (A level (Double))	DD	120	48
GCE Advanced Double Award (A level (Double))	DE	100	40
GCE Advanced Double Award (A level (Double))	EE	80	32

Top 20 HE Providers

Although there is no standard measure of the 'top' HE providers in the UK, various league tables have been published by media which attempt to rank the HE providers based on various factors. For the purpose of this report, a 'Top 20' has been created by using a combination The Complete University Guide League Table 2020, The Guardian University Guide 2020 and The Times University Guide 2020. All other HE providers are grouped together into 'Other'.

0109 The University of Bath
0110 The University of Birmingham
0112 The University of Bristol
0114 The University of Cambridge
0116 University of Durham
0167 The University of Edinburgh
0119 The University of Exeter
0168 The University of Glasgow
0132 Imperial College of Science, Technology and Medicine
0123 The University of Lancaster
0124 The University of Leeds
0137 London School of Economics and Political Science
0152 Loughborough University
0153 University of Manchester
0155 University of Nottingham
0156 The University of Oxford
0173 The University of St Andrews
0160 The University of Southampton
0149 University College London
0163 The University of Warwick

Type of further qualification

This identifies the type of qualification the leaver was aiming for if they were engaged in further study on the census date.

Year of study/ first year marker

First years includes those students who commenced their programme instance within the reporting period and is based on the HESA standard registration population. In some cases, the student's first year of study may be the second or subsequent year of a programme. All years includes all student instances regardless of their commencement date and is based on the HESA standard registration population.