Department for Education

Analysis of teacher supply, retention and mobility

September 2018

Executive Summary

This compendium brings together different strands of new analysis around the teaching workforce. We present new analysis on expanding supply initiatives such as subject knowledge enhancement (SKE) courses and Teacher Subject Specialism Training (TSST) together with analyses on those who return to teaching, the pool of qualified teachers who are not currently teaching in the state-funded sector, and time series analysis of teachers in England between 1999 and 2015, using teachers' pensions scheme data.

New analysis is also included on the retention of newly qualified teachers (NQTs). We also provide an update to previously published analysis on those entering and leaving the teaching profession, by subject. An app accompanies these two sets of analyses giving a more detailed breakdown of findings. This app can be found from the main publication page.

Many of the sections involve linking datasets to the School Workforce Census (SWC). Given that detailed underlying data have already been published alongside each School Workforce Census publication[1], this report does not seek to provide an exhaustive or comprehensive set of fine-grained data. Instead, it aims to generate new insights, be an accessible resource to stimulate debate, improve the public understanding of our data, and generate ideas for further research, rather than to provide authoritative answers to research questions.

Section 1 outlines the key figures around Subject Knowledge Enhancement (SKE) courses. Four years' worth of data are presented, split into initial teacher training (ITT) cohorts 2014/15, 2015/16, 2016/17 and 2017/18.

The number of SKE places has grown over the four cohorts, largely driven by the introduction of new subjects whilst the proportion of courses delivered online has risen from 43% in 2014/15 to 70% in 2017/18. 8-week SKE courses have remained the most common course length throughout the duration of SKE. In 2017/18, around 50% of all SKE courses taken are 8 weeks in length and up to 80% of all courses are 16 weeks or less.

We have been able to link the SKE data to three datasets; the Initial Teacher Training Census, the Initial Teacher Training Performance Profiles and the School Workforce Census to draw information on how SKE trainees compare with the wider pool of ITT trainees. The SKE programme continues to be well used, with 37% of new entrants to

[1] School workforce census: https://www.gov.uk/government/collections/statistics-school-workforce

ITT in SKE subjects in 2017/18 taking a SKE course. On the whole, SKE trainees perform on par with the wider pool of ITT trainees.

Section 2 presents data on Teacher Subject Specialism Training (TSST) for the 2016/17 academic year.

There were 115 lead schools in 2016/17, with 99 schools offering STEM (Science, technology, engineering and maths) TSST courses and 46 schools offering modern foreign languages (MFL) TSST courses (30 schools offering both courses). 605 participants were recruited to TSST courses in MFL and 2,899 to TSST courses in STEM. Of these, 592 and 2,838 completed the courses respectively.

Section 3 provides new time series analysis of teachers in England between 1999 and 2015, using teachers' pensions scheme data. The availability of this data now allows us to pull out seasonal patterns and any long-term trends.

The time series analysis presents a different pattern for teachers in primary schools compared to those in secondary schools: the former has increased at the same pace whilst the latter has plateaued in 2010. Seasonality is more pronounced in secondary schools until 2007, after which the pattern registered a change. There has also been a rise in the number of primary school pupils since 2009, which increased the number of primary teachers needed. This "bulge" is now starting to make its way into secondary schools.

The data show that for leavers, there are three spikes every year in March, August and December with the highest peak in August, at the end of the school year. There are also three spikes every year for both entrants and returners - April, September and December with the highest peak in September, the start of the school year.

Section 4 looks at those returning to the teaching profession between 2011 and 2016.

The analysis undertaken shows that approximately 20,000 teachers (by headcount) return to teaching every year with around 60% having permanent contracts compared to around 95% of the remaining workforce. Returning teachers are also less likely to work full time. The analysis shows that the gender and age split of returners is in line with the rest of the teaching workforce.

Section 5 presents analysis undertaken into the pool of qualified teachers who are not currently teaching in the state-funded sector.

The pool of qualified teachers who are not currently teaching in the state-funded sector has remained steady since 2007/08 at around 350,000 teachers for each year. Female secondary teachers are more likely to return to state-funded teaching than male secondary teachers after a period of absence. The analysis shows that most secondary teachers classed as inactive will return within the first few years after leaving. 24% of

males return within 5 years compared to 31% of females and so with each passing year, the likelihood of return grows smaller.

Section 6 provides an update to analysis published in the first Teachers Analysis Compendium on initial teacher training (ITT) entrants, and leavers to the teaching profession over time, with a focus on different subject breakdowns. The previous analysis covered 2011 to 2015 and the new update looks at data from 2015 to 2017.

The overall number of entrants remained stable in most subjects over the last three years. Most EBacc subjects saw an increase across the three years, with the largest increases being in Biology (180 entrants) and Geography (117 entrants). Newly qualified teachers made up more of the new entrants for EBacc subjects.

The pattern for leavers was similar. The overall number of leavers has also remained stable over the last three years whilst most EBacc subjects have seen an increase in leavers across the three years, with the largest increases being in Mathematics (131) and Geography (110).

Teachers in the middle age group (between 35 and 54) were least likely to leave, but there was no significant difference for male and female teachers. More teachers left than joined in every subject in 2017, except for Mathematics and Physics.

An app is available from the main publication page providing a more detailed breakdown of those entering and leaving the teacher profession by different subject breakdowns.

Section 7 looks at the cohorts of newly qualified teachers (NQTs) from 2010 to 2016 and the percentage of them that were still in service each year afterwards. Breakdowns are provided by gender, age, ethnicity, phase of education, location and subject taught.

NQTs who were female had a higher retention rate after five years than male NQTs, by 5 percentage points. Younger NQTs (those under 30) were also more likely to be in service after five years, with a higher retention rate of 3 percentage points.

Black, Asian and minority ethnic (BAME) NQTs had a lower retention rate than white NQTs, however this appears to be largely due to the fact that there are a significantly higher proportion of BAME NQTs in London (which has a lower retention rate than the rest of England). In fact, BAME NQTs have a higher retention rate than white NQTs in Inner and Outer London, but a lower retention rate across the rest of the country.

NQTs from secondary schools were less likely to stay in service, both after one year and five years than those in primary or special schools.

A more detailed breakdown of findings, focusing on eight particular characteristics and the differences between them, can be found in the accompanying app, which can be found from the main publication page.

Contents

Introduction

This is the fourth publication in the series of compendia on teachers analysis[2]. This edition presents analyses on expanding supply initiatives such as subject knowledge enhancement (SKE) courses and Teacher Subject Specialism Training (TSST) together with time series analysis of teachers in England between 1999 and 2015, using teachers' pensions scheme data. Also contained are analyses on those who return to teaching, the pool of qualified teachers who are not currently teaching in the state-funded sector, those entering and leaving the teaching profession, by subject plus the retention of newly qualified teachers (NQTs).

These analyses are designed to complement the publication of annual statistics such as the School Workforce Census with in-depth, data-driven explorations of the factors, which shape the school workforce.

New analyses are included which look at the impact of some of the initiatives to expand teacher supply. Key figures around Subject Knowledge Enhancement (SKE) courses are presented across four years' worth of ITT cohorts 2014/15, 2015/16, 2016/17 and 2017/18 whilst section 2 presents data on Teacher Subject Specialism Training (TSST) for the 2016/17 academic year.

Section 3 provides new time series analysis of teachers in England between 1999 and 2015, using teachers' pensions scheme data whilst new analysis is also presented around teachers returning to the profession and the pool of qualified teachers who are not currently teaching in the state-funded sector. Section 7 presents new analysis looking at the cohorts of newly qualified teachers (NQTs) from 2010 to 2016 and the percentage of them that were still in service each year afterwards.

Section 6 provides an update to analysis published in the first Teachers Analysis Compendium on those entering and leaving the teaching profession over time, with a focus on different subject breakdowns. The previous analysis covered 2011 to 2015 and the new update uses data published since to look at 2015 to 2017.

We would welcome feedback on the methods used and insights generated in this report, to inform future research and development of further publications. Please send your views to **TeachersAnalysisUnit.MAILBOX@education.gov.uk**

[2] The three previous editions of the Teachers Analysis Compendia are available at: https://www.gov.uk/government/statistics?keywords=compendium&topics%5B%5D=all&departments%5B%5D=department-for-education&from_date=&to_date=

Background and School Workforce Census

The annual School Workforce Census was introduced in November 2010, replacing a number of different workforce data collections. It collects information on school staff from all state-funded schools in England, including local-authority-maintained (LA-maintained) schools, academy schools (including free schools, studio schools and university technology colleges) and city technology colleges, special schools and pupil referral units (PRU).

The statistical release "School Workforce in England" provides the main annual dissemination of statistics based on the data collected, as well as details of the underlying methodology for those and the collection itself. The latest publication was released in June 2018, with results from the November 2017 census[3]. Alongside the statistical release, an underlying dataset is released, giving some of the workforce statistics at school level alongside details of regions, local authorities, wards and parliamentary constituencies. The information is used by the Department for Education for analysis and modelling, including the Teacher Supply Model[4], as well as research purposes.

[3] School Workforce in England: November 2017 is available at: https://www.gov.uk/government/statistics/school-workforce-in-england-november-2017

[4] More information on the Teacher Supply Model can be found at https://www.gov.uk/government/statistics/teacher-supply-model-2017-to-2018

Organisation of the Report

This report contains seven sections:

Section 1 outlines the key figures around Subject Knowledge Enhancement (SKE) courses. Four years' worth of data are presented, split into ITT cohorts 2014/15, 2015/16, 2016/17 and 2017/18.

Section 2 presents data on Teacher Subject Specialism Training (TSST) for the 2016/17 academic year.

Section 3 provides new time series analysis of teachers in England between 1999 and 2015, using teachers' pension scheme data. The availability of this data now allows seasonal patterns and any long-term trends to be identified.

Section 4 looks at those returning to the teaching profession between 2011 and 2016.

Section 5 presents analysis undertaken into the pool of qualified teachers who are not currently teaching in the state-funded sector.

Sections 6 provides an update to analysis on those entering and leaving the teacher profession over time, with a focus on different subject breakdowns. This new update looks at data from 2015 to 2017.

Section 7 looks at the cohorts of newly qualified teachers (NQTs) from 2010 to 2016 and the percentage of them that were still in service each year afterwards with breakdowns by gender, age, ethnicity, phase of education, location and subject taught.

Supporting data in Excel format accompanies the report.

An app is also available from the main publication page. This app provides a more detailed breakdown on the analysis presented in sections 6 and 7 on those entering and leaving the teaching profession by different subject breakdowns and on retention of NQTs, focussing on eight particular characteristics and the differences between them.

We would welcome feedback on the methods used and insights generated in this report, to inform future research and development of further publications. Please send your views to TeachersAnalysisUnit.MAILBOX@education.gov.uk.

1. Subject Knowledge Enhancement (SKE)

Background

This section outlines the key figures around Subject Knowledge Enhancement (SKE) courses. These courses are offered (and are a condition of an Initial Teacher Training (ITT) place) to ITT trainees who require further training in their chosen subject. For example – those with a degree not in their chosen subject, but closely related; those who studied as far as A level but not beyond; those with unrelated degrees but have relevant professional experience; those for whom it has been some time since their degree study.

For the 2017/18 ITT cohort SKE courses were available in Mathematics, Primary Mathematics, Physics, Biology, Chemistry, Computing, English, Design & Technology and Modern Foreign Languages (MFL). Courses currently run from eight to twenty-eight weeks but suppliers have historically offered courses up to thirty-six weeks. These can be taken prior to ITT training or alongside.

We present four years' worth of SKE data, split into ITT cohorts 2014/15, 2015/16, 2016/17 and 2017/18. Where we consider entry into teaching, we are only able to look at the earliest two cohorts due to data availability, which is outlined in more detail below. We cover a range of topics such as SKE subject, SKE mode of delivery, entry into teaching and comparisons with all ITT trainees as a whole.

SKE Landscape

The number of SKE trainees has increased year on year

Table 1.1 shows the number of SKE trainees and places for the four cohorts shown[5]. The number of places is larger than the number of individuals as one individual can take on more than one MFL course, therefore the number of SKE places is higher than the number of individual SKE trainees. Our 'cohorts of interest' include 12,235 places and 12,044 individuals over the four-year period (2014/15 to 2017/18). A small number of duplicate entries were found and removed from these data.

[5] The figures for 2016/17 were published in the TAD Compendium 2017. The figures presented in this publication are slightly different for the reason that we have moved to presenting SKE data in terms of the ITT cohort to which trainees belong, rather than the SKE claim year.

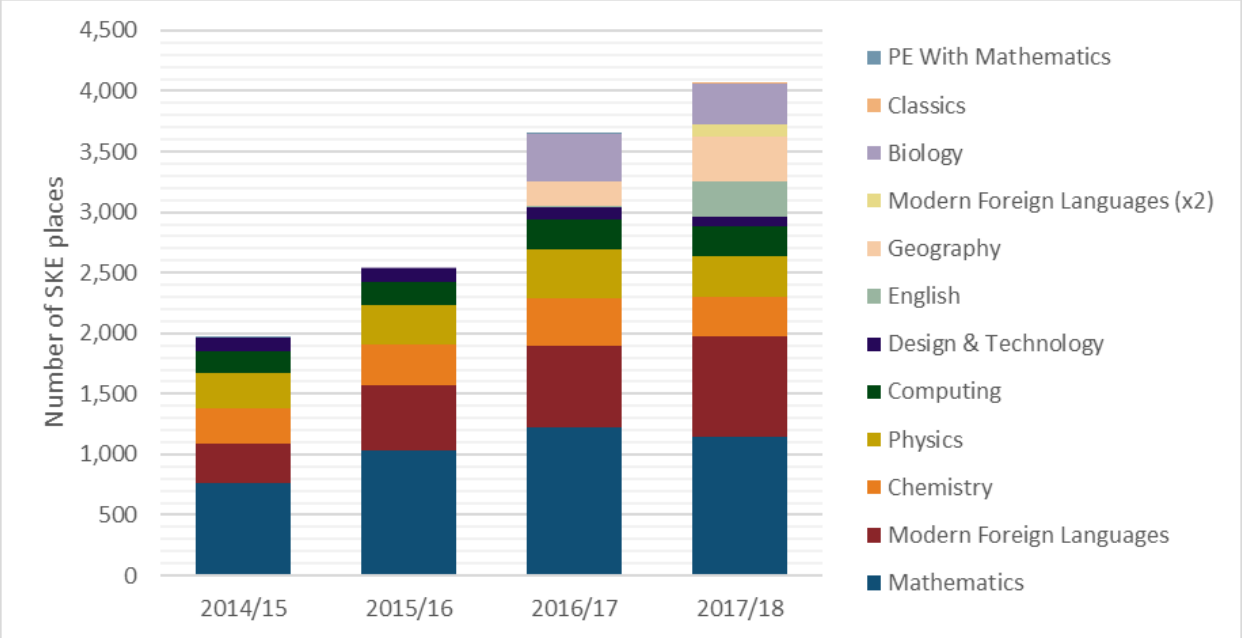
Table 1.1: Numbers of SKE trainees and places by ITT cohort

ITT Cohort	SKE Places	SKE Trainees
2014/15	1,972	1,960
2015/16	2,539	2,526
2016/17	3,652	3,637
2017/18	4,072	3,921

Growth in SKE places is largely driven by the introduction of new subjects and MFL

Figure 1.1 shows the number of places by SKE subject for each cohort. Primary Mathematics is not included here as no provider currently supplies a course for this SKE subject. Modern Foreign Languages (x2) refer to those who have taken two SKE courses in languages (100 places in MFL(x2) in 2017/18 is equal to 50 SKE trainees). The subjects that have been present in all four cohorts have, for the majority, grown from 2014/15 to 2016/17. From that point on, numbers have looked to be steady, with the major growth in overall SKE places coming from the introduction of new subjects. MFL(x2) is categorised separately to show the impact of this new subject addition.

Figure 1.1: SKE places by subject and cohort

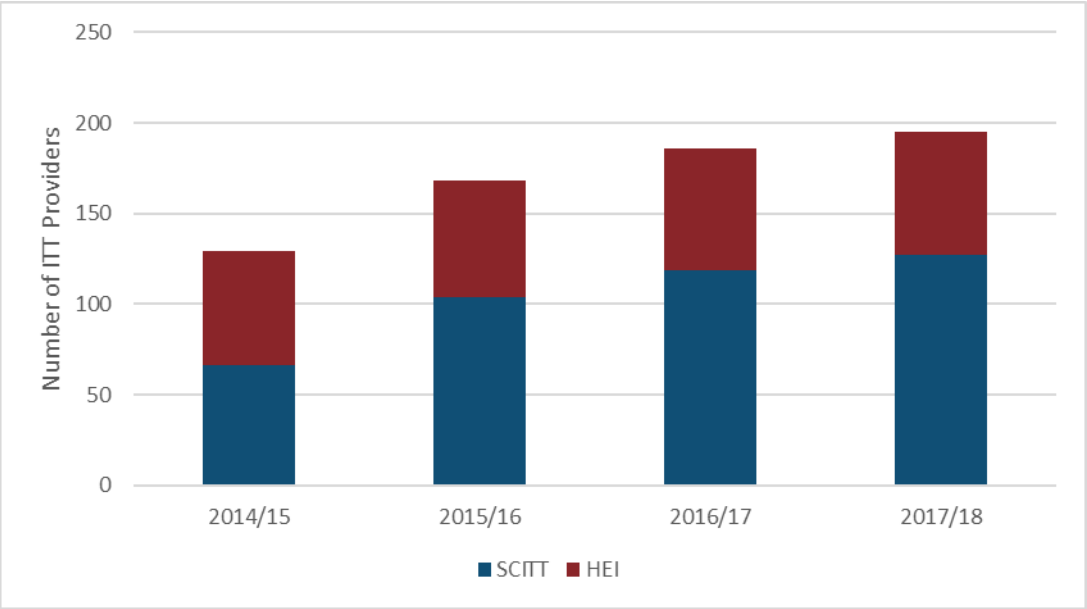


The number of SCITTs using SKE has risen

The number of ITT providers who use SKE to support their recruitment (i.e. those who make completion of a SKE course a condition of offers to some ITT candidates) has risen year on year, mainly due to an increase in its use by providers offering School Centred Initial Teacher Training (SCITTs). We expect the number of Higher Education Institutes (HEIs) to be constant as the vast majority are involved in SKE. Many of the SCITTs will

be former EBITTs (Employment Based Initial Teacher Training institutions) who converted as well as new SCITTs. Not shown here are School Direct providers, which may offer places through HEIs or SCITTs. Figure 1.2 shows how the number of ITT providers using SKE has risen since 2014/15. Just under 200 ITT providers used SKE courses in the latest cohort. Three ITT providers for 2015/16 and 2016/17 are not shown, as they could not be categorised.

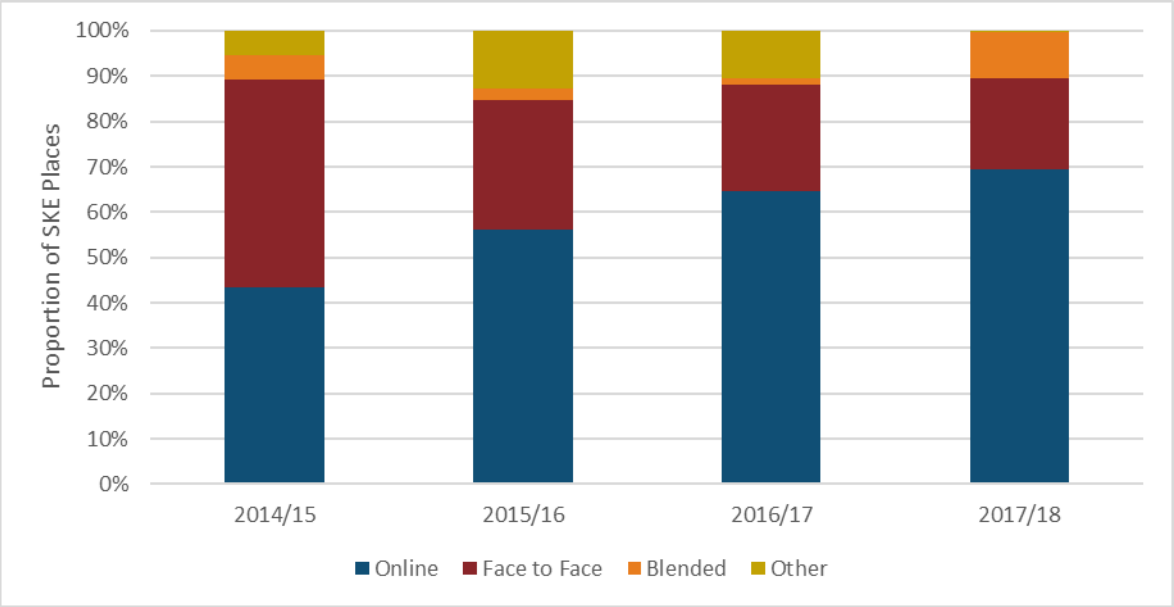
Figure 1.2: Number of ITT providers by provider type using SKE



The proportion of online courses has risen

SKE courses can be delivered online, in a face-to-face setting, or a combination of the two. Figure 1.3 shows how online courses have grown over the years, starting at 43% of courses delivered online in 2014/15 and rising to 70% in 2017/18. The proportion of face-to-face courses has decreased. It is not clear whether this is due to a reduction in the number of face-to-face courses available or whether this is due to trainee preference. 'Other' is a data collection alternative, which allows the option of entering a description of a course not otherwise specified. These descriptions are always a combination of either distance learning, online or face-to-face and so we would describe these as 'Blended'. 'Other' has decreased as data collection has improved.

Figure 1.3: SKE places by course delivery

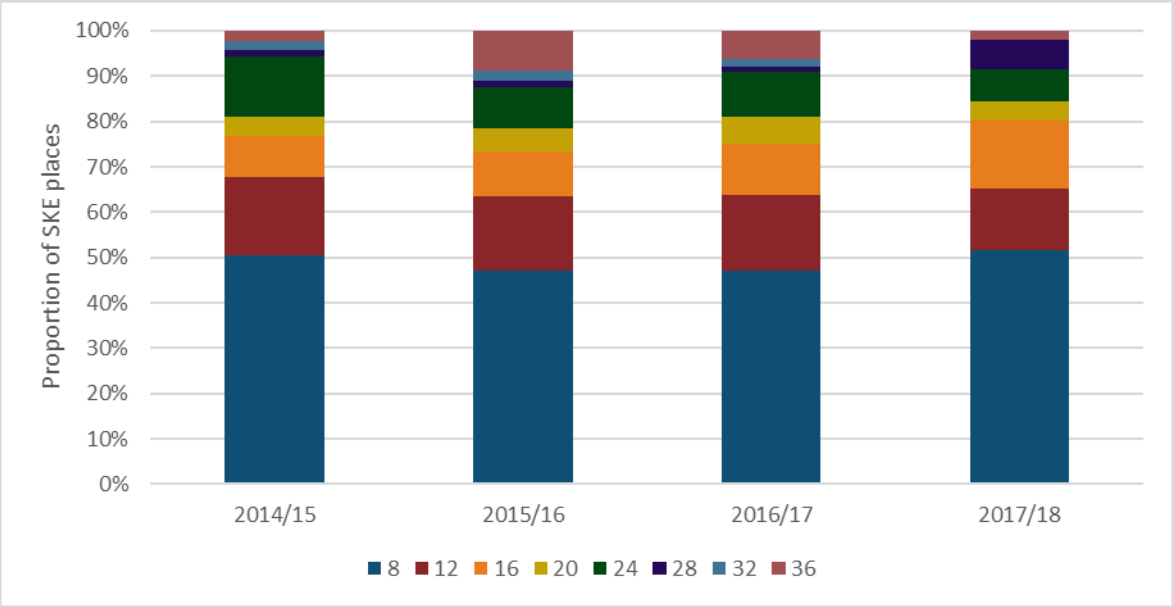


Course lengths vary depending on trainee needs

Changes have been made to the length of courses available throughout the four years shown and so any changes in proportions can generally be attributed to the introduction of new course lengths or the cessation of other course lengths[6]. However, it is clear that 8-week courses have remained the most common course length throughout the duration of SKE. From figure 1.4, we can see that around 50% of all SKE courses taken are 8 weeks in length and up to 80% of all courses are 16 weeks or less.

[6] Courses with the following duration - 5, 9, 10, 11, 13, 14, 18, 19, 21, 22, 25, 26, 30, 31 & 34 weeks – have been excluded from this chart as they occur in very small numbers and do not appear in all cohorts. This equates to 170 places (1.39% of total).

Figure 1.4: Proportion of SKE places by course duration



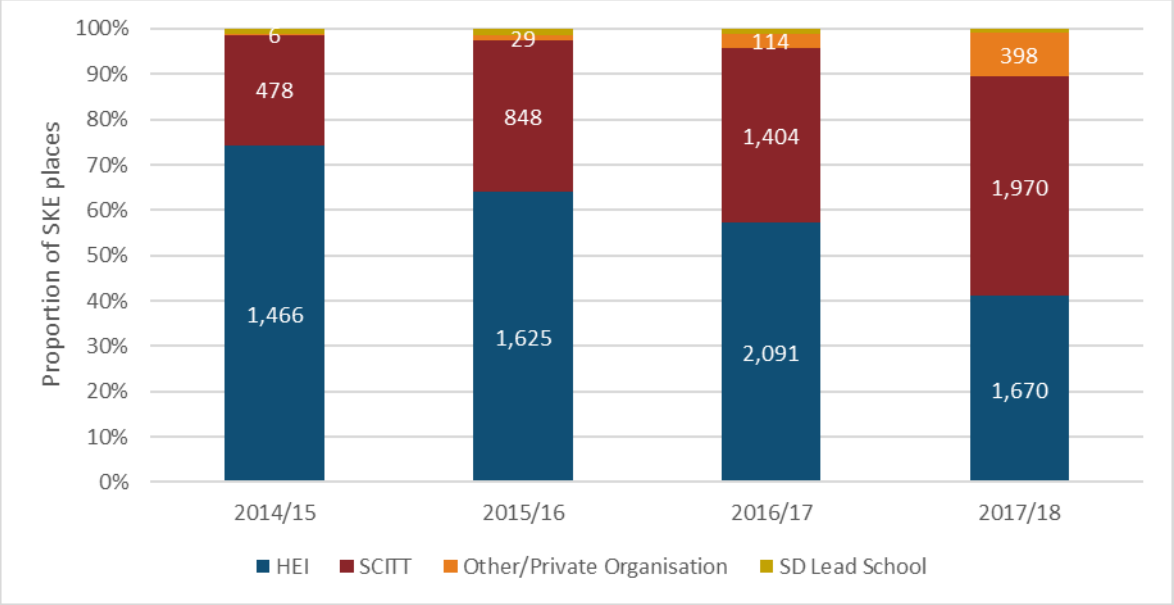
There is a diverse range of SKE providers

SKE courses can be supplied by:

- Higher Education Institutions (HEIs)
- School Centred Initial Teacher Training institutions (SCITTs)
- School Direct Lead Schools
- Other/private organisations (these do not receive funding direct from DfE. The lead school or ITT provider must claim on their behalf)

The number of places available overall has increased across the four cohorts. Figure 1.5 shows that every SKE provider type has increased the number of places they supply from 2014/15 to 2017/18. New SKE providers have entered the market during this time period and contributed to this growth.

Figure 1.5: Proportion of SKE places by SKE supplier type

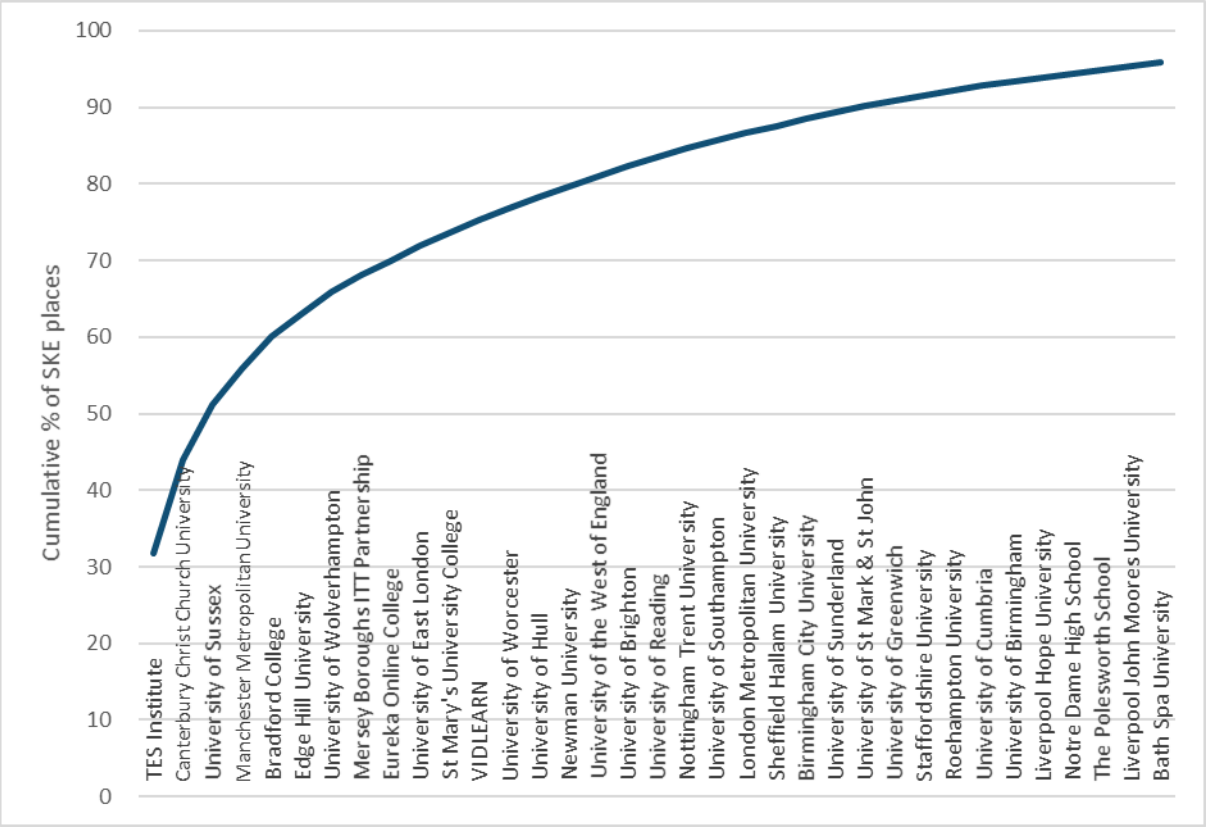


A small number of SKE suppliers supply many SKE places

Figure 1.6 shows the proportion of SKE places supplied by the top 35[7] SKE providers (out of 75) over the four cohorts. The SKE suppliers are ranked from highest to lowest in terms of the number of places they supply. Also shown is the proportion of the total market that these suppliers accumulate together. For example, we can see from the chart that the first five SKE suppliers (by highest places) supply 60% of all SKE places. Out of 75 SKE providers, the first 25 supply 90%.

[7] We have included only the top 35 to ensure the chart is readable. The suppliers shown take up 96% of all places while the remaining 40 make up just 4%.

Figure 1.6: Proportion of SKE places cumulative with SKE supplier



Data Linking Methodology

The aim of SKE courses are to equip trainees with the knowledge required for teacher training in their chosen subject. It is therefore necessary to compare these trainees with the wider pool of ITT trainees to determine how they are performing. We draw our information by linking SKE trainees through three datasets:

- The Initial Teacher Training Census (ITT Census) – this counts trainees registered on an ITT course in England.
- The Initial Teacher Training Performance Profiles (ITT Performance Profiles) – data are provided to the department by ITT providers and gives the outcomes of ITT trainees i.e. whether or not the trainee gained Qualified Teacher Status (QTS).
- The School Workforce Census (SWC) – data returned to the department by institutions in England. This includes information on all staff in state-funded schools.

We have linked our datasets through careful matching on first names, surnames and dates of birth. As a result, we can track SKE trainees through to ITT training and employment. There is a chance that our matching procedures have failed to match some trainees but we estimate that this would apply to a very small number. Trainees not found in the school workforce census are not necessarily lost. We are aware that some trainees may take some time to appear in the SWC for a few reasons; some trainees take longer

than others to find a post, some schools are late to report new entrants and others may be teaching in sectors that are not covered (i.e. independent schools).

Trainees not found in the ITT Census

We may lose SKE trainees before they begin initial teacher training or before their ITT provider has a chance to report them in the census[8]. For instance, some trainees do not start ITT after SKE, some defer etc. We look at these in more detail below. To note, the data are not yet available for 2017/18 and so we present data for 2014/15, 2015/16 and 2016/17 only.

Table 1.2 shows that 85% of SKE trainees across the three cohorts shown were registered on an ITT training course. This figure is slightly lower for 2016/17 at 83%. We may find higher proportions in the earlier cohorts due to more data being available e.g. a trainee may defer for a number of years before appearing in the trainee census. Therefore, trainees in 2016/17 may appear in newer data as it becomes available.

Table 1.2: Proportions of SKE trainees registered on ITT training by ITT cohort

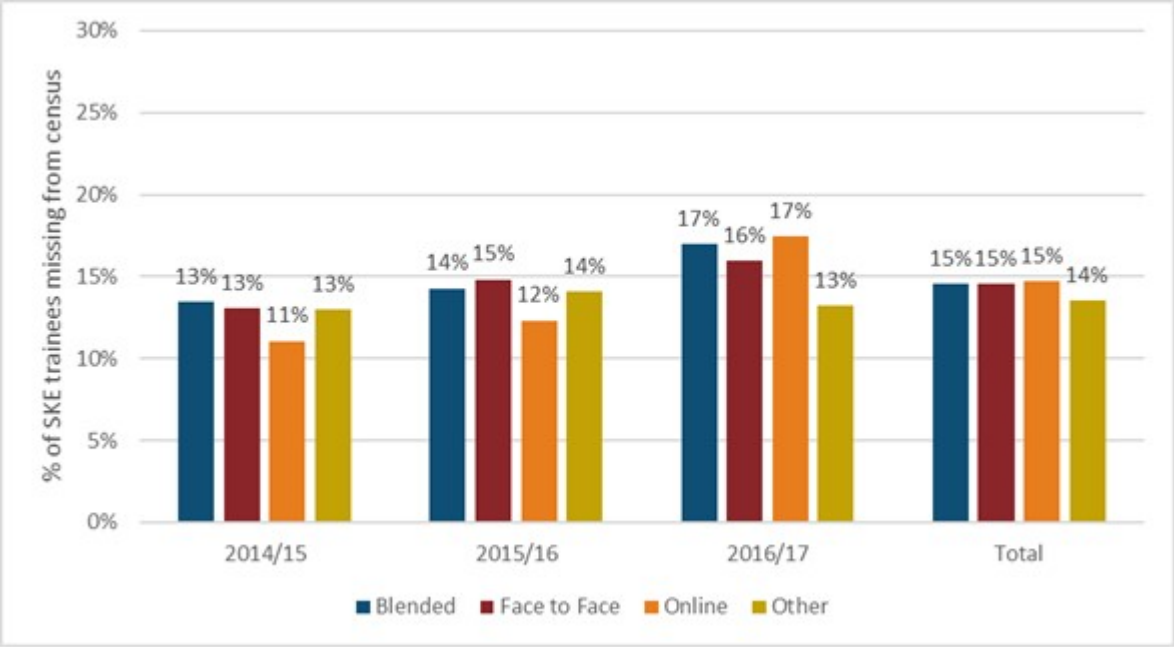
ITT Cohort	SKE Trainees Registered on ITT Course
2014/15	88%
2015/16	87%
2016/17	83%
Total	85%

Delivery method of SKE did not affect loss rates

We do not find that any course delivery method affected loss rates more than any other method. Figure 1.7 shows the proportions of SKE trainees lost from 2014/15, 2015/16 and 2016/17 cohorts (the data is not yet available for 2017/18). Online courses show slightly lower rates of loss than other delivery methods in the first two cohorts. 2016/17 figures should be taken with reservation as we anticipate new data will bring these figures in line with the earlier cohorts due to trainees deferring to another cohort. Nevertheless, the total figures show no differences between any delivery method across all cohorts.

[8] The ITT Census data is provisional in status when taken in November. If trainees fall into the category where a provider has not had a chance to report them, they would be picked up in the revised census.

Figure 1.7: Proportion of SKE trainees missing from ITT Census by course delivery method



SKE trainees do not differ from other ITT trainees in terms of gaining qualified teacher status or entry into state teaching

We have published statistics, which show QTS success and employment rates for all ITT trainees. QTS rates in the published Initial Teacher Training Performance Profiles[9] look at the number of trainees in the performance profiles data and take the proportion who gained QTS. Table 1.3 shows that the QTS rate of SKE trainees is comparable to that of all ITT trainees. Since 2006, this has ranged from 87% to 92% of all postgraduate ITT trainees achieving QTS. Generally, this rate has been stable at around 89-91%.

Table 1.3: QTS comparison of SKE trainees with all post-graduate ITT trainees

ITT Cohort	SKE Trainees with QTS	All ITT Trainees with QTS
2014/15	92%	92%
2015/16	90%	91%

The published employment rates in the TAD Compendium 3[10] look for an employment record for those who have gained QTS in their first year since qualifying and in the following year (since about 10% of qualified teachers only enter in the following year). Therefore we have looked to see the proportion of 2014/15 SKE trainees who have

[9] ITT Performance Profiles

[10] TAD Compendium 3

gained QTS and are seen in the SWC in the first (2015) and following (2016) census[11]. The figures for all ITT trainees inevitably include the small number who have taken SKE. Table 1.4 shows only a slightly smaller proportion of SKE trainees enter the state workforce than all other ITT trainees. It is important to note that this is not the proportion of *all* post-graduate trainees; for both the SKE trainees and the ITT trainees, the employment rate is only for those who achieved QTS.

Table 1.4: Employment comparison of SKE trainees with all ITT trainees

ITT Cohort	SKE Trainees present in SWC	All ITT Trainees present in SWC
2014/15	83%	85%

Of the ITT trainees studying in SKE subjects, 37% have taken a SKE course

We have previously reported[12] the figures of SKE uptake for all ITT trainees to be at 39% for 2016/17 trainees. The SKE programme continues to be well used, with 37% of new entrants to ITT taking SKE in the subjects shown in table 1.5. Uptake varies by subject from the lowest at 13% for Classics and English to 55% for Modern Foreign Languages. The number of total SKE trainees does not equal the number of SKE trainees who progressed to ITT. Some trainees will dropout and others will defer and so the proportion of all trainees taking SKE in these SKE subjects may reduce subject to dropout.

[11] At the time of analysis, the SWC 2017 was not yet available and so is not presented here

[12] In the first Teachers Analysis Compendium

Table 1.5: Subject Knowledge Enhancement by subject 2017/18[13]

SKE Subject	Total SKE Trainees	Total ITT Trainees in Census for SKE Subjects[14]	Proportion of all ITT trainees taking SKE[15]
Biology	343	1,025	33%
Chemistry	327	875	37%
Classics	8	60	13%
Computing	251	475	53%
Design & Technology	82	305	27%
English	288	2,175	13%
Geography	367	1,225	30%
Mathematics	1,148	2,450	47%
Modern Foreign Languages	775	1,405	55%
Physics	332	720	46%
Total	3,921	10,715	37%

[13] Total in Census – Table 1: Provisional data on PG ITT new entrants (including forecast new entrants) and training places by subject, Initial teacher training: trainee number census - 2017 to 2018

[14] Figures have been rounded to the nearest multiple of 5

[15] Proportions have been calculated using the ITT figures rounded to the nearest multiple of 5

2. Teacher Subject Specialism Training (TSST)

Introduction

The purpose of Teacher Subject Specialism Training (TSST) is to improve the subject knowledge of non-specialist teachers and those teachers looking to return to the profession, thereby increasing the number of hours taught in secondary maths, physics and modern foreign languages (MFL). For the purpose of TSST, non-specialists are those teachers who have not undertaken initial teacher training (ITT) in the TSST subject.

TSST in secondary mathematics and physics was introduced in 2015/16 as part of the science, technology, engineering and mathematics (STEM) teacher supply package. The TSST programme was extended to secondary MFL in 2016/17 to build additional capacity to deliver the English Baccalaureate.

TSST is a school led delivery programme, where good and outstanding schools and sixth form colleges can apply for funding to design and deliver TSST to meet local need. Those, which apply successfully, are awarded lead school status, and work in partnership with other schools and strategic partners such as higher education institutions, subject associations, Maths Hubs and Science Learning Partnerships, to design a programme and delivery model that works for their local schools and participants.

This section presents descriptive statistics on TSST for the 2016/17 academic year.

Background

In 2015/16, 2,978 participants[16] were recruited to TSST programmes by 98 course providers in the science, technology, engineering and mathematics (STEM) subjects of mathematics and physics.

Management information (MI) data analysed in this section was obtained internally from Department for Education (DfE) records. MI data for 2016/17 was collected and uploaded by individual TSST lead schools to DfE via a centralised web portal. Lead schools are responsible for the accuracy of the data they submit, and this information was collated to produce the tables and figures in this section.

16 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624769/Maths_and_physics_teacher_supply_package-report.pdf

Participant numbers

Participant numbers for 2016/17 are broken down by MFL and STEM (mathematics and physics). Table 2.1 and table 2.2 show that 605 participants were recruited to TSST courses in MFL and 2,899 in STEM. Of these, 592 and 2,838 completed the courses respectively[17].

Recruited figures were determined from the MI data by excluding participants whose course status was withdrawn, any ineligible participants, and any duplicates (identified individuals who took the same TSST course more than once). Of the number of participants recruited, the number marked as 'completed' are those participants who are known to have completed the course.

MFL

There were 605 participants recruited to take MFL TSST courses in 2016/17. Spanish had the highest number of participants (281), followed by French (262) and then German (60).

Table 2.1: TSST MFL courses and participants in 2016/17

Subject	Recruited	Completed
French	262	249
German	60	60
Mandarin	2	2
Spanish	281	281
Total	605	592

STEM

There were 2,899 participants recruited to take a STEM TSST course in 2016/17. Most STEM participants took Maths - Secondary courses (1,602), followed by Physics (678) and Maths - Cross-phase (619).

The Maths - Cross-phase TSST programme was targeted towards those working as part of a cross-school key stage 2/3 collaboration, or those looking to convert from a primary to secondary teaching post, to supplement the existing Maths - Secondary TSST programme.

[17] Not all schools had submitted completion records to DfE by time of publication; thus, the remaining recruited participants were assumed to have started but not completed the course.

Table 2.2: TSST STEM courses and participants in 2016/17

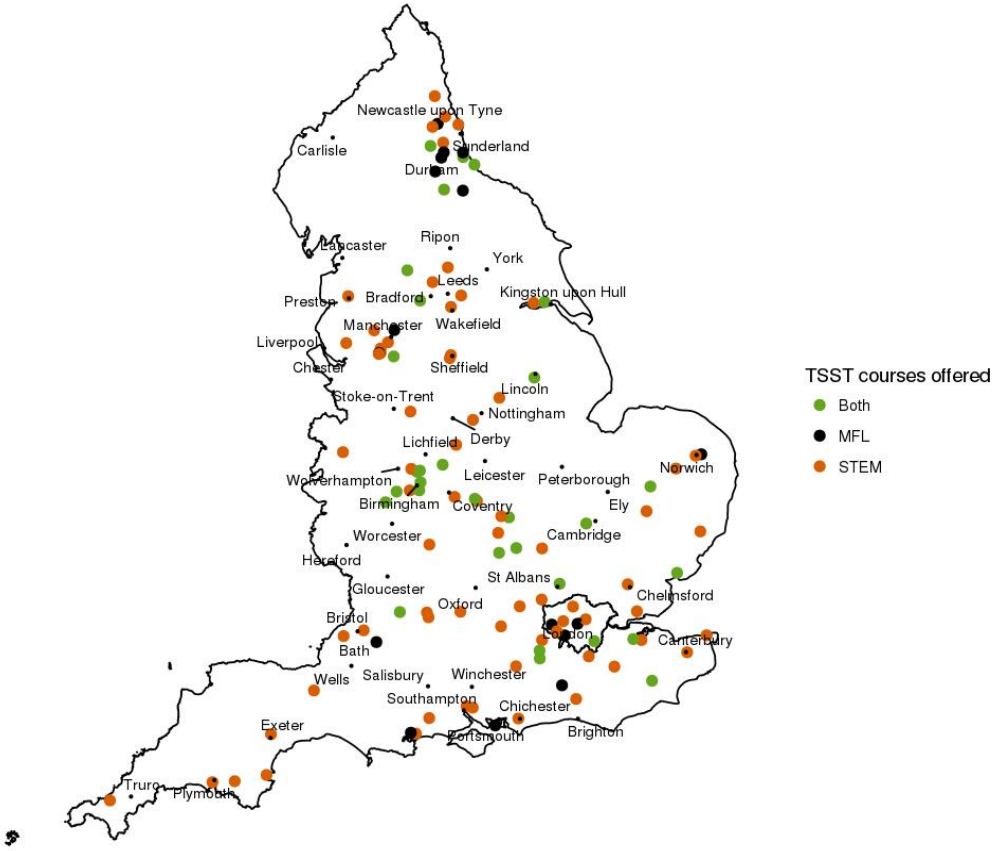
Subject	Recruited	Completed
Maths - Cross-phase	619	619
Maths - Secondary	1,602	1,547
Physics	678	672
Total	2,899	2,838

Lead schools

There were 115 lead schools in 2016/17, with 99 schools offering STEM TSST courses and 46 schools offering MFL TSST courses (30 offering both).

Figure 2.1 displays the location of lead schools, colour coded by MFL and STEM provision. The map shows that lead schools tend to be centred near major urban areas including London, Birmingham, and Manchester together with the Newcastle, Sunderland and Durham corridor in the north east. Areas with fewer lead schools overall include Cumbria, East Midlands and East Anglia, whilst Devon and Cornwall consists primarily of STEM providers. The areas of low provision may reflect a lower demand for courses in those areas.

Figure 2.1: TSST 2016/17 provider map, by MFL/STEM.



Breakdown by current subject taught

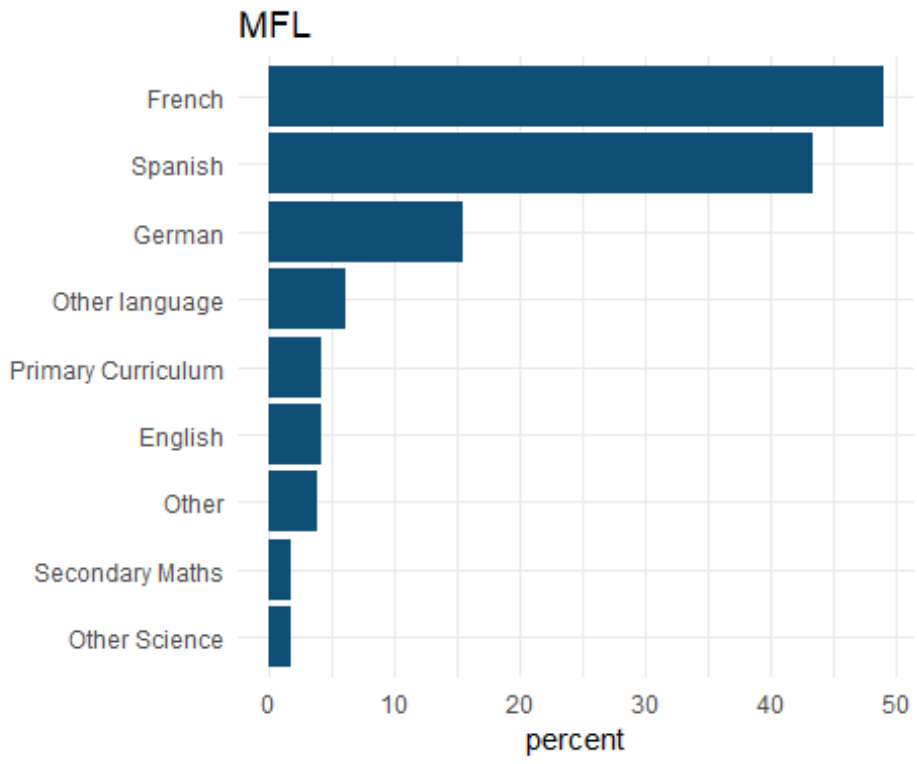
Data was collected from participants on the current subjects that they were teaching at the time of participating on the course. Participants reported up to two subjects (241 of 605 MFL and 780 of 2899 STEM participants had additional subjects reported).

A breakdown of the most common subjects currently taught by TSST participants is presented in figure 2.2 and figure 2.3 for MFL, and figure 2.4 and figure 2.5 for STEM. The subjects that participants were teaching were not necessarily their specialist trained subject as participants may already have been teaching their TSST subject as a non-specialist before starting the course. This is expected, as TSST is available to improve the subject knowledge of non-specialist teachers who are currently teaching maths, physics or MFL either full time or in addition to their main subject.

MFL

The majority of MFL participants were already teaching an MFL subject, with the most commonly reported subjects being French (49.1%), German (43.5%) and Spanish (15.4%).

Figure 2.2: The most common subjects currently taught by TSST MFL participants, by percentage

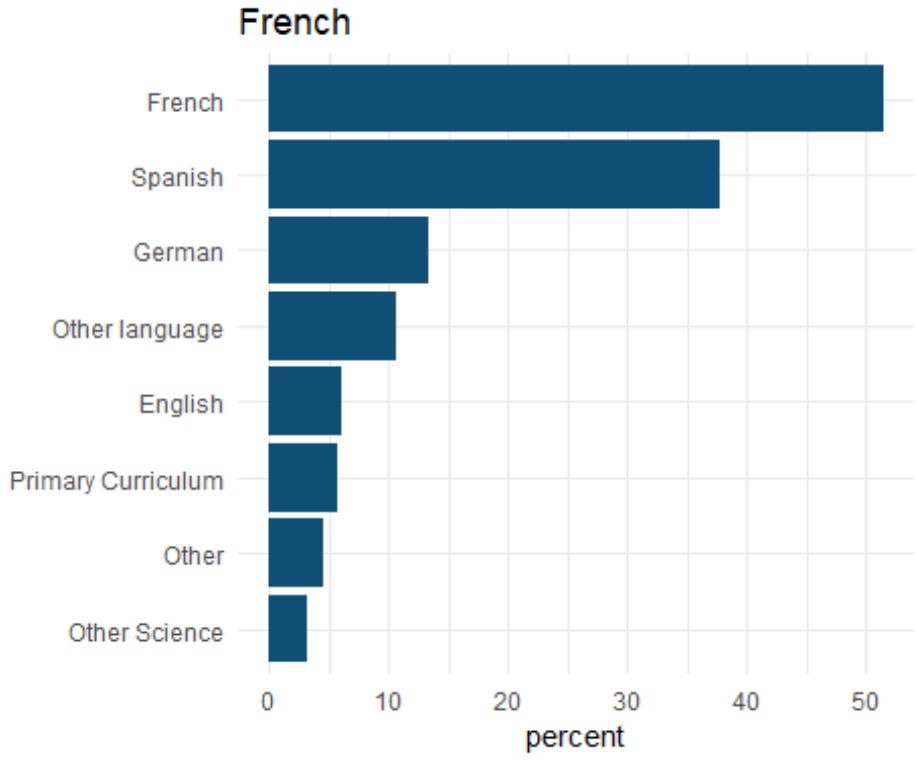


Note: (n = 605). Participants may teach more than one subject hence the sum may be greater than 100.

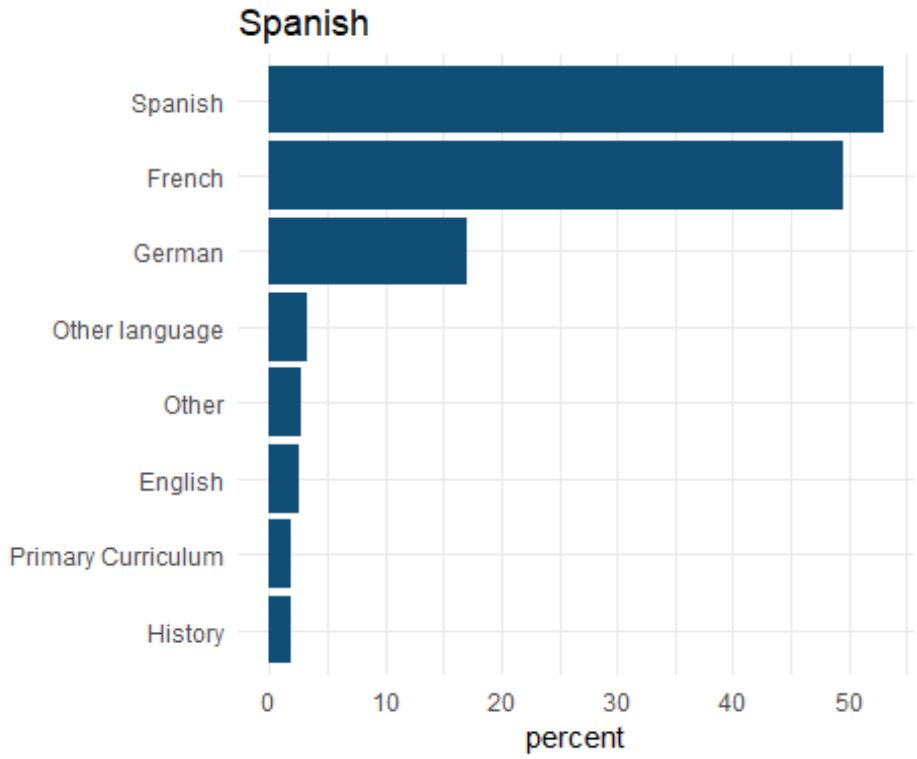
The subject-specific breakdowns show that a majority of participants were taking TSST in the subject they were teaching already (51.5% for French and 53% of Spanish). However, for German TSST participants, the most prevalent subject taught was French

(35%). The second most prevalent subject taught by MFL participants were also MFL subjects (Spanish for French and German TSST, and French for Spanish TSST).

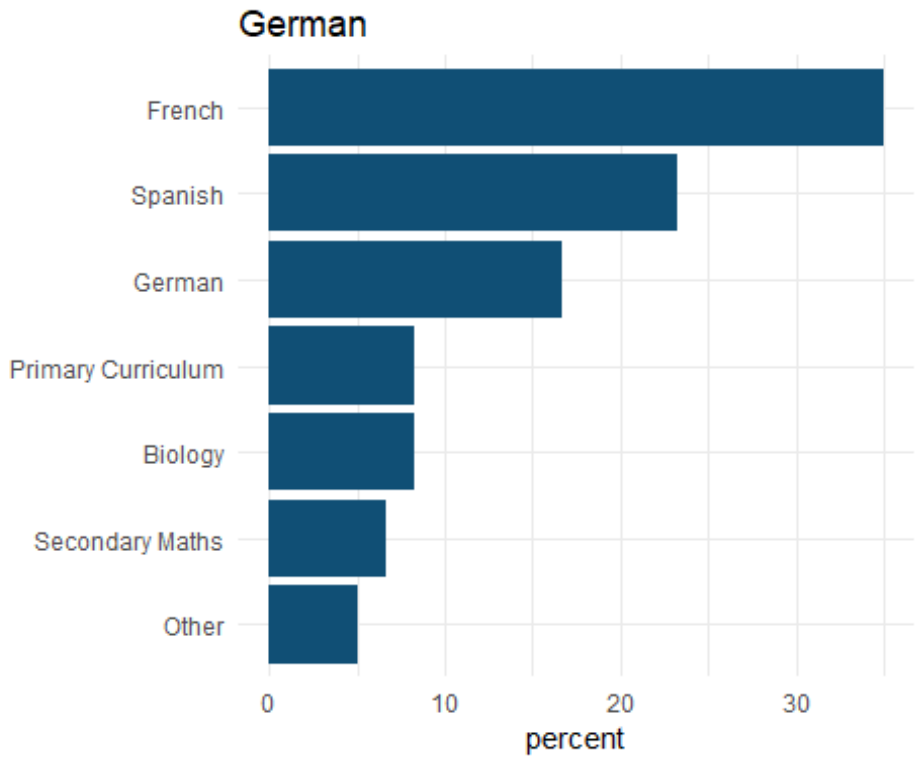
Figure 2.3: The most common subjects currently taught by participants, by percentage



Note: Total number of French participants = 262. Participants may teach more than one subject hence the sum may be greater than 100.



Note: Total number of Spanish participants = 281. Participants may teach more than one subject hence the sum may be greater than 100.

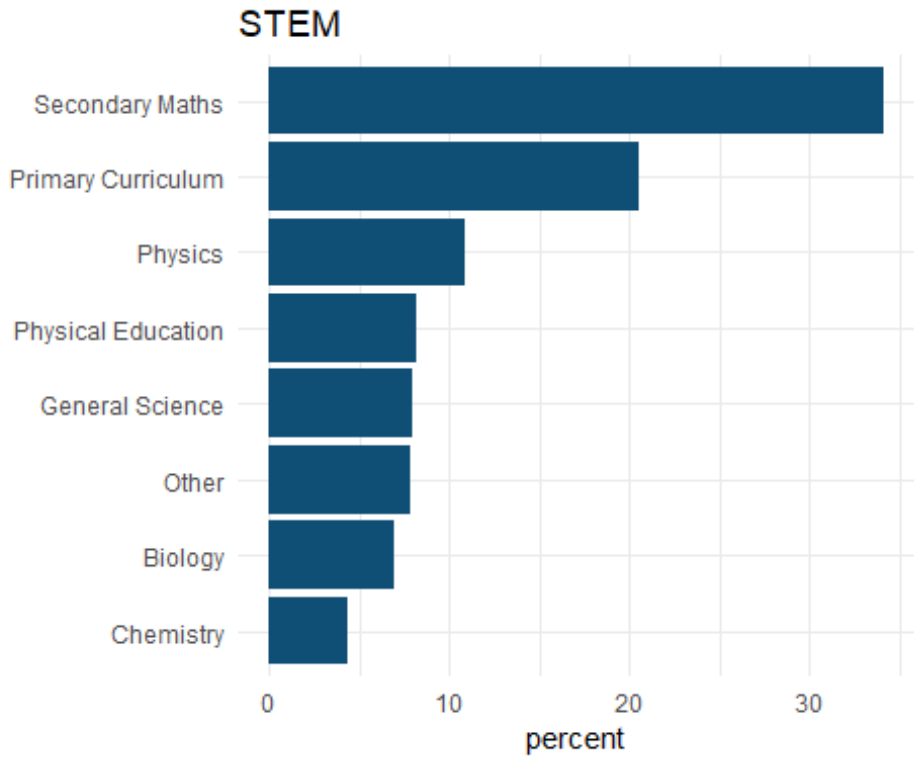


Note: Total number of German participants = 60. Participants may teach more than one subject hence the sum may be greater than 100.

STEM

About a third of STEM participants were currently teaching secondary maths (34.1%), followed by primary curriculum (20.5%). The other main subjects taught by STEM participants were physics, physical education, general science, biology and chemistry.

Figure 2.4: The most common subjects currently taught by TSST STEM participants by percentage

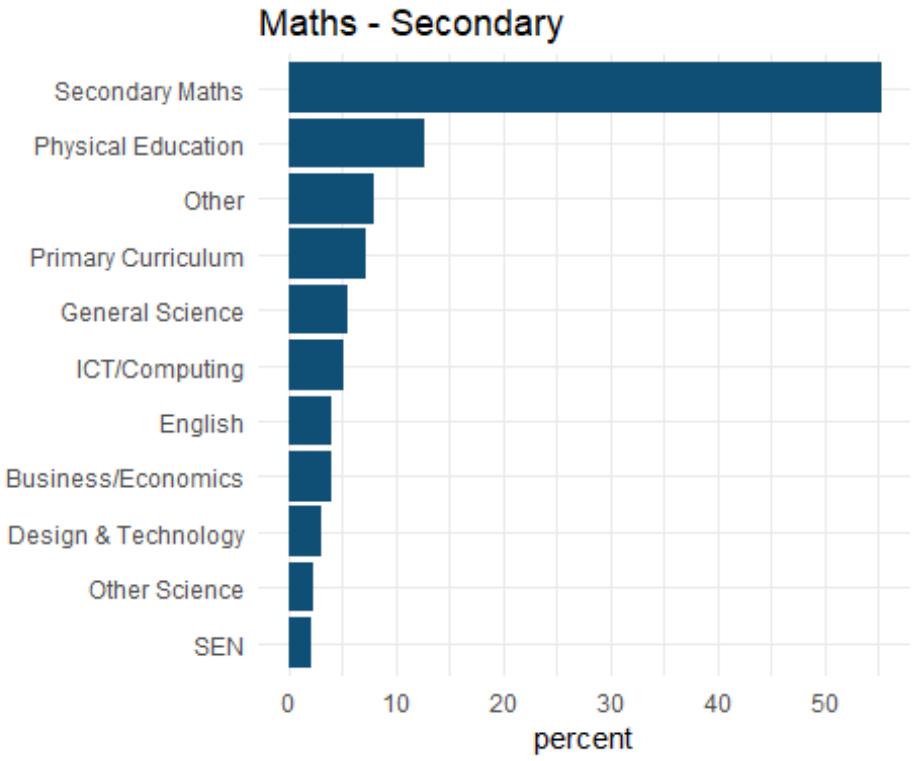


Note: n = 2899. Participants may teach more than one subject hence the sum may be greater than 100

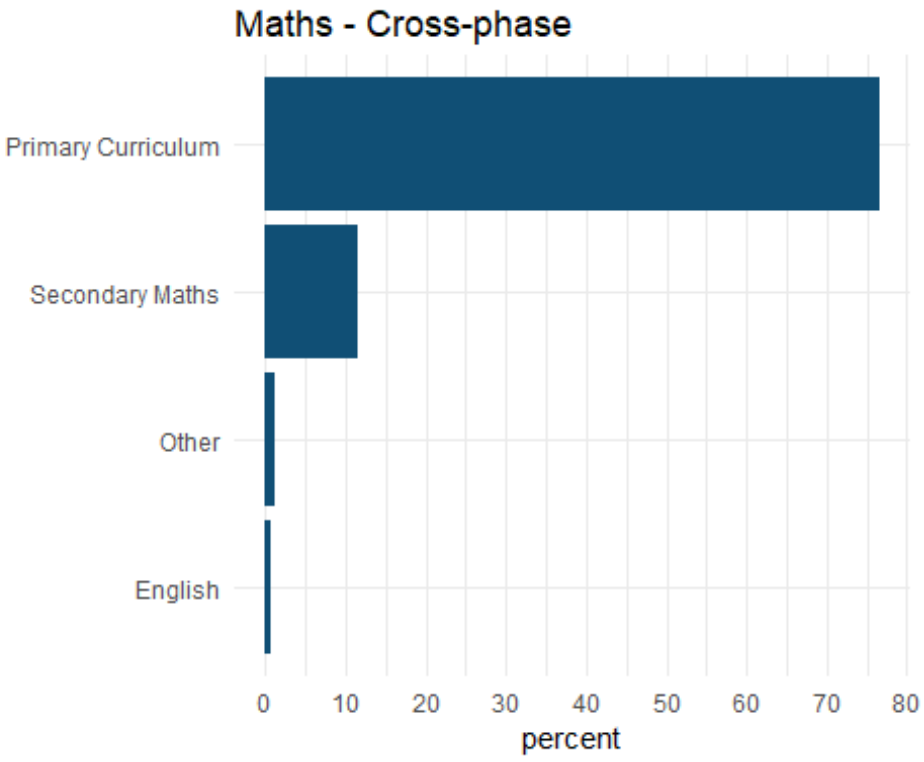
Breaking down further by TSST course, it can unsurprisingly be seen that the majority of existing participants teaching primary curriculum can be attributed to Maths - Cross-Phase (76.6% were primary curriculum). The most common subject taught by Maths - Secondary participants was secondary maths (55.2%), followed by physical education (12.7%).

Physics had a wider spread of subjects taught by participants. The most common subject taught was physics (43.2%), followed by biology (27.6%), general science (20.8%) and chemistry (16.1%) teachers, suggesting that Physics participants were already teaching science.

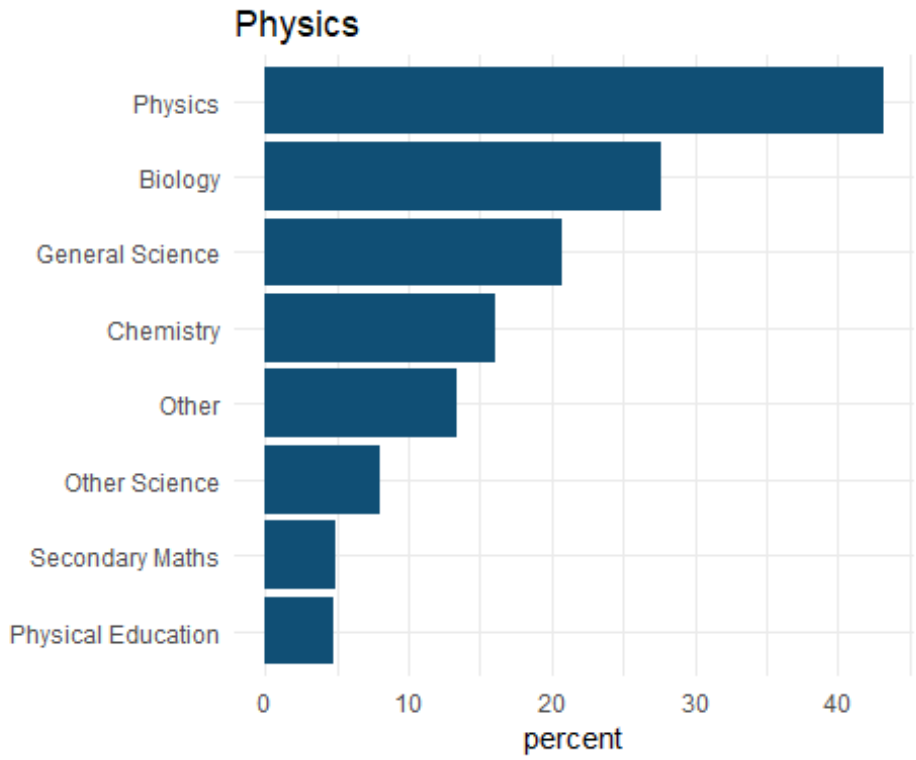
Figure 2.5: The most common subjects currently taught by participants, by percentage and individual TSST subject taken



Note: Total Maths – Secondary participants = 1,602. Participants may teach more than one subject hence the sum may be greater than 100.



Note: Total Maths - Cross-phase participants = 619. Participants may teach more than one subject hence the sum may be greater than 100.



Note: Total Physics participants = 678. Participants may teach more than one subject hence the sum may be greater than 100.

How many participants are currently teaching their TSST subject?

Table 2.3 and table 2.4 show the number of participants currently teaching the respective subjects in which they were taking TSST. For MFL, 51.1% of French participants were already teaching that subject, and 53% of Spanish. A lower proportion (16.7%) of German participants were teaching their subject already. In STEM, 43.1% of maths participants and 43.2% of physics participants were teaching their TSST subject.

Participants already teaching the subject they were undertaking TSST in are likely to be non-specialists using TSST to upskill.

Table 2.3: The number of participants currently teaching the MFL subject in which they are taking TSST

TSST Subject	Subject Currently Teaching	Total Participants	Percent
French	134	262	51.1
German	10	60	16.7
Mandarin	0	2	0.0
Spanish	149	281	53.0

Table 2.4: The number of participants currently teaching the STEM subject in which they are taking TSST

TSST Subject	Subject Currently Teaching	Total Participants	Percent
Maths	957	2,221	43.1
Physics	293	678	43.2

Note: The two TSST maths courses are aggregated for this analysis

3. Time series analysis of teachers in England using Teachers' Pensions Scheme data

Background information

Introduction

Teachers' Pensions Scheme (TPS) is a Defined Benefit Scheme based on earnings registered with HM Revenue and Customs available to all teachers in England and Wales.

Teachers' Pensions Scheme data are provided by Capita, a company that manages teachers' pensions on behalf of the Department for Education (DfE). Data are held on everyone eligible for a teacher pension, however this has changed over time (e.g. regulatory change in 2007 to an 'Opt Out' scheme not 'Opt In'). The criteria for inclusion of members within the extract are as follows:

1. Members must have had at least one period of service, reckonable or not, within the time-scale 01/04/1996 - 31/10/2017.

2. Any members who had reckonable service that was subsequently transferred out of the scheme or refunded should be included.

3. Members who have subsequently retired and become re-employed or passed away should be included in the report.

The availability of 20 years' worth teachers' service history from Capita now makes it possible to provide time series analysis of monthly teachers volumes and to pull out seasonal patterns and any long term trends. This allows us to understand trends and changes over time on a consistent basis.

This chapter has been created using the Reproducible Analytical Pipeline (RAP) model as part of the Department's work on reproducibility.

Methodology of comparing School Workforce Census and Teachers' Pensions Scheme

Analysis of teachers missing from TPS

Comparisons of the number of teachers in the pensions data with the number of teachers in the census data were done through matching individual teachers in the School Workforce Census with TPS members using Teacher Reference Number (TRN), Local Education Authorities (LEA) and Establishment Numbers (ESTAB) allocated by Get information about schools (GIAS).

The proportion of teachers missing is much higher for 2017, and this is mainly down to how the pensions database is updated by payroll providers. This process has been revised in 2018 with rolling updates, which means that the complete 2018 data will be available in 2019. This analysis uses pensions data because it gives a longer time series on a consistent basis.

The previous process involved payroll providers sending annual data to Capita at different dates, which meant that DfE received an incomplete pensions dataset for the most recent year, with some payroll providers' submissions lagging behind by one to two years.

This analysis covers data to October 2017, making 2017 data incomplete so it was not included. In addition, for reasons outlined above, 2016 data must also be treated with caution because it is more than likely incomplete and cannot be considered as a typical year.

When comparing data from the School Workforce Census with data from the Teachers' Pensions Scheme from 2010 to 2015, on average 5.3% teachers are missing from pensions data as per table 3.1.

Table 3.1: The number of teachers not recorded in Teachers' Pensions Scheme

Census Year	All teachers in census	Missing from pensions	Proportion missing (%)
2010	465,610	23,394	5.02
2011	460,935	21,780	4.73
2012	473,546	23,286	4.92
2013	482,021	25,968	5.39
2014	491,157	28,131	5.73
2015	492,868	28,235	5.73
2016	493,319	35,848	7.27
2017	490,401	110,103	22.45

Further information on the characteristics of teachers missing from the pensions data can be found in the annex. Further analysis is needed to understand whether teachers are missing at random. This comparison includes teachers from primary, secondary and special schools.

Time series analysis

This new analysis using Teachers' Pensions Scheme data allows us to look at longer term trends and to analyse monthly seasonality, both of which we were unable to understand from the annual snapshots of the School Workforce Census.

The Teachers' Pensions Scheme (TPS) includes teachers from both England and Wales and teachers from state-maintained and independent schools, so a subset of the data is needed to match teachers and schools that are recorded in the School Workforce Census (SWC).

To identify schools registered in England, the Employer LEA variable is matched to all LEAs from England (as held in GIAS) and only matches are kept in the subset. To identify all state-funded schools, Employer Establishment descriptions were used and only descriptions corresponding to state schools were allowed in the subset.[18]

The comparison of teacher numbers from the SWC and from the pensions data (TPS) in table 3.2 below shows that both datasets are similar, with slightly fewer teachers in TPS than in the SWC.

Table 3.2: Number of teachers in the teachers' pension scheme as a proportion of number of teachers in the school workforce census

Year	2010	2011	2012	2013	2014	2015	2016
Proportion (%)	94.21	95.22	94.15	94.26	94.62	95.69	92.08

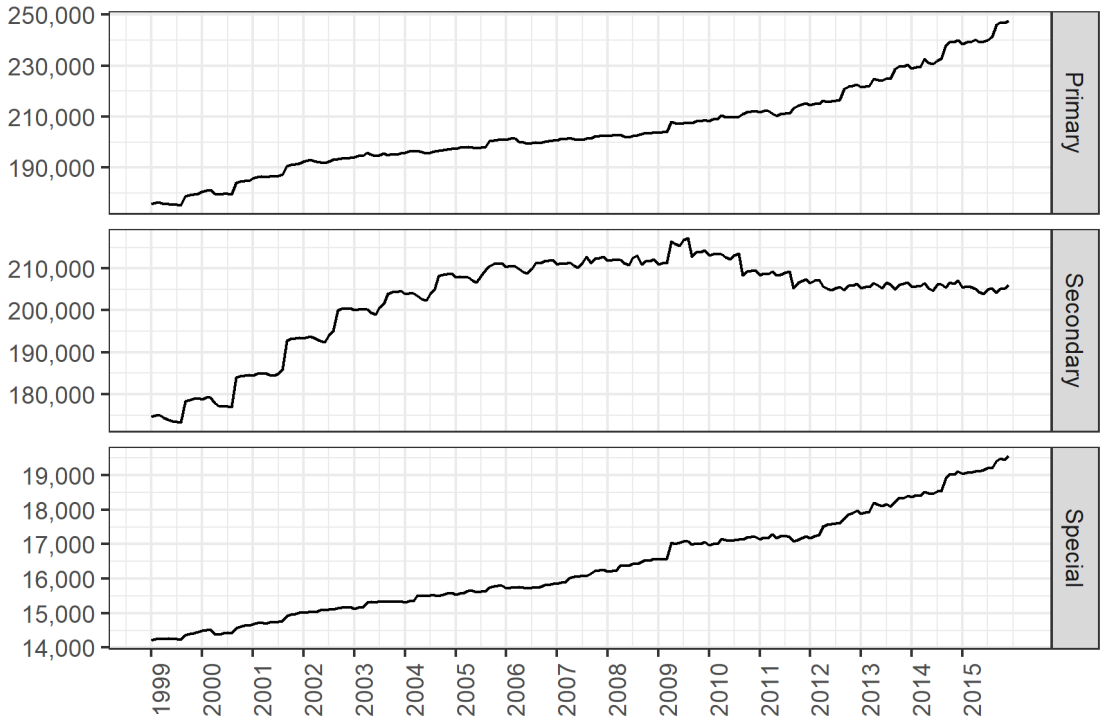
As both periods between 1997 and 1999 and between 2015 and 2017 have been affected by the way the data is recorded and the numbers of teachers recorded do not represent national volumes, it is reasonable to select data from 1999 to 2015 for time series analysis.

[18] Data are taken from the School Workforce Census which had a number of large outliers. These were removed as they were considered to be inaccurate, assuming that it is impossible for a teacher to work more than 60 hours a week.

Teachers by school phase

The time series in figure 3.1 for teachers in primary schools is different from those in secondary schools: the former has increased at the same pace whilst the latter has plateaued in 2010. Seasonality is more pronounced in secondary schools until 2009, after which the pattern registered a change. There has also been a rise in the number of primary school pupils since 2009, which increased the number of primary teachers needed. This “bulge” is now starting to make its way into secondary schools.[19]

Figure 3.1: Monthly teachers volumes by school phase



In figure 3.2 below, we see the monthly proportion of teachers calculated as a percentage difference from September volume, showing whether seasonality has changed over the years. As September is the reference month, changes to its volumes cannot be followed here. Note that only four months are displayed for simplicity, unveiling November for comparison with census data, January and April for understanding mid-year changes and August for showing volumes during school holidays. In addition, the graph shows school years running from September to August so the beginning of school year is displayed along the horizontal axis.

There are different patterns in all school phases, apart from November and September being similar. From the time series in figure 3.1, primary schools do not have a strong

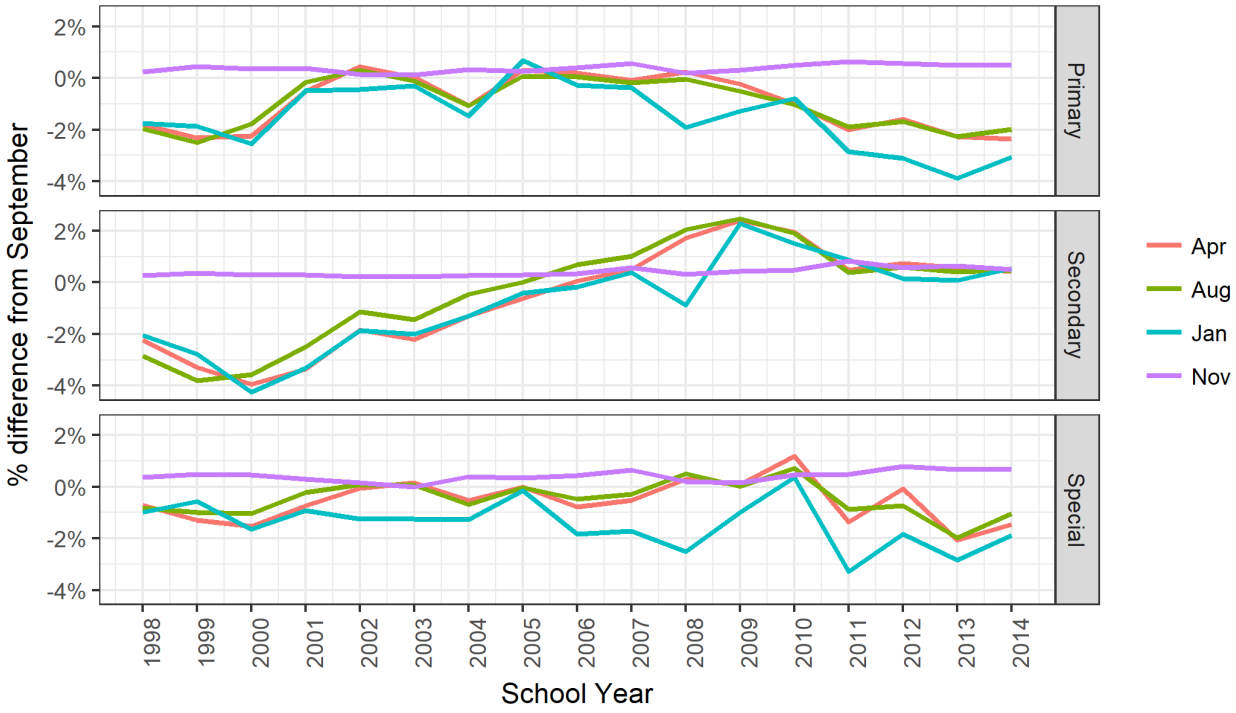
[19] As per [Schools, pupils and their characteristics: January 2018] (https://www.gov.uk/government/statistics/schools-pupils-and-their-characteristics-january-2018).

seasonality so all months are similar in the year. The first three years show January, April and August lower than November then from 2001/2002 to 2009/2010 have similar volumes but from 2010/2011 onwards, these months are dropping below the September/November number of teachers.

In secondary schools, there is a change in seasonality from 2007/2008 with January, April and August volumes overtaking September/November number of teachers until 2011/2012, after which they are all similar ironing out seasonality.

Special schools do not present seasonality, as all volumes are similar with some fluctuations for January. Volumes of teachers in special schools are much lower than other phases so larger fluctuations are expected.

Figure 3.2: January, April, August, November as percentage difference from September



Teacher mobility

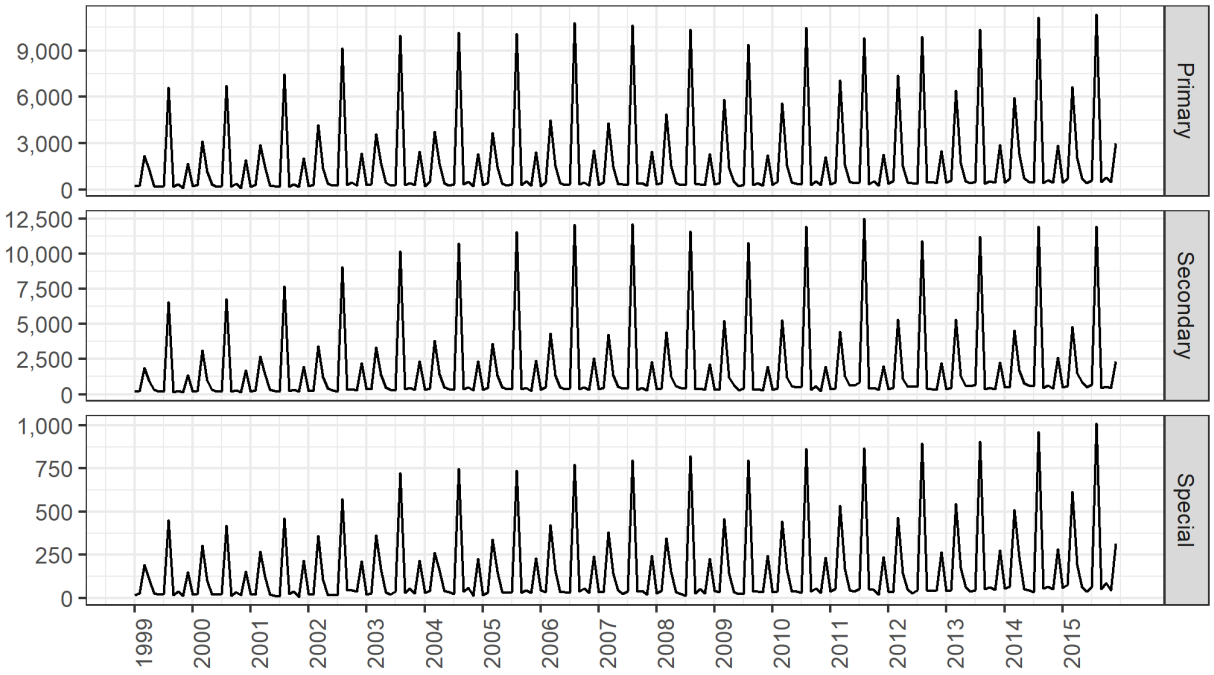
Seasonal analysis of teachers that entered, re-entered or left the profession is carried out in this section. The methodology for defining these types of teachers is explained below:

- Teachers considered leavers in a month are those ending a contract in that month and not starting a new contract in the following year.
- Teachers considered returners in a month are those starting a contract in that month after at least one year of not having any contract with a school.
- Teachers considered entrants in a month are those starting on their first contract as members of the Teachers' Pensions Scheme.

Leavers by school phase

Time series data for leavers in figure 3.3 show that there are three spikes every year in March, August and December with the highest peak in August.

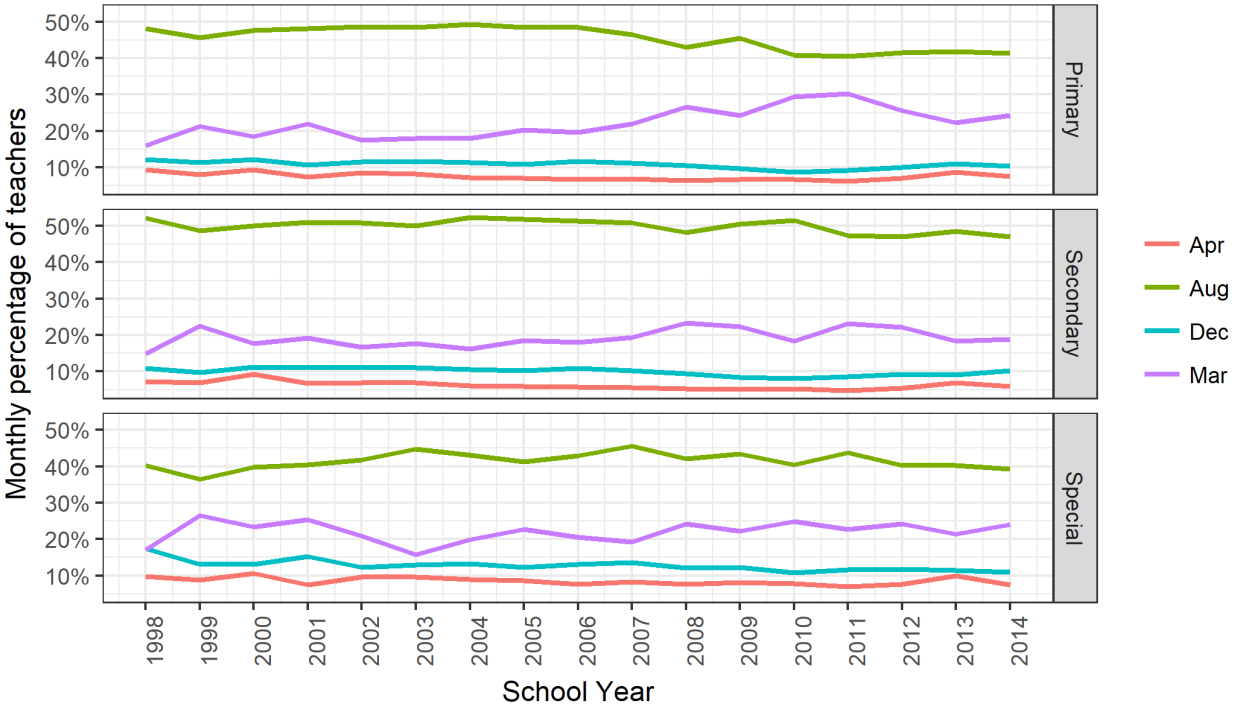
Figure 3.3: Monthly leavers by school phase



In figure 3.4, monthly rates of teachers as a percentage of total annual volumes reveal changes in seasonality over the years. Again, for simplicity only monthly rates over 5% are displayed, allowing visibility of March, April, August and December rates. From the previous graph, three of these four months have the highest volumes of teachers leaving the system: March, August and December.

Whilst April and December are constant, March and August started fluctuating from 2007/2008 in primary and secondary schools exhibiting a small change in seasonality. Unlike these, special schools' monthly leaver rates registered reasonably constant patterns.

Figure 3.4: High monthly leavers rates (over 5%)



Returners by school phase

Time series for returners in figure 3.5 show that there are three spikes every year in January, April and September with the highest peak in April for most recent years.

Figure 3.5: Monthly returners by school phase

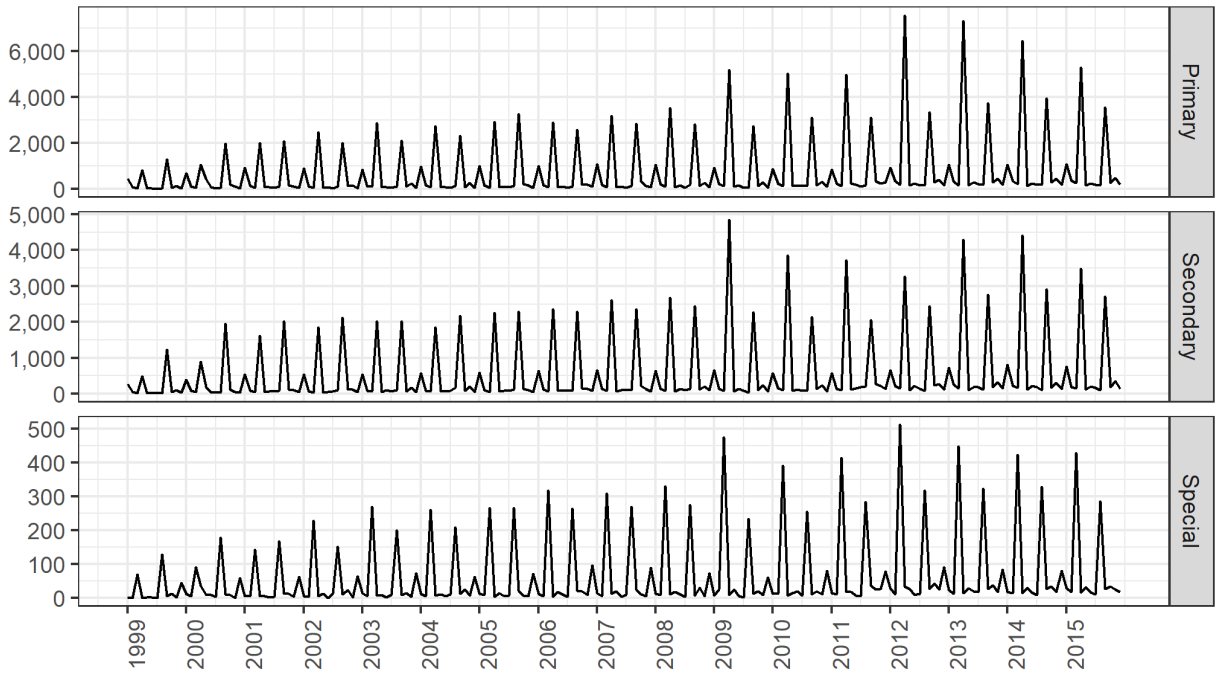
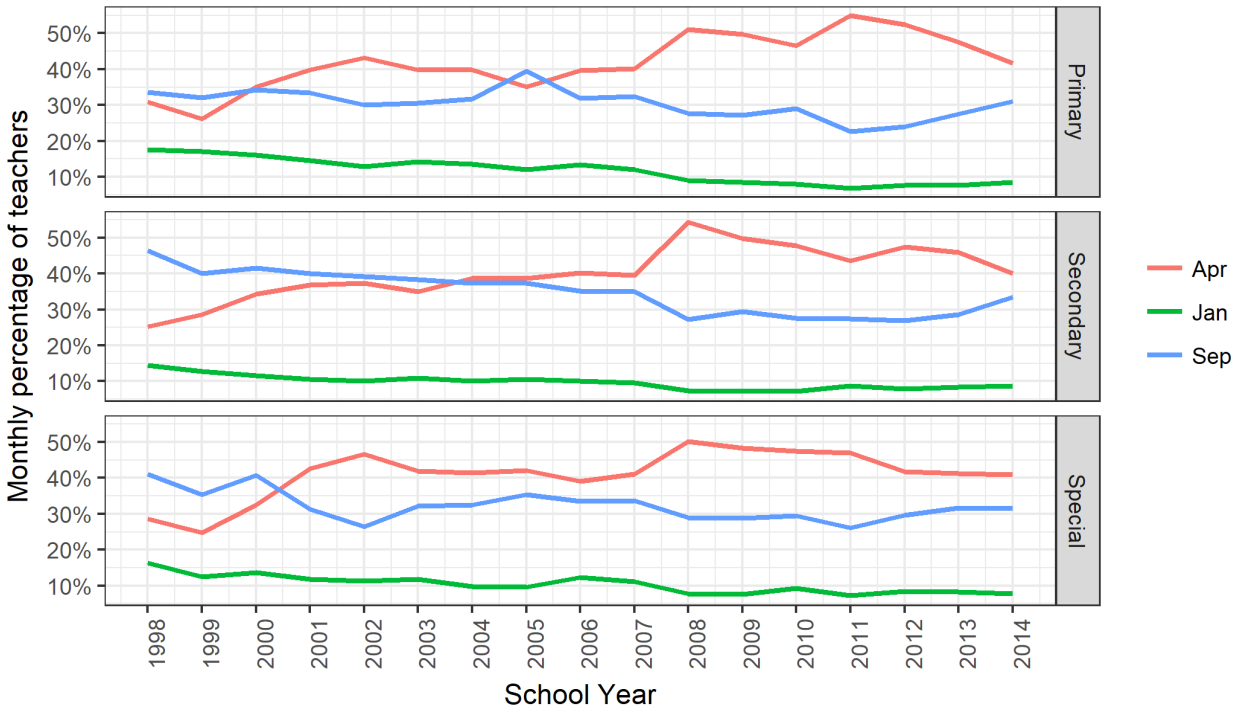


Figure 3.6 shows monthly rates of teachers as a percentage of total annual volumes, unveiling seasonality changes over the years. Only monthly rates over 5% are displayed, showing only January, April and September rates, which are the months with the highest mobility as demonstrated in the previous graph.

All school phases have similar patterns. Monthly rates of returners in January are falling, with an almost 10% decrease in primary schools from 1998/1999 to 2014/2015. April and September rates have changed the reasonably constant shape in 2007/2008 by increasing returner rates in April to the detriment of September across all school phases.

Figure 3.6: High monthly returners rates (over 5%)



Entrants by school phase

Time series data for entrants in figure 3.7 shows that there are three spikes every year in April, September and December with the highest peak in September.

Figure 3.7: Monthly entrants by school phase

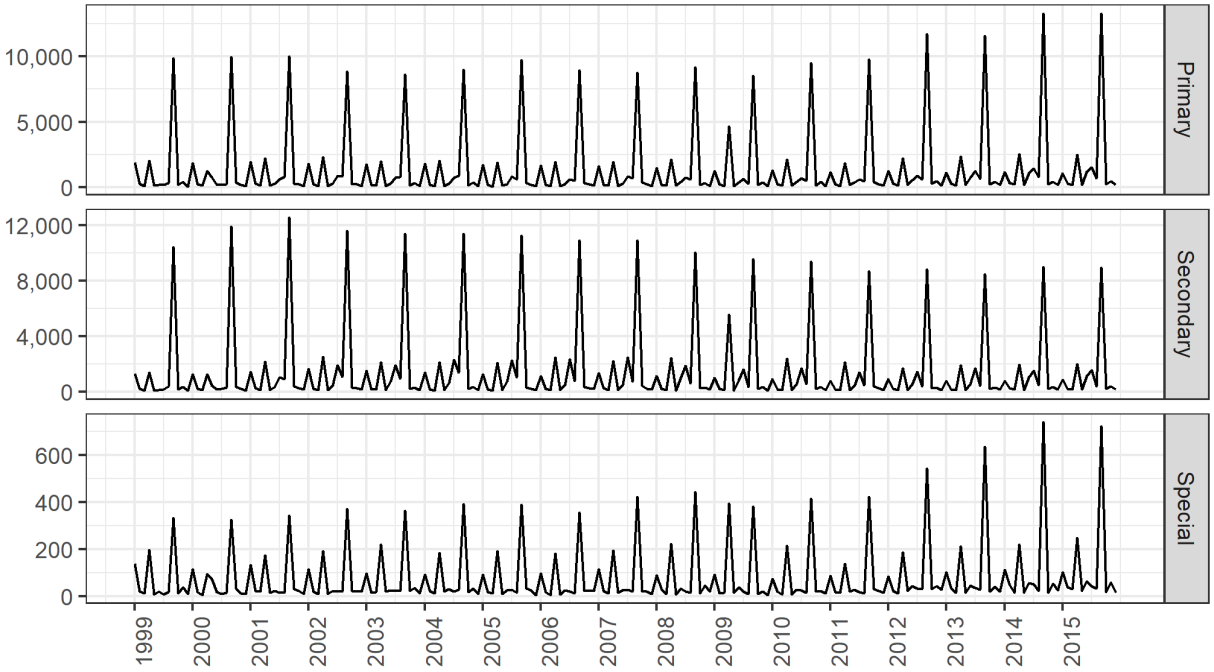
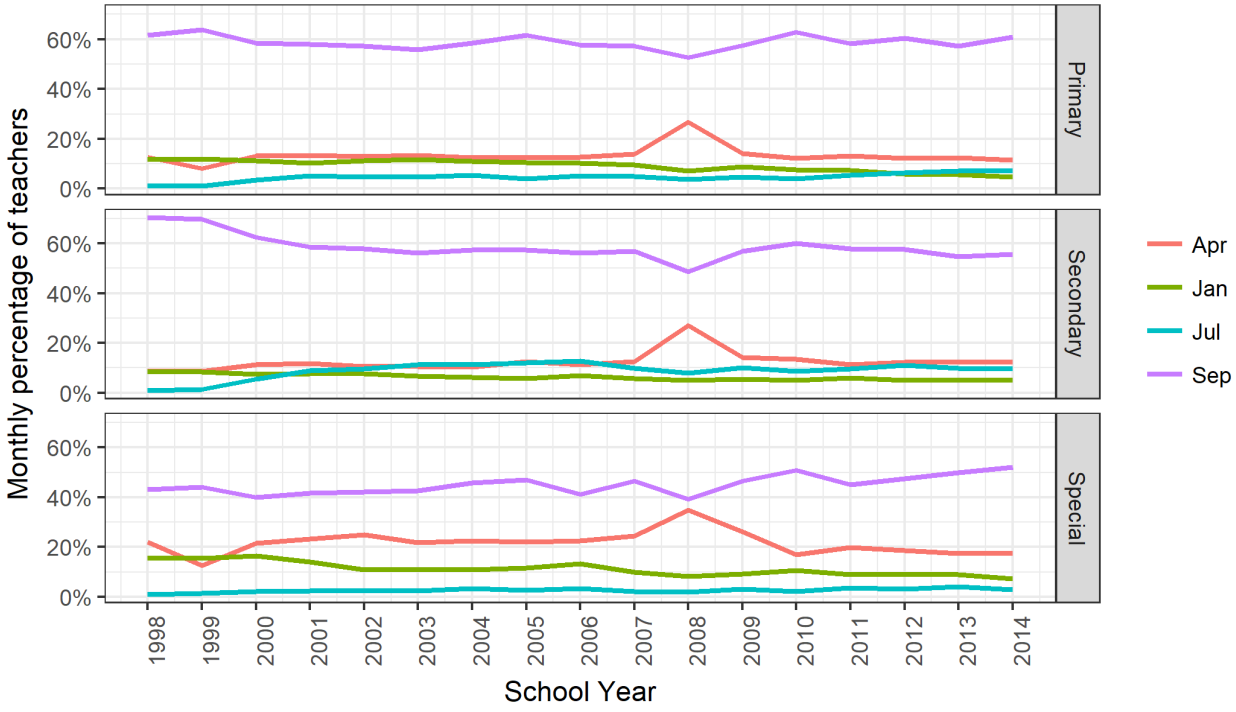


Figure 3.8 shows the monthly teacher entrant rates as a percentage of total annual volumes for understanding seasonality changes over the years. Only monthly rates over 5% are displayed, showing January, April, July and September rates. All of these except July are months with high mobility as demonstrated in the previous graph.

All entrant rates are constant across all school phases, with the exception of April in 2008/2009, which recorded just over a 10% increase.

Figure 3.8: High monthly entrants rates (over 5%)



In summary, the year 2007/2008 has been important in terms of mobility fluctuations, especially for volumes of teachers in each school phase. This is a direct consequence of regulatory change in 1 January 2007 when all entrants automatically joined the Teachers' Pensions Scheme, unless they opted out. More recent years, starting with 2010/2011 have changed the general seasonality of the total volumes of teachers, especially in secondary schools and this might be related to regulatory changes in retirement age that took place in 2010.

4. Teachers returning to the profession

This section outlines recent trends in the numbers and characteristics of returning teachers. We look at data from 2011 to 2016 using the School Workforce Census to gain information about subjects taught and the types of contract these teachers have. We look to the Teachers' Pensions data to examine career history over the last 20 years to determine whether these teachers have been part of the state-teaching workforce at any point and the number of years they have been absent since.

We have defined a returning teacher as the following:

- A teacher in service in a state-funded school,
- Not in service in the previous year,
- With previous experience of working in a state-funded school.

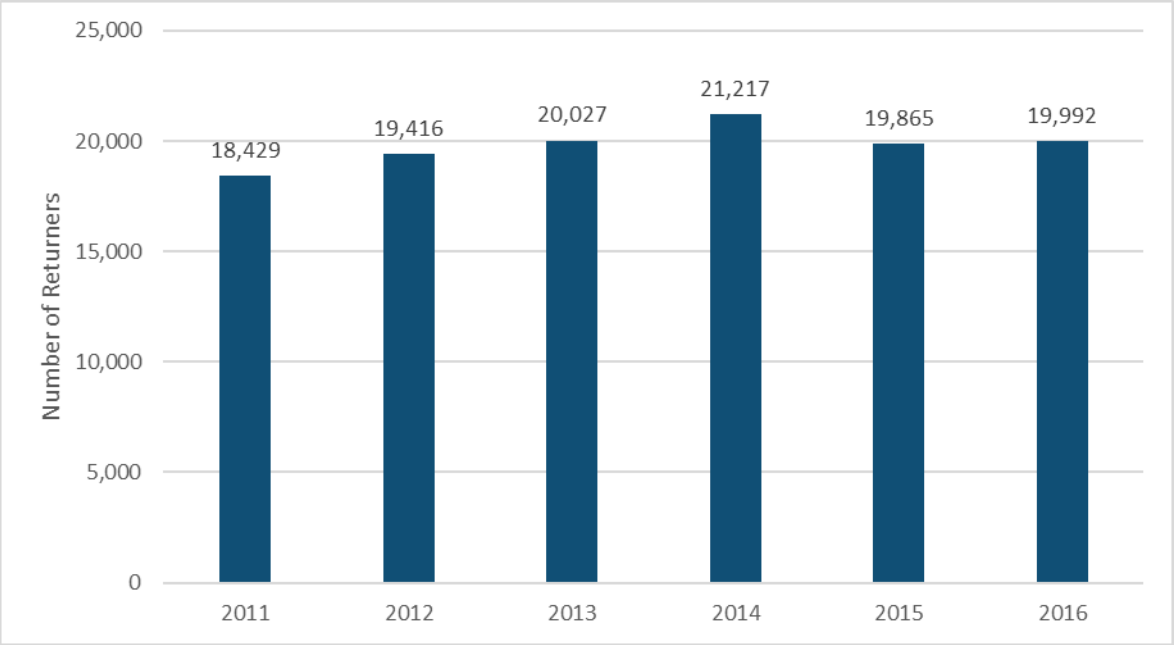
We have looked for prior state-sector experience by looking at the Teachers' Pensions data. From this, we can see all contracts that a teacher held from 1996 onwards. We would not have sight of those who left teaching prior to 1996, however, it is presumed that only a very small number of teachers return after a 20-year career break. Teachers may leave for a variety of reasons and may then return at a later date. The data we have utilised in this analysis does not show the reasons for leaving and so analysis explored here looks at returners as a whole.

There has been a slight increase in the number of returners since 2011

Our estimation of the number of returning teachers in this publication has differed from previous published work. The returner figures we present here are 2 to 3 thousand higher than those quoted in the School Workforce Census (SWC). The SWC estimates there to be around 14,000 returners (full time equivalent), which is equal to 17,000 by headcount. There is a stage of post-processing in the School Workforce Census publication, which discounts schools with potentially unrealistic high teacher turnover and scales up to a national total. We anticipate this would tend to report lower returner numbers than shown here. The analysis presented here is based on the career histories of individual teachers without any such adjustment[20]. Figure 4.1 shows the number of returners by year, ranging from 18,429 in 2011, hitting a peak in 2014 at just over 21,000 and dropping again to just under 20,000 in 2016.

[20] The School Workforce Census will continue to publish returner figures with the adjustment

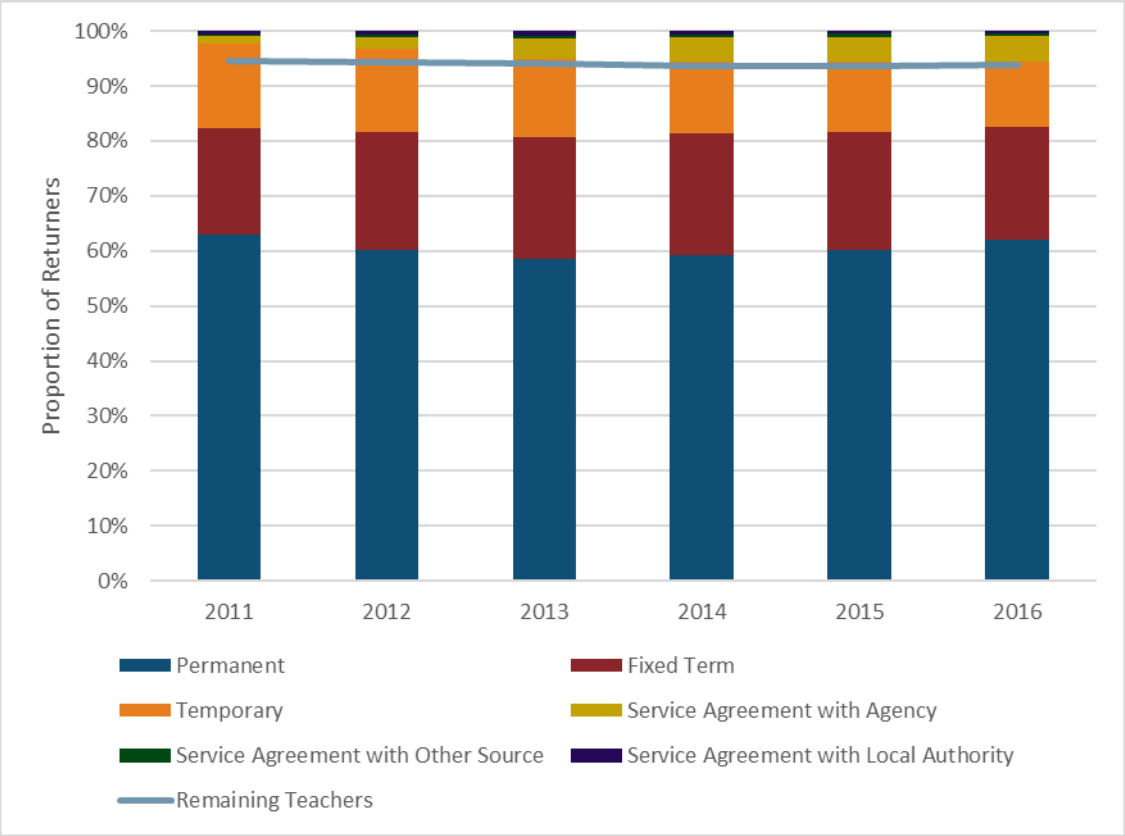
Figure 4.1: Number of returning teachers by year



60% of returners have permanent contracts compared with around 95% of the remaining workforce

Figure 4.2 shows around 60% of returning teachers have permanent contracts compared to around 95% of 'remaining teachers' (teachers who were working in a state-funded school in the year previous). A possible explanation for this may be that teachers leave the profession for maternity or childcare reasons and wish to re-join on a more flexible basis. Conversely, schools may only be willing to employ a returning teacher on a short-term contract before committing to a permanent one (the School Workforce Census offers a snapshot of employment in November and so it is possible that these teachers could gain permanent contracts later in the academic year). All contracts that are not permanent are temporary in nature. Service agreements are a type of temporary contract that is not with the school but with an outside source such as the local authority, agency or other source. Fixed term contracts are also temporary but have a fixed end date.

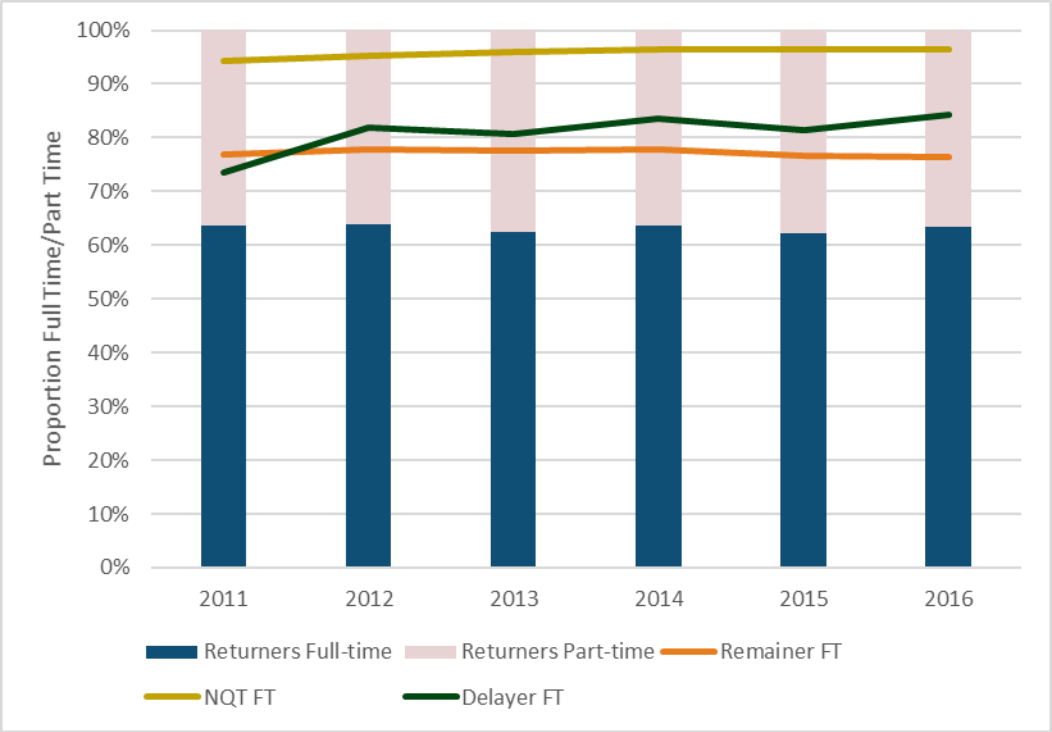
Figure 4.2: Proportion of returners by contract type compared with all other teachers



More than a third of returners re-enter teaching on part-time terms

As well as returning to more temporary employment, returning teachers are less likely to work full-time than remaining teachers, newly qualified teachers (NQTs) and 'delayers' (newly qualified in the last two years or more but their first instance of working in the state sector). Figure 4.3 shows upwards of 90% of NQTs enter the workforce full-time compared to just over 60% of returners. This is the pattern we might expect given that returning teachers are more likely to have family or caring responsibilities than NQTs.

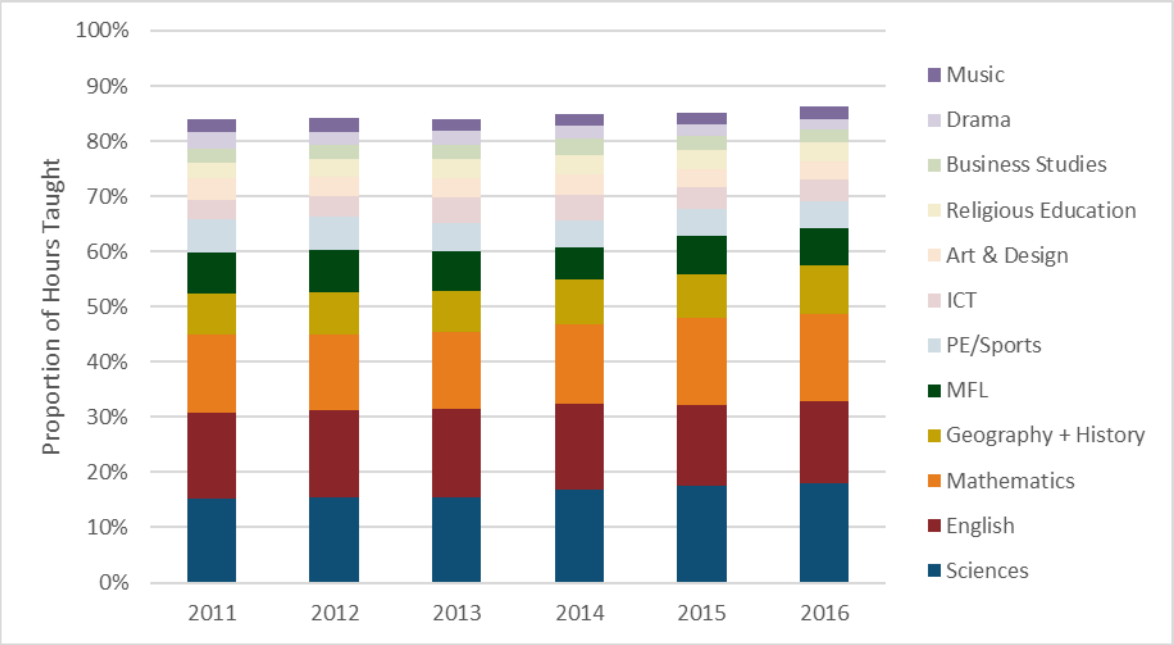
Figure 4.3: Proportion of returners working full/part-time compared with other teaching staff



60% of returner teaching is in EBacc subjects

Figure 4.4 presents the proportion of the number of hours taught in each subject. This does not represent the number of teachers in each subject. All teachers have the potential to teach in more than one subject and so we have simply looked at the proportion of teaching hours and include every subject taught. From the chart, we can see that the majority of returners teaching hours (60-64%) are spent in EBacc subjects while the proportion of teaching hours in EBacc subjects for all remaining teachers ranges from 54-59%. EBacc subjects include Sciences (General Science, Physics, Chemistry and Biology), English, Mathematics, Modern Foreign Languages, Geography and History.

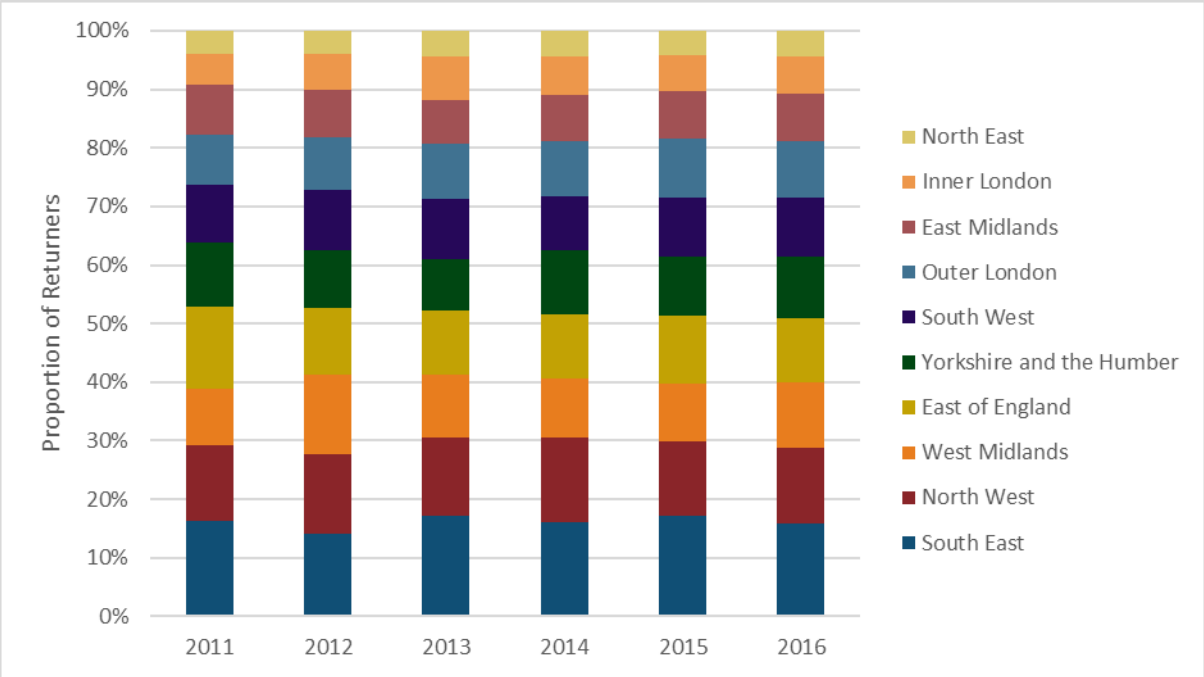
Figure 4.4: Proportion of hours taught by returning teachers



The regional share of returners has remained steady

The largest proportion of returners are teaching in the South East and North West of England. This corresponds with what we would expect as these areas have the largest numbers of teachers. We can see from figure 4.5 that the proportion of returners by region has remained steady from 2011 to 2016.

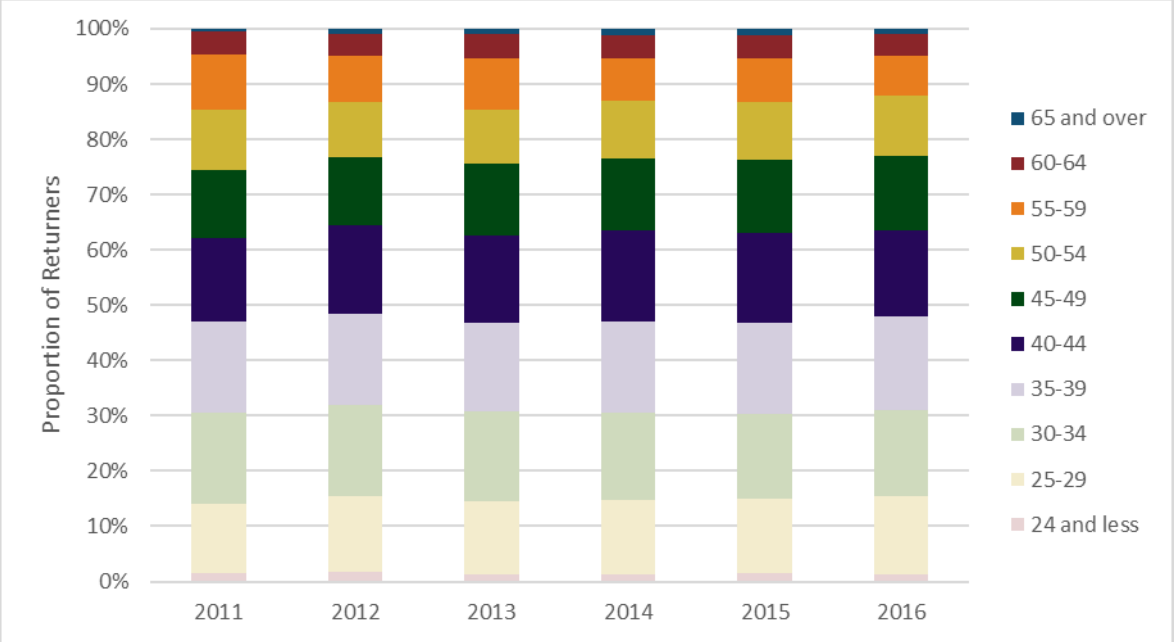
Figure 4.5: Proportion of Returners by region



Over 35% of returners are 45 and over

Less than 5% of NQTs are aged over 45 compared to 35% of returning teachers. This proportion reflects the workforce as a whole as 'remaining teachers' have a similar proportion of over 45 year olds. Figure 4.6 shows the distribution of age for returners has remained steady across the years shown.

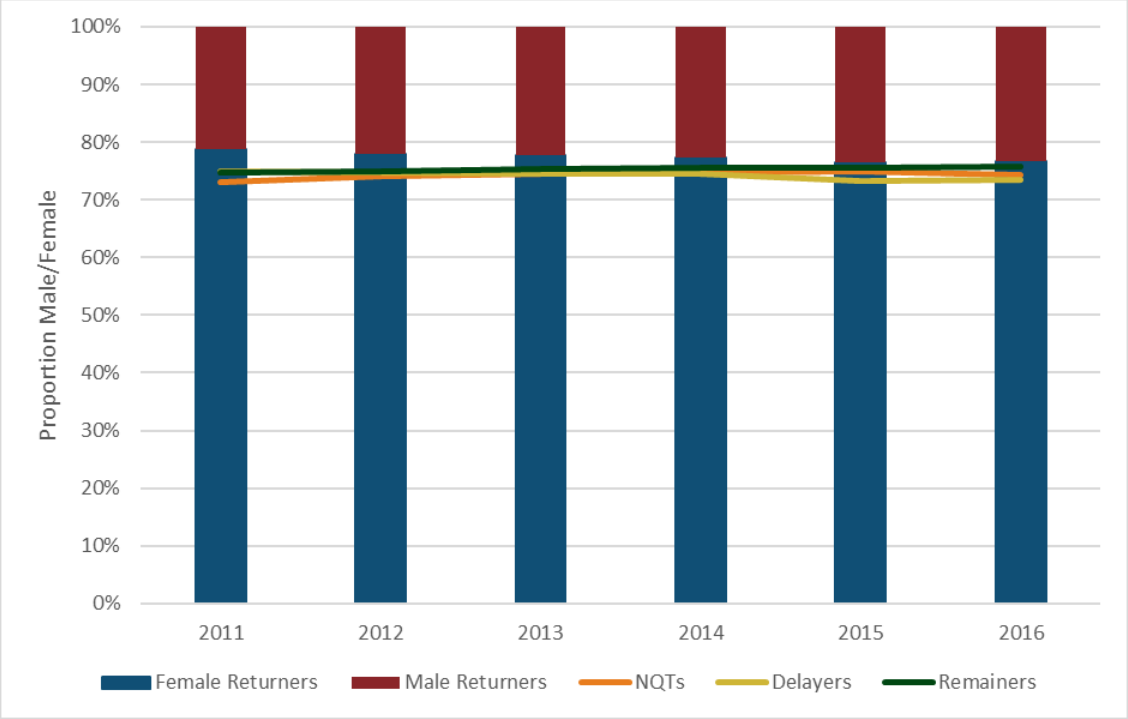
Figure 4.6: Proportion of returning teachers by age



The gender split of returners is in line with that of the rest of the teacher workforce

Figure 4.7 shows the gender split of returning teachers, newly qualified teachers, delayers and the remaining teacher workforce. The proportion of female teachers has continued to be around 80% across the years shown and is comparable to that of the rest of the workforce shown.

Figure 4.7: Proportion of returning teachers by gender



5. The pool of qualified teachers who are not currently teaching in the state-funded sector

Who are the pool of qualified teachers who are not currently teaching in the state-funded sector?

The pool of qualified teachers who are not currently teaching in the state-funded sector is the term we apply to the group of teachers who have previously taught but who are not teaching (at different points in time). It is important for us to analyse data on these teachers so we can better understand those who leave and determine how likely it is that they will return to teaching.

We have defined a qualified teacher who is not currently teaching in the state-funded sector as the following:

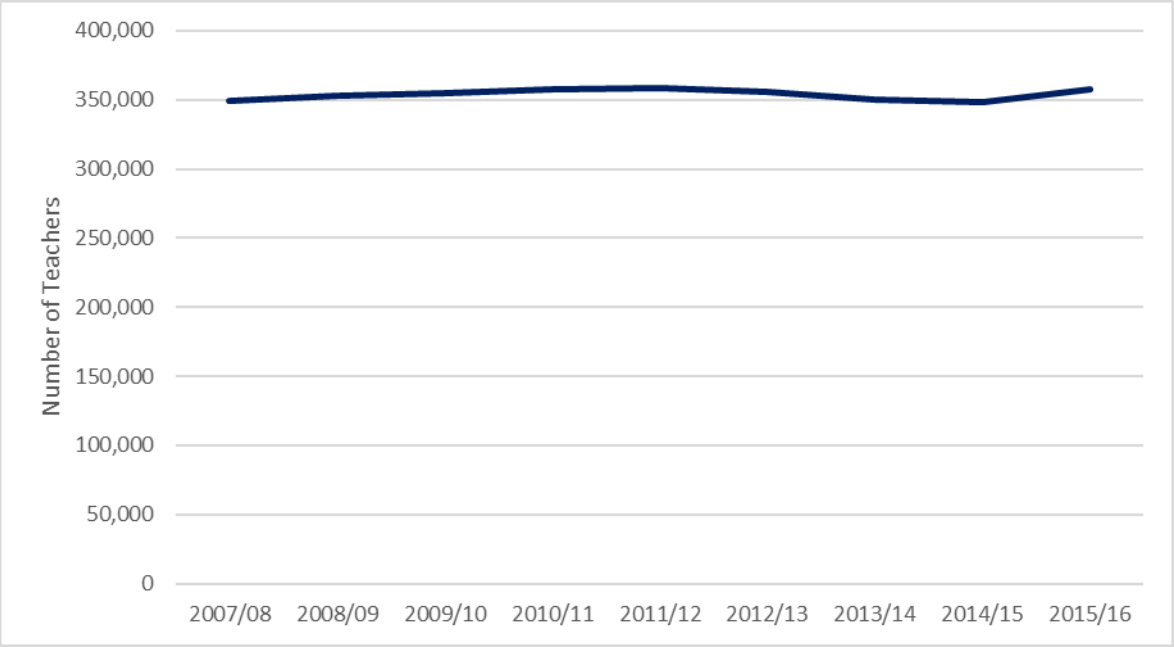
- Teachers qualified to teach, who are not teaching in state schools according to our records
- Under 60 years old at the start of the academic year

Qualified teachers who are not currently teaching in the state-funded sector could include those who are teaching in other countries (including Scotland, Wales & Northern Ireland), early retirees, those on career breaks, those who have subsequently changed career etc. It could also include those who are still teaching, who have been in the Teachers' Pensions Scheme but have since dropped out. The Teachers' Pensions Scheme is a desirable pension and so we estimate the number of teachers who would opt out of this to be small, although we have no sight of the exact number. Additionally, our analysis does not include those who have not taught since 1996 and does not include those who have never been in the Teachers' Pensions Scheme.

The cohort of qualified teachers who are not currently teaching in the state-funded sector has remained steady across time

Figure 5.1 shows the number of qualified teachers who are not currently teaching in the state-funded sector from 2007/08 to 2015/16. We can see that the cohort figure has not changed in any meaningful way and has hovered around 350,000 teachers for each year.

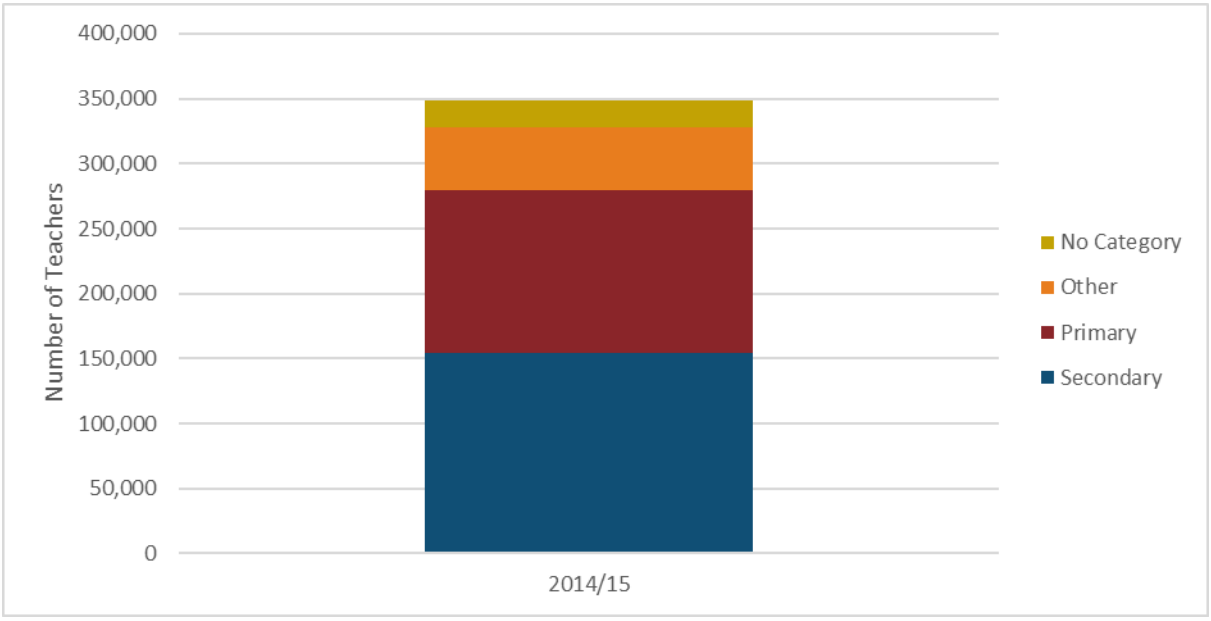
Figure 5.1: The pool of qualified teachers who are not currently teaching in the state-funded sector across time



A large proportion of the pool of qualified teachers currently not teaching in the state-funded sector are secondary teachers

Figure 5.2 shows that 44% of teachers in the 2014/15 cohort were secondary teachers who are not currently teaching in the state-funded sector at just under 155,000. Primary teachers make up 125,000 teachers in the pool of qualified teachers. Those categorised as 'Other' could not be placed into a single category and generally belong to All-through schools or Special Schools. Those with no category had no establishment information and so could not be categorised which makes it difficult to estimate whether the proportion of secondary to primary teachers is the same as the general teaching population.

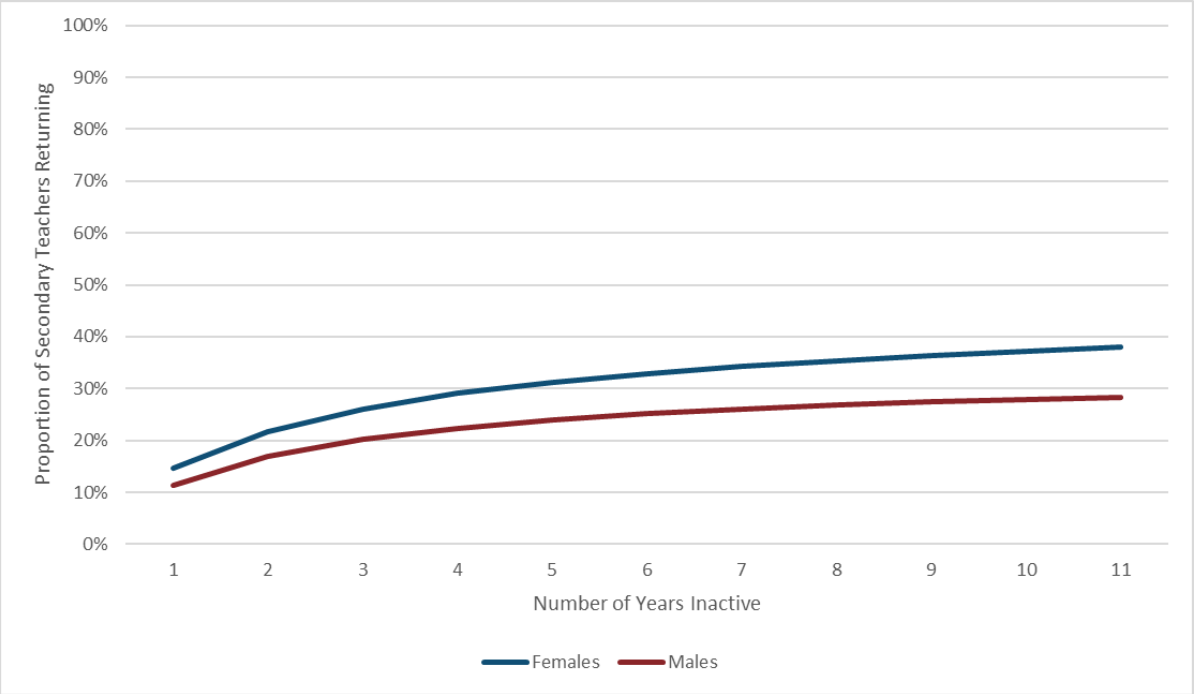
Figure 5.2: Number of qualified teachers currently not teaching in the state-funded sector by phase



Female secondary teachers are more likely to return to state-funded teaching than male secondary teachers after a period of absence

We have looked at the number of secondary teachers in the pool of qualified teachers currently not teaching in the state-funded sector and calculated the proportion that return depending on the number of years absent. We have focussed on secondary teachers for this analysis. Figure 5.3 shows that the proportion of females returning hits its peak around 38% and for males, the proportion who return plateaus around 28%. This fits with our analysis of returners, which suggests around 80% of returners are female. Most of these teachers will return within the first few years after leaving. 24% of males return within 5 years compared to 31% of females and so with each passing year, the likelihood of return grows smaller. One potential reason for this is that females may take a career break for caring responsibilities and then return once children are grown.

Figure 5.3: Proportion of secondary teachers returning by period of absence



6. Entrants and leavers to the teaching profession

Entrants to the teaching profession

This section provides trends in the number of teachers entering the profession in English state-funded schools between 2011 and 2017, focusing particularly on 2015 to 2017 as data from 2011 to 2015 was published in the first Teachers Analysis Compendium in May 2017. The analysis looks at differences by subject, with emphasis on the EBacc subjects[21]. This analysis does not look into the subjects that a teacher is qualified to teach; it only looks only at the subjects that a teacher is teaching in their entry or exit year. For example, a teacher may be qualified to teach Geography but may have spent the week the School Workforce Census (SWC) was taken teaching Mathematics. Therefore, in this analysis they would be identified as a Mathematics teacher.

The analysis here is different to that found in the SWC publication Table 7a for a few reasons. Firstly, this analysis has been done by teacher headcount; the figures in the SWC are calculated using the full-time equivalent (FTE) rate of teachers. Secondly, entrants here are identified as anyone who was not teaching in either a state-funded primary or secondary school the year before, this is in line with the methodology used in the Teacher Supply Model. The difference between this and the SWC is that teachers in special schools or centrally employed teachers are out of scope.

The estimates for Science and the Humanities should be treated with particular caution. In the SWC, a significant proportion of Science teachers are identified as teaching combined Science. In the Teacher Supply Model, these combined Science hours are apportioned between the three component subjects based on the number of 'known' hours for the three subjects i.e. if 30.0% of the total hours taught in Biology, Chemistry and Physics is taught in Physics, then 30.0% of the total combined Science hours are attributed to Physics.

A similar calculation is made here for the number of entrants and leavers in each of the Science subjects; i.e. if 30.0% of the total entrants in Biology, Chemistry and Physics are Physics teachers, then 30.0% of the total combined Science entrants are attributed to Physics.

This calculation is also made to attribute entrants and leavers in Humanities (a small group) between Geography and History. These two calculations mean that the estimates

[21] English Baccalaureate (EBacc): The English Baccalaureate (EBacc) was introduced in 2010 and defined an academic core including GCSE-level examinations in English, Mathematics, Science, Humanities and languages. To enter the EBacc, pupils are required to take GCSE-level examinations in English Language and English Literature, Mathematics, two or three science subjects, History or Geography, and an ancient or a modern language.

for the entrants and leavers in Biology, Chemistry, Physics, Geography and History have an extra level of uncertainty.

The overall number of entrants remained stable over the last three years, with small increases across most EBacc subjects.

This section looks at the number of entrants and the entrant rate for each subject, with a focus on Newly Qualified Teachers (NQTs) and those returning to the profession. The entrant rate is defined as the percentage of teachers in a subject identified as an entrant divided by the total number of teachers teaching the subject.

Figure 6.1 below shows the number of entrants in each subject across the last three years; it shows that the number of entrants remained stable in most subjects across the three years. There was an overall fall of approximately 125 entrants from 2015 to 2017, with the largest falls occurring in Design & Technology (149) and Computing (133). Most EBacc subjects saw an increase across the three years, with the largest increases being in Biology (180) and Geography (117).

Figure 6.1

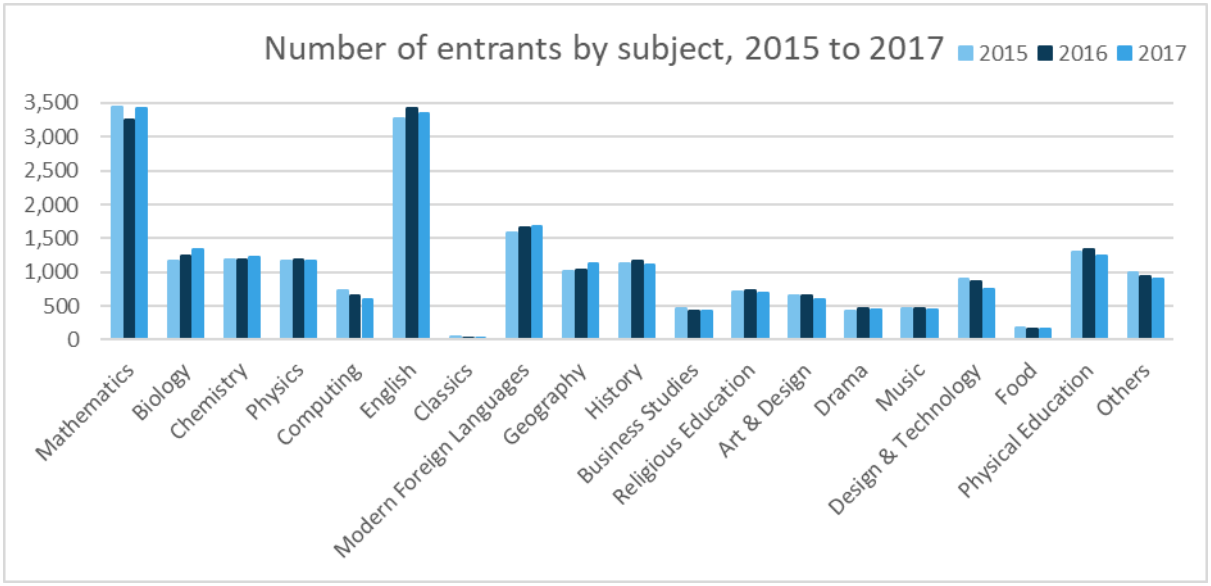


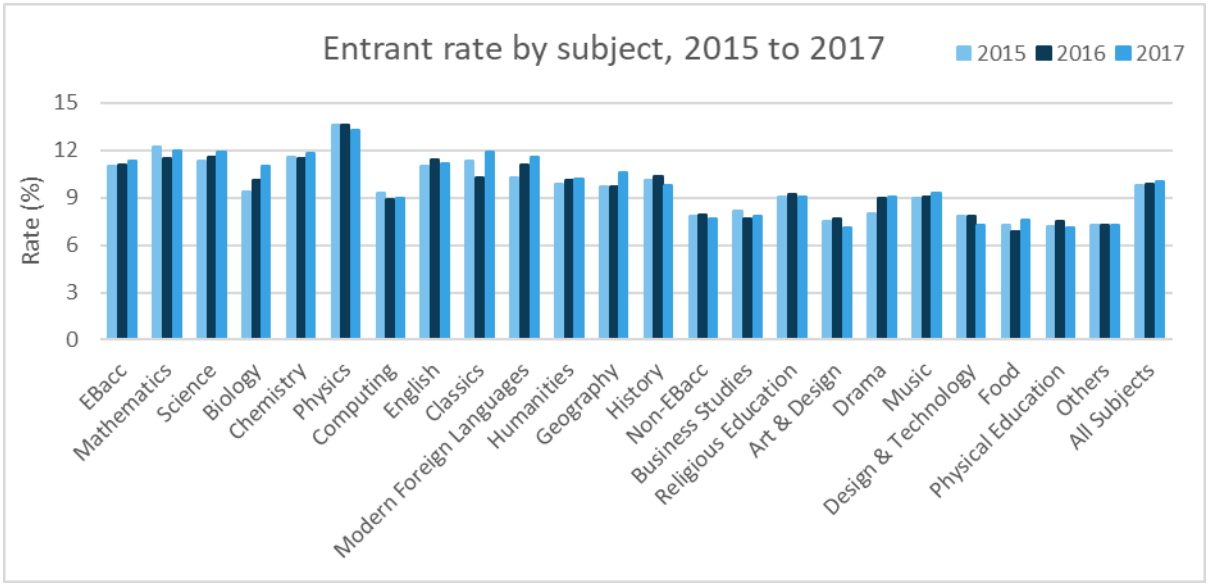
Figure 6.2 shows the entrant rates in 2015, 2016 and 2017; it shows that the entrant rate remained stable across all subjects, with an overall 0.2 percentage point increase; a 0.3 percentage point increase across EBacc subjects and a 0.1 percentage point decrease in non-EBacc subjects.

The most notable increases occurred in Biology (1.6 percentage points) and Modern Foreign Languages (1.3 percentage points); this is likely to be driven by the increased need for teachers in these subjects as the EBacc entry rate goes up. The subjects that suffered the biggest drop in entrant rate in this period were Design & Technology (0.5 percentage points) and Art & Design (0.4 percentage points). This was also likely to be driven by the increase in EBacc entry rate as the number of hours taught in non-EBacc

subjects decreases and as such, there would not be as much need to recruit new teachers.

In all three years, the entrant rate was highest in Physics and was at least 1.3 percentage points higher than the subject with the second highest entrant rate (Mathematics in each year). These were also two of the subjects with the highest wastage rates (those who leave the profession), so it would be expected that the entrant rates would also have been high to fill the gap.

Figure 6.2

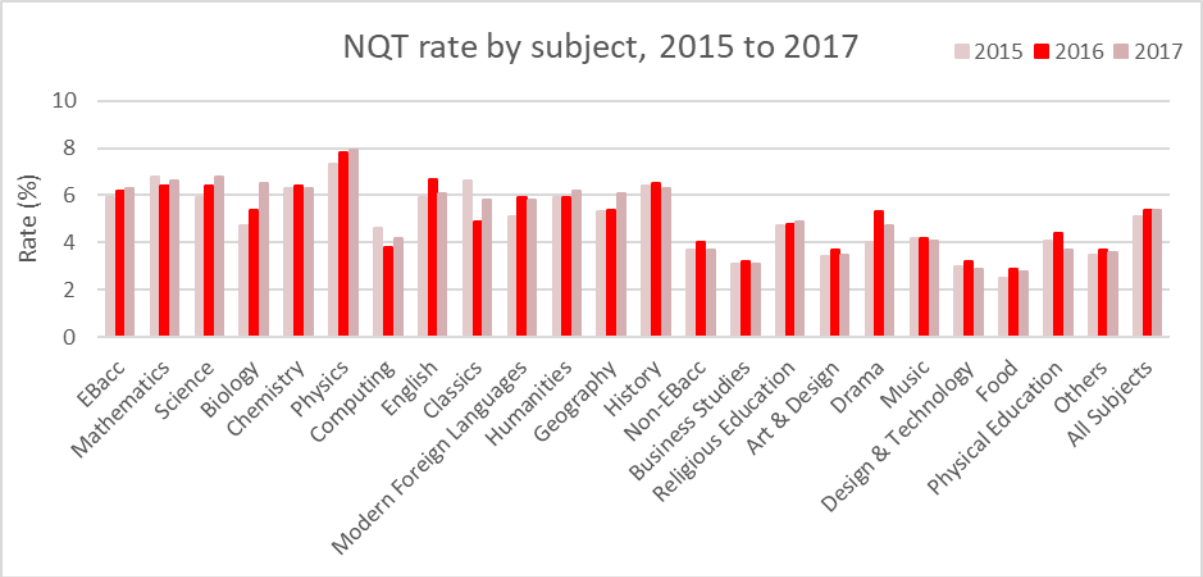


Newly qualified teachers made up more of the new entrants for EBacc subjects

This section looks at the Newly Qualified Teacher (NQT) rate for each subject. Figure 6.3 below shows the NQT rate in each subject in 2015, 2016 and 2017. It shows that the NQT rate was generally higher across EBacc subjects than it was in non-EBacc subjects across the three years.

The biggest increases were seen in the EBacc subjects. These subjects also saw the biggest increase in the number of hours taught as a result of the increased EBacc entry rate, so there was an additional need for teachers in these subjects. Computing is an anomaly here but Computing teaching comprises both ICT (a non-EBacc subject) and Computer Science (an EBacc subject), whilst Computer Science hours have increased the overall number of Computing hours has decreased.

Figure 6.3



Entrants returning to the profession remained stable across the three years.

This section looks at the returner rate for each subject. Figure 6.4 below shows the returner rate in each subject from 2015 to 2017. It shows that the returner rate remained stable across the years with the largest increase coming in Chemistry (0.7 percentage points) and the largest decrease coming in Classics (1.3 percentage points), although figures for Classics are based on a small number of teachers.

Figure 6.4

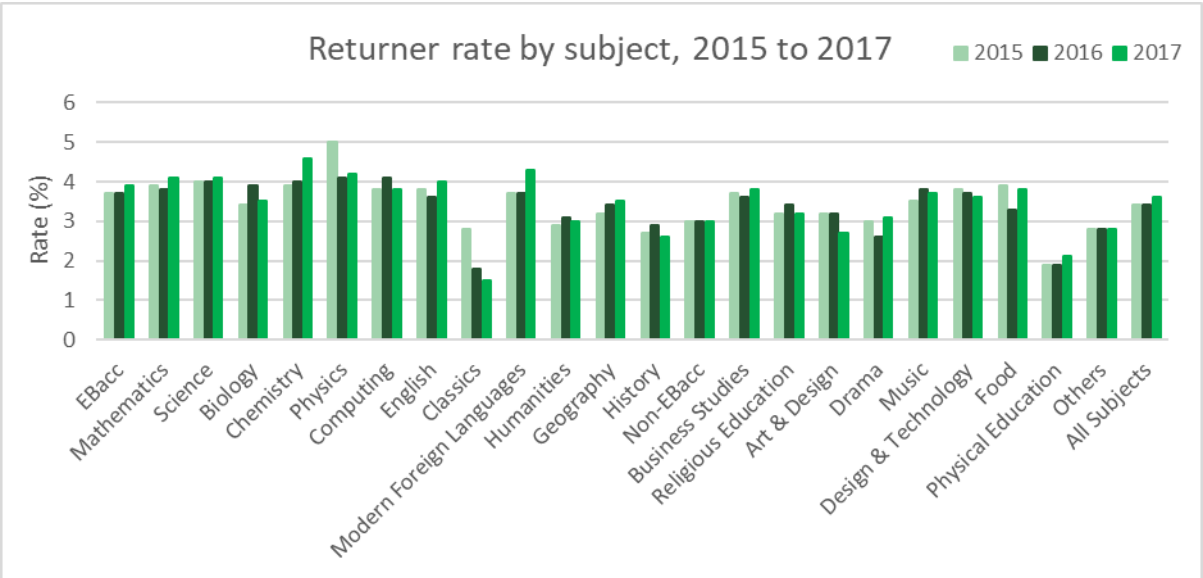
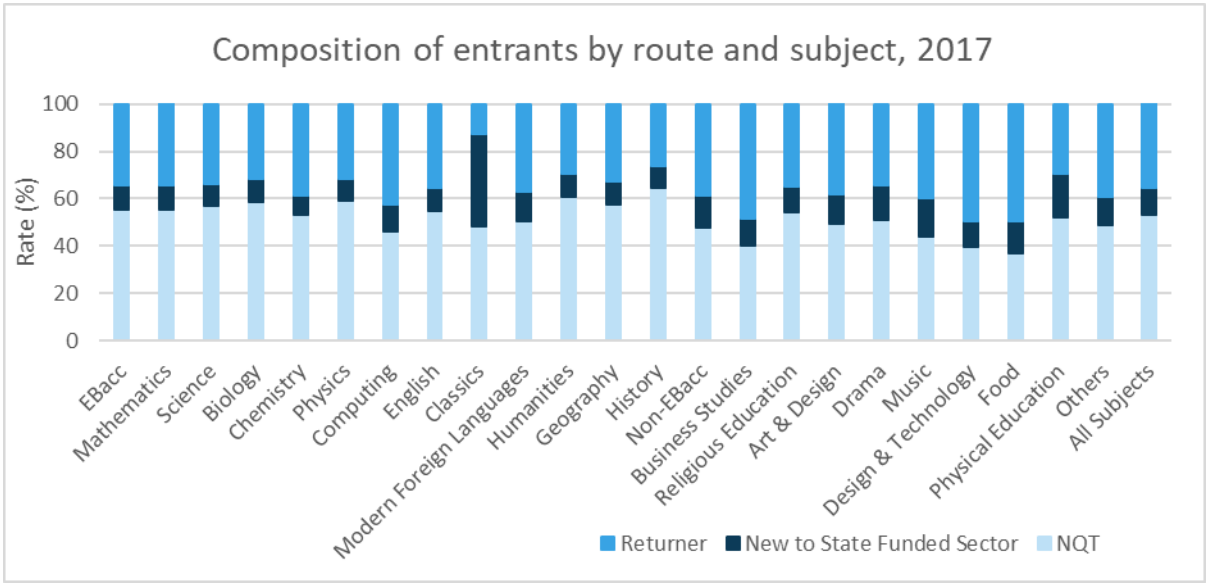


Figure 6.5 below shows the breakdown of number of entrants by entry route in 2017. It shows that the proportion of entrants who are NQTs was highest in History (64.5%) and Physics (59.4%). The subjects with the lowest proportion of entrants coming in as NQTs are non-EBacc subjects: Food (36.9%) and Design & Technology (39.5%). However, both of these subjects had the highest proportion of entrants coming in as returners (49.6%).

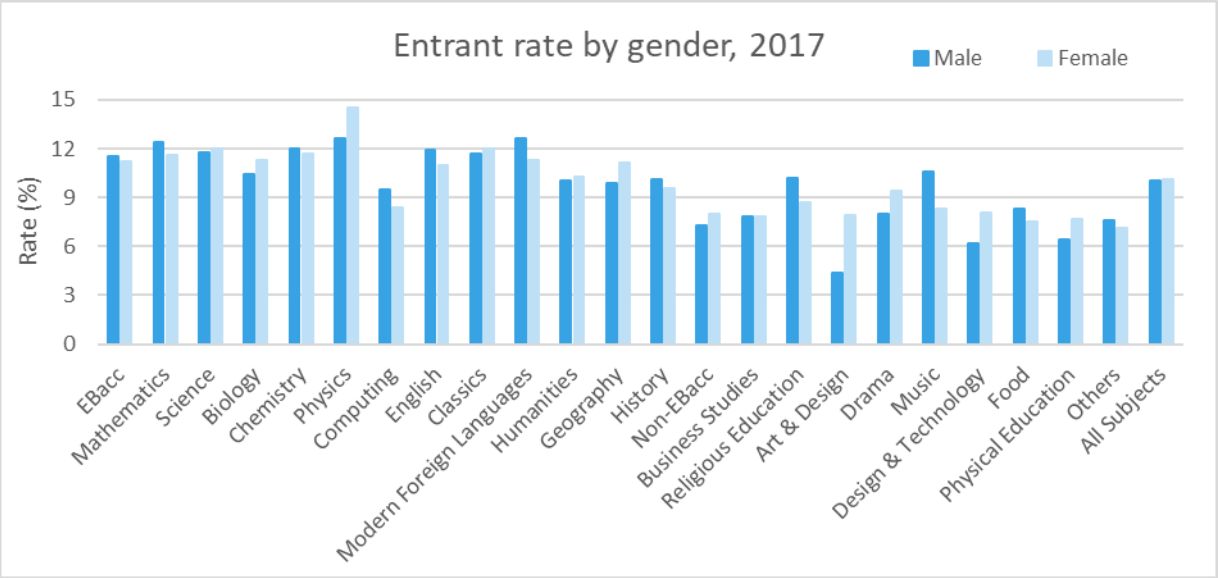
Figure 6.5



There are several possible reasons why these patterns were seen. Teacher demographics may have a significant effect on the number of returners a subject can attract. For example, those subjects, which have had a higher proportion of female teachers, may naturally have a higher pool of potential returners from which to recruit, as teachers return from taking a career break to start a family. This is illustrated in the 2018/19 TSM, where 90% of all qualified Food teachers were female. This was the highest percentage of any subject.

When we look at the demographics of entrant rates by subjects, we see very few significant differences between male and female teachers. Figure 6.6 shows the differences in entrant rates for male and female teachers in 2017. This shows that the biggest differences between the male and female entrant rates came in Art & Design (3.5 percentage points) and in Music (2.3 percentage points). For Art & Design the female entrant rate was higher and for Music the male entrant rate was higher.

Figure 6.6



These figures suggest that we are not seeing any major differences in the subjects that male or female teachers are teaching when they join or return to the profession, compared to how the teaching stock has historically been. Therefore, the gender balance of teachers in subjects is likely to remain relatively stable if this trend continues.

Wastage in the teaching profession

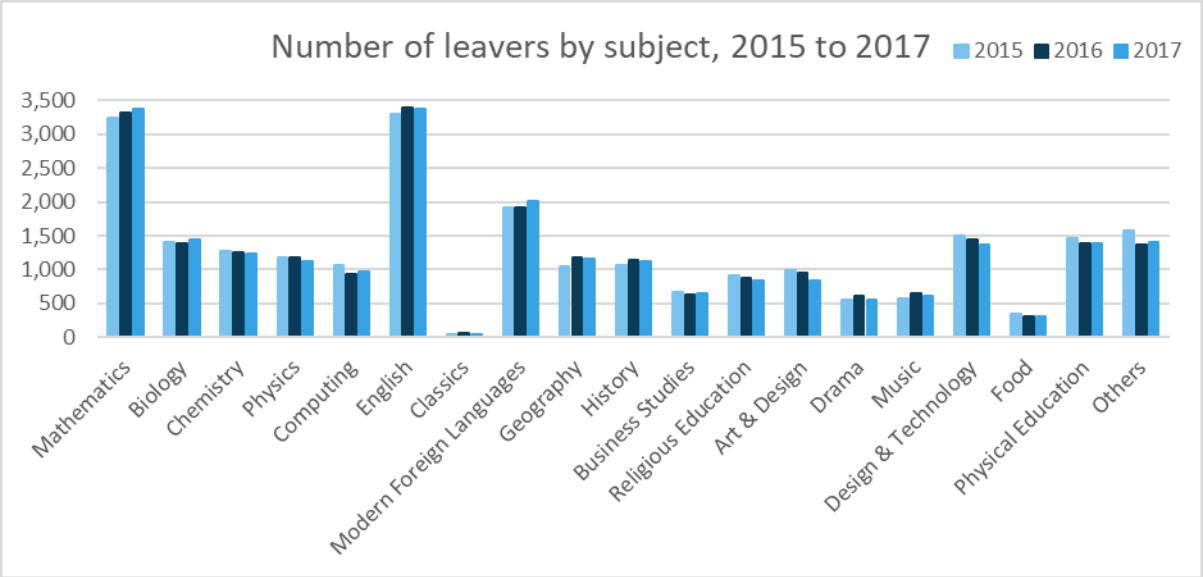
This section follows the same methodology as that for entrants, except that leavers are identified as someone who was teaching in a state-funded secondary school in one year and not identified in a state-funded primary or secondary school the year after. The difference between this and the SWC is that teachers in special schools or centrally employed teachers are out of scope.

Wastage can be broken down into three components: those leaving to go 'out of service', those who have retired and those who have died in service. This analysis focuses on those leaving 'out of service' and those who have retired. Those that have died in service is a very small proportion of leavers with the rate being between 0.3% and 0.6% across the seven years.

The overall number of leavers remained stable over the last three years, similar to the pattern with entrants.

Figure 6.7 below shows the number of leavers in each subject across the last three years; it shows that the number of leavers remained stable in most subjects across the three years. There has been an overall fall of approximately 312 leavers from 2015 to 2017, 'Others' seeing an estimated 170 fewer leavers and Art & Design seeing an estimated 148 fewer leavers. However, most EBacc subjects have seen an increase in leavers across the three years, with the largest increases being in Mathematics (131) and Geography (110). This follows the same pattern as the number of entrants.

Figure 6.7

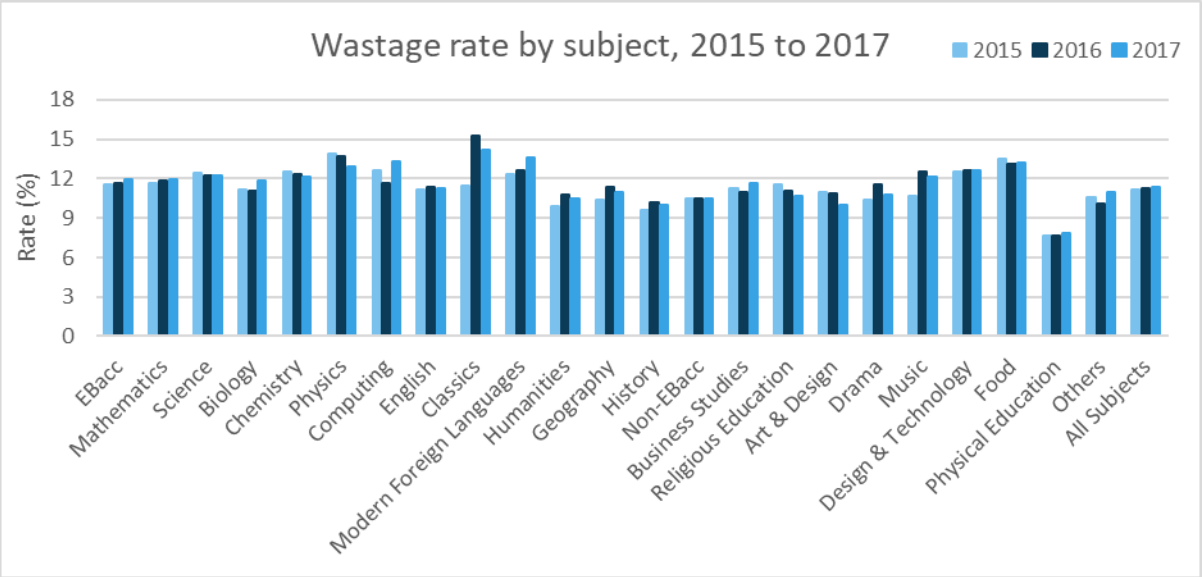


Between 2015 and 2017 the overall wastage rate for secondary schools increased by 0.2 percentage points, from 11.2% in 2015 to 11.4% in 2017. The wastage rate is defined as the percentage of teachers in a subject identified as having left the profession divided by the total number of teachers teaching the subject.

The subjects which had the largest wastage rates in 2017 were Classics (14.2%) and Modern Foreign Languages (13.6%), both these subjects saw large increases in the wastage rate since 2015 (2.7 and 1.3 percentage points respectively). The subject with the lowest wastage rate in each year was Physical Education (7.8% in 2017) whilst the subjects which saw the biggest fall from 2015 to 2017 were Physics and Art & Design (both 1 percentage point).

Figure 6.8 shows the wastage rate by subject in 2015, 2016 and 2017. It shows that it is relatively stable across the three years and that EBacc subjects had a slightly higher wastage rate than non-EBacc subjects.

Figure 6.8



The out of service rate has increased in every subject between 2015 and 2017.

Despite wastage rates remaining relatively stable, there was an increase in the number of teachers choosing to leave the profession (rather than retiring). Figure 6.9 shows that the 'out of service' rate increased in every subject between 2015 and 2017, with the overall secondary increase being 1 percentage point. The largest increases were seen in Classics (3.0 percentage points) and Modern Foreign Languages (1.8 percentage points), with the smallest increases coming in Chemistry (0.2 percentage points) and Art & Design (0.3 percentage points).

Figure 6.9

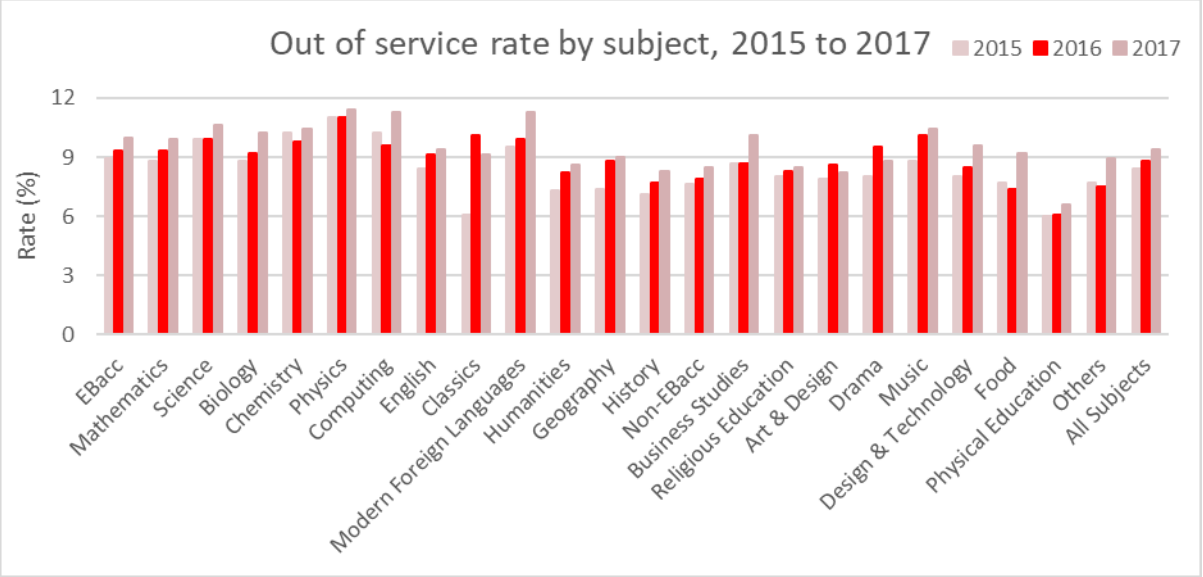
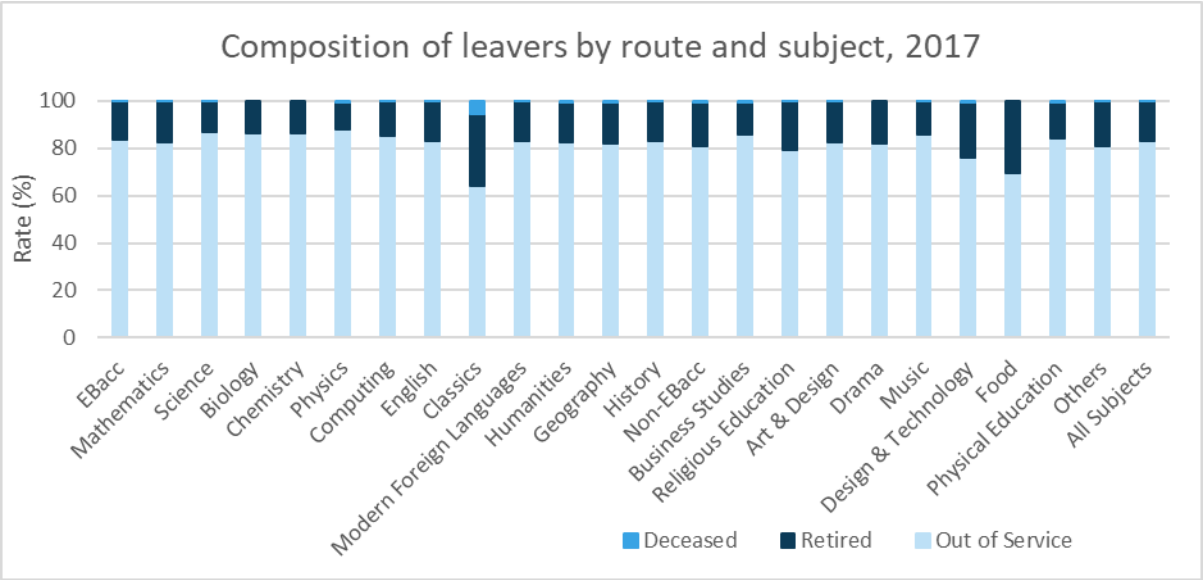


Figure 6.10 demonstrates how the composition of leavers is split between retirees and out of service for each subject. Unsurprisingly, the subjects which tend to have an older workforce (Classics, Food and Design & Technology) also had a higher proportion of leavers as retirees. In the 2018/19 TSM, 18.2% of all qualified Classics teachers were 55 and over, for Food this was 16.2% and for Design & Technology it was 12.8%. No other subject had a percentage higher than 10%.

Figure 6.10



Teachers in the middle age group were least likely to leave, but there was no significant difference for male and female teachers.

Figure 6.11 below shows the wastage rate by age group (teachers under 35, teachers between 35 and 54 and those 55 and over) in 2017. Those over 55 were most likely to leave, largely due to the numbers that will be retiring. Those who are under 35 were more likely to leave than those between 35 and 54 for every subject except Computing and Food. Overall, the wastage rate was 1.7 percentage points higher for teachers under 35 than those aged 35 to 54. A number of factors could drive this; teachers in the older age group are more likely to be in leadership roles and will therefore be less likely to leave and teachers under 35 may be more likely to leave to start a family.

Figure 6.11

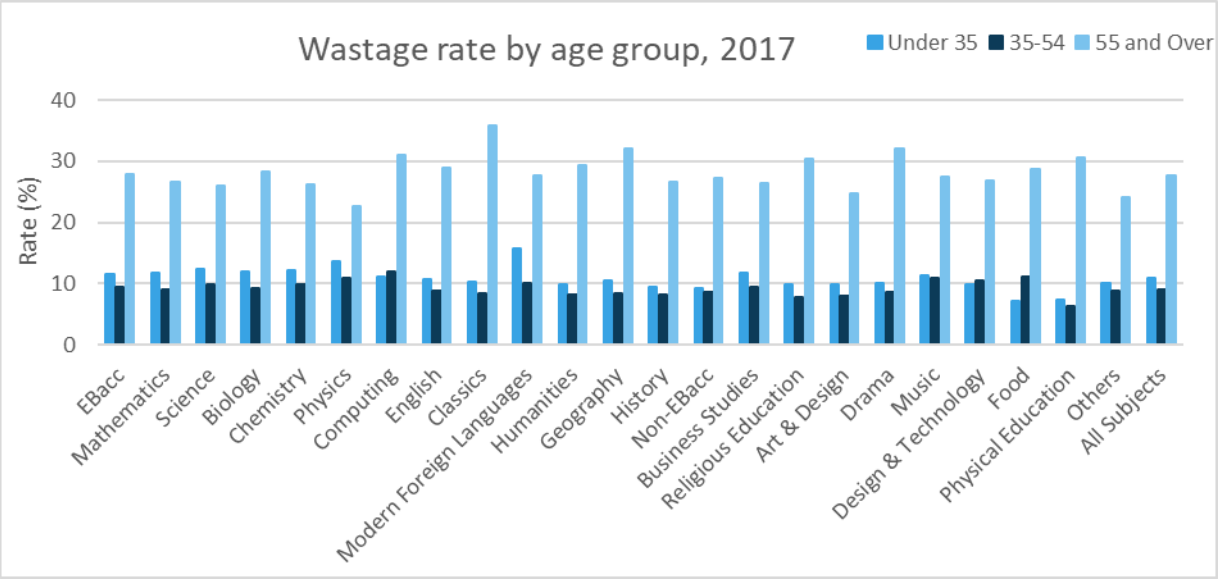


Figure 6.12 below shows the wastage rate in each subject by gender in 2017. There are no significant differences between male and female teachers; the largest differences between the two came in Classics and Religious Education where the male wastage rate was 2.9 and 2.8 percentage points respectively higher.

Figure 6.12

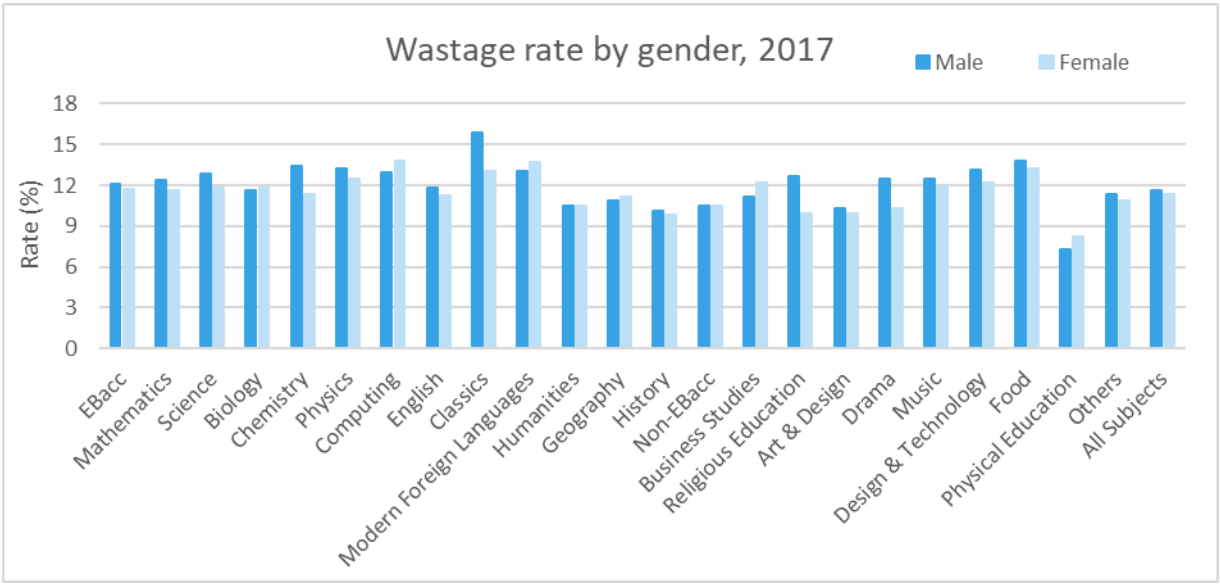
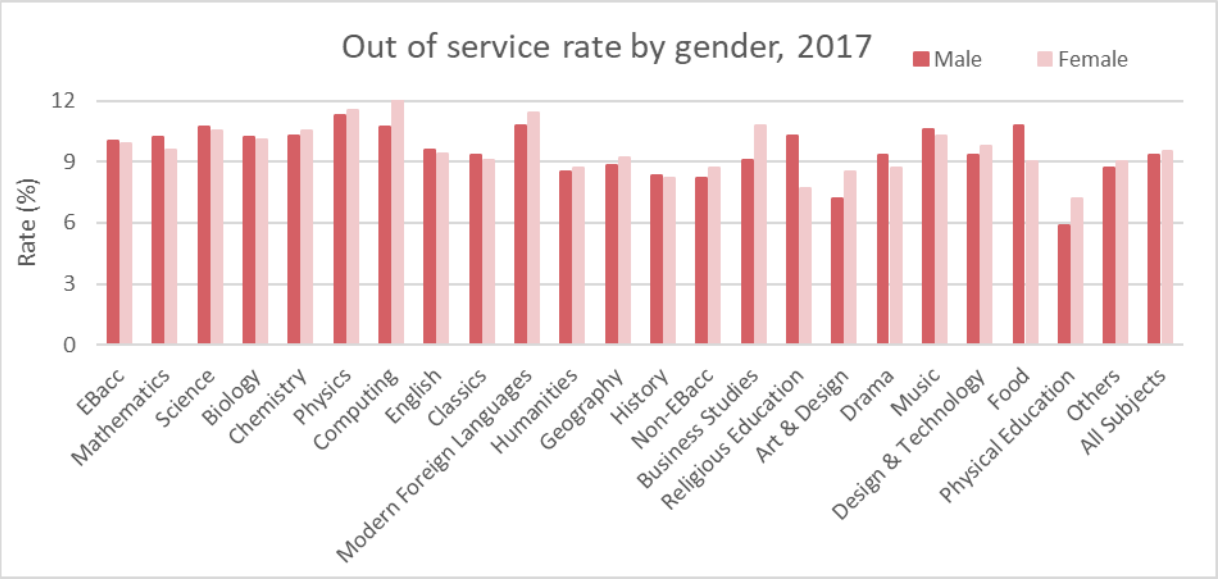


Figure 6.13 also shows that the overall male wastage rate was 0.3 percentage points higher than the overall female wastage rate, however if we discount teachers retiring and only look at those leaving 'out of service' then the female rate was 0.2 percentage points higher. This suggests that a higher proportion of male teachers were retiring than female teachers; in the 2018/19 TSM 9.2% of all qualified male teachers were aged 55 or over, whereas for female teachers this figure was 7.9%.

Figure 6.13

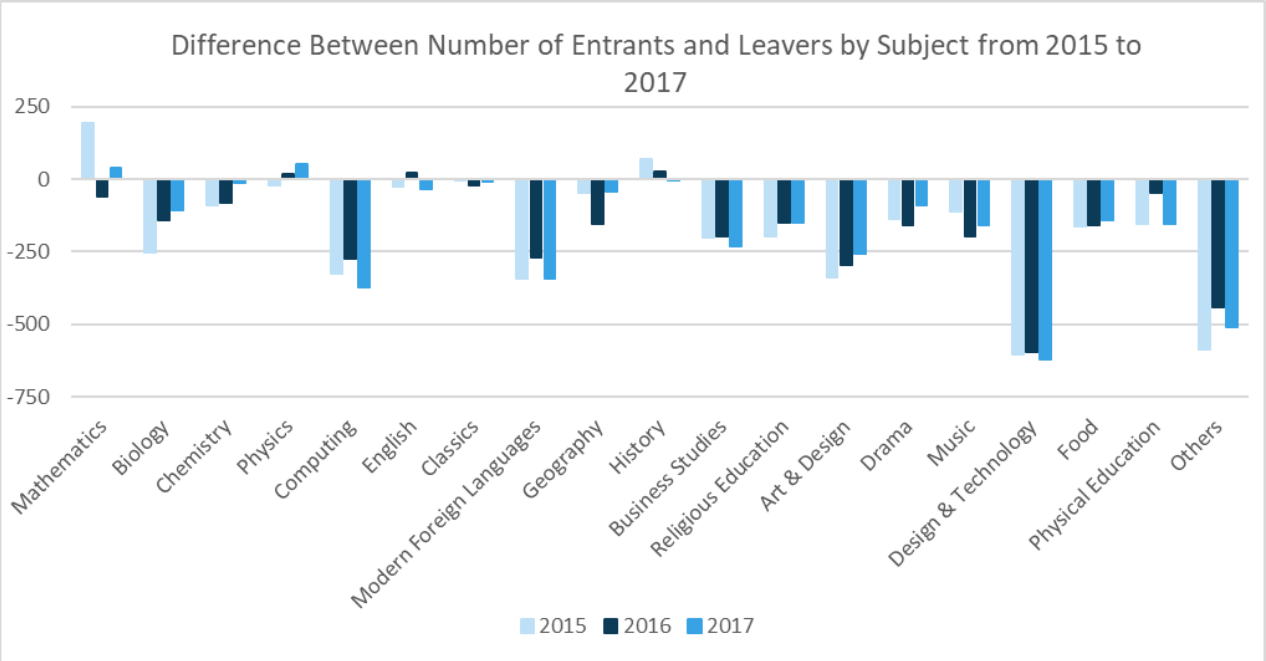


These figures suggest that there is no gender bias when it comes to teachers leaving the profession depending on which subject they are teaching, there is no reason to believe that a female teacher in any subject is more or less likely to leave than a male teacher.

More teachers left than joined in every subject in 2017, except for Mathematics and Physics.

The number of teachers leaving was at least 3,000 higher than the number of entrants in each year between 2015 and 2017. More teachers left the profession than entered in every subject except Mathematics and Physics in 2017; in 2016 this was the case for all subjects except English, Physics and History and in 2015 this was the case for all subjects except Mathematics and History.

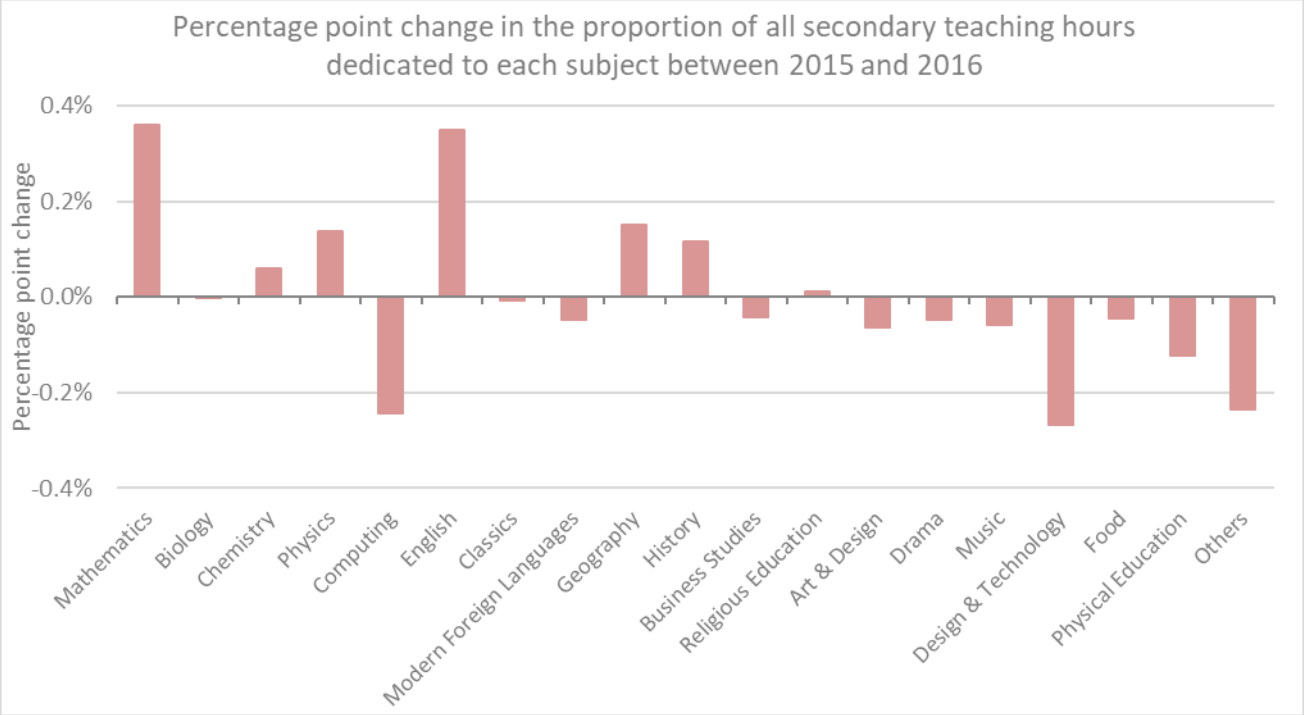
Figure 6.14



The differences between subjects here follows a very similar pattern to the changes in the number of hours being taught in different subjects. Figure 6.15 below shows the percentage point change in the number of hours taught between 2015 and 2016 (taken from the 2018/19 TSM) in each subject. Overall hours have been falling in secondary schools due to a fall in the number of pupils, which is one possible reason why the number of teachers leaving is greater than those entering the system.

The subjects which have seen increases in the proportion of hours devoted to them (Mathematics, English, Physics, Geography and History) are also subjects which have seen more entrants than leavers, or have seen a smaller difference between the two.

Figure 6.15



The difference in the number of entrants and leavers here is higher than that seen in the SWC between tables 7a and 7b. This is because headcount is used here and not the FTE rate and people who leave the profession have a lower FTE rate on average than those who enter.

7. Retention of Newly Qualified Teachers

This section looks at the cohorts of newly qualified teachers (NQTs) from 2010 to 2016 and the percentage of them that were still in service each year afterwards. Overall data going back to 1996 can be found in Table 8 of the School Workforce Census (SWC).

In this publication, the focus is on looking at the retention of NQTs by different demographics, region, the types of schools they entered, the subjects they are specialised to teach and the training route they went through. The data published in the SWC prior to 2010 makes use of the Database of Teacher Records. Most of the breakdowns calculated here would not be possible from that database, so only data from 2010 (when the SWC was introduced) onwards has been analysed.

In this publication and in the accompanying Excel tables the focus will be on eight particular characteristics and the differences between them. More detail on some of these are available in the accompanying app, along with some more characteristics, which can be found from the main publication page.

The key findings were:

- Female NQTs were more likely to remain in service in their early career than male NQTs.
- NQTs under 30 were more likely to remain in service in their early career than older NQTs.
- NQTs who declared their ethnicity as white were more likely to remain in service in their early career than those who declared their ethnicity as Black, Asian and minority ethnic (BAME).
- NQTs in primary schools were more likely to remain in service in their early career than those who joined secondary schools.
- NQTs outside the capital were more likely to remain in service in their early career than those who started as an NQT in London.
- NQTs who trained in a Higher Education Institute were more likely to remain in service than those who went through a school-based route.
- NQTs who did an Undergraduate trainee course were more likely to remain in service in their early career than those who did a Postgraduate trainee course.
- NQTs who are specialists in non-STEM subjects were more likely to remain in service in their early career than those who are specialists in STEM subjects.

NQTs who are male and over 30 are more likely to leave early in their career.

Table 7.1 below shows the percentage of NQTs from the 2012 and 2016 SWC who were still in service in the 2017 SWC broken down by gender, age group and ethnicity. It shows that NQTs who were female had a higher retention rate after five years than male NQTs, by 5 percentage points. Younger NQTs (those under 30) were also more likely to be in service after five years, with a higher retention rate of 3 percentage points.

Black, Asian and minority ethnic (BAME) NQTs had a lower retention rate than white NQTs, however this appears to be largely due to the fact that there are a significantly higher proportion of BAME NQTs in London (which has a lower retention rate than the rest of England). In fact, BAME NQTs have a higher retention rate than white NQTs in Inner and Outer London, but a worse retention rate across the rest of the country.

Table 7.1: Percentage of NQTs who were still in service in the 2017 SWC broken down by gender, age group and ethnicity

	Percentage still in service 1 Year after becoming an NQT (from 2016 to 2017)	Percentage still in service 5 years after becoming an NQT (from 2012 to 2017)
Female	86	70
Male	82	65
Under 30	86	69
30+	83	66
BAME	83	65
White	86	69

NQTs in secondary schools more likely to leave, with little difference between LA maintained schools and academies.

Table 7.2 shows the percentage of NQTs still in service by the phase and type of school that they did their NQT year in. NQTs from secondary schools were less likely to stay in service, both after one year and five years than those in primary or special schools. Whether or not an NQT started in an LA maintained school or an academy appears to have no relation to whether or not an NQT stays in service. However, this analysis does not take into account whether a school converted from an LA maintained school to an academy and therefore figures from earlier years will be based on a small number of schools. The figure for special academies in particular is based on a very small number of NQTs and should not be considered as evidence of an overall trend.

Table 7.2: Percentage of NQTs still in service in the 2017 SWC by the phase and type of school that they did their NQT year in

	Percentage still in service 1 Year after becoming an NQT (from 2016 to 2017)	Percentage still in service 5 years after becoming an NQT (from 2012 to 2017)
Primary LA Maintained	87	72
Primary Academy	85	74
Secondary LA Maintained	84	65
Secondary Academy	83	65
Special LA Maintained	90	70
Special Academy	89	74

NQTs in Inner London the most likely to leave after 5 years, those in the North East and East Midlands most likely to stay.

Table 7.3 below shows the retention rate by region. Inner and Outer London have the worst retention rates after five years of any region in England with 57% and 63% of NQTs respectively remaining in service. In contrast, 74% of NQTs in the East Midlands and the North East were still in service after five years.

Table 7.3: Retention rate of NQTs still in service in the 2017 SWC by region

	Percentage still in service 1 Year after becoming an NQT (from 2016 to 2017)	Percentage still in service 5 years after becoming an NQT (from 2012 to 2017)
North East	84	74
North West	85	70
Yorkshire & Humber	85	73
East Midlands	88	74
West Midlands	84	72
East of England	87	70
Inner London	82	57
Outer London	84	63
South East	85	67
South West	85	69

NQTs with post A Level qualifications in Modern Foreign Languages the most likely to leave after 5 years.

Table 7.4 shows the percentage of NQTs still in service based on the specialism of any post A Level qualifications they have. An NQT may hold multiple qualifications and any qualification can map to up to three subjects. Therefore, an NQT may appear in the figures for more than one category.

The subject with the lowest retention rate is Modern Foreign Languages (56% still in service after five years), with STEM subjects also having lower retention rates than non-STEM subjects. This is likely to be because of greater demand for people with these skills in the wider economy.

These figures will also be affected by the demand for teachers in these subjects. If a subject has become less popular, an NQT specialised in that subject who chooses to leave after one or two years may struggle to find employment should they choose to return, whereas an NQT of a more popular subject may be able to find a role. Therefore, the five-year retention rate would be higher for the more popular subjects.

Table 7.4: Percentage of NQTs still in service in the 2017 SWC based on the specialism of any post A Level qualifications they have

	Percentage still in service 1 Year after becoming an NQT (from 2016 to 2017)	Percentage still in service 5 years after becoming an NQT (from 2012 to 2017)
Art & Design	85	68
Biology	85	66
Business Studies	78	60
Chemistry	82	63
Classics	80	56
Computing	79	63
Design & Technology	83	66
Drama	87	66
English	85	65
Food	83	66
Geography	82	64
History	86	66
Mathematics	82	62
Modern Foreign Languages	78	56
Music	82	67
Physical Education	90	75
Physics	80	60
Religious Education	81	66

Conclusion

The biggest differences seen here come from the region an NQT starts working in and the subjects that an NQT is qualified as a specialist to teach. Those in London and with post A Level qualifications in STEM subjects or languages are less likely to be in service after five years, which is likely to be down to more opportunities in the local economy. These factors appear to be more important to whether an NQT stays in service as opposed to their demographics or the type of school they enter into.

Analysis on the employment rates of NQTs based on the region of the training provider and how far NQTs travelled for their first position (relative to their training provider) was published in chapters 1 and 2 of the third Teachers Analysis Compendium.

It should be noted that there will be correlation between some of these variables that will cause some of the trends here. For example, as noted earlier, NQTs in Inner London are more likely to be from a BAME background than NQTs in other areas of the country, if we compare the retention rates by ethnicity in Inner London, then 56% of white NQTs were still in service after 5 years whereas 62% of BAME NQTs were still in service. This suggests it is the region that has more influence on whether an NQT is likely to stay in service. Further analysis will be undertaken using this data to further our understanding of the factors driving the fall in retention rates over recent years.

8. Annex

Methodology of comparing School Workforce Census and Teachers' Pensions Scheme

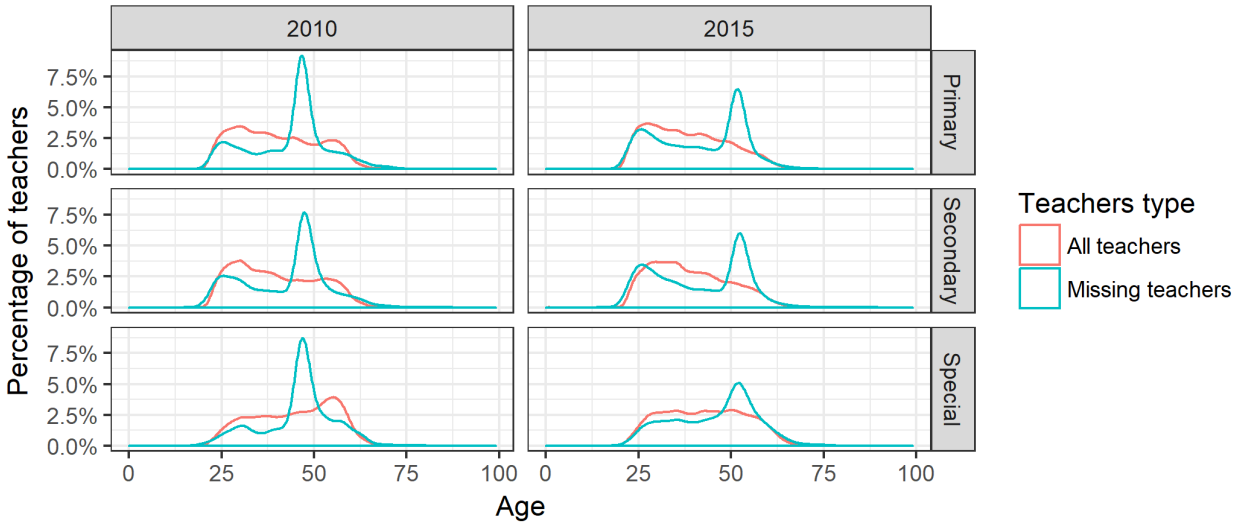
This section contains further information on the characteristics of teachers missing from the pensions data, analysed in section 3: Time series analysis of teachers in England using Teachers' Pensions Scheme data. Further analysis is needed to understand whether teachers are missing at random. This comparison include teachers from primary, secondary and special schools.

Analysis of teachers missing from the Teachers' Pensions Scheme

By age distribution

All teachers missing from the Teachers' Pensions Scheme (TPS) are split into two groups, one averaging 30-years old and one averaging 55-years old. It is reasonable to assume that these teachers have opted out of the Teachers' Pensions Scheme as spikes have moved on five years. In figure 8.1, age distributions are different for all teachers and missing teachers in all charts, indicating that these teachers are not missing at random.

Figure 8.1: Age distribution for all teachers and those missing from TPS

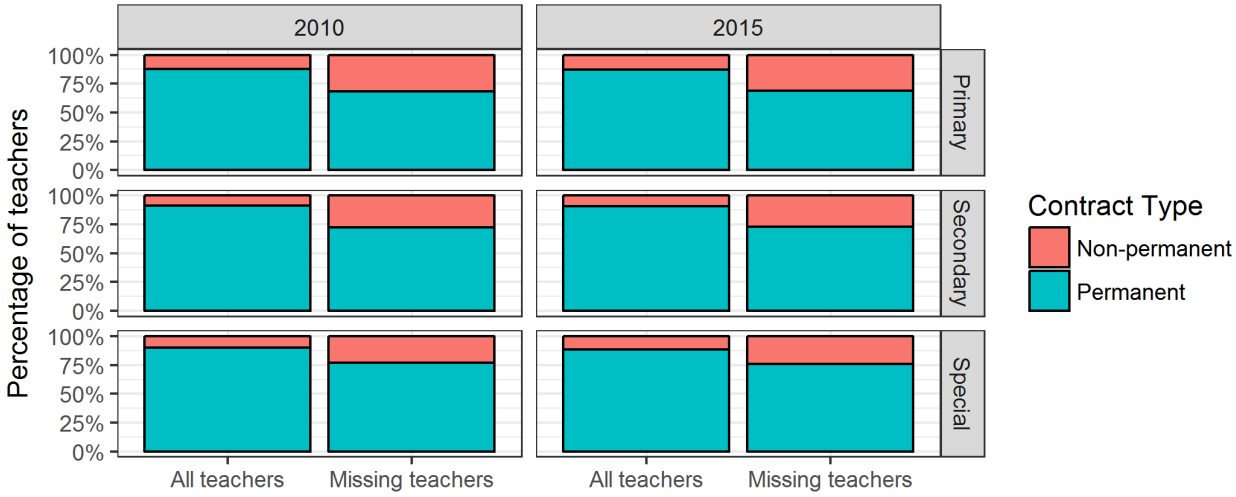


By average weekly working hours and contract type

Weekly working hours overlap for both groups of teachers in all charts, which means that those missing from the Teachers' Pensions Scheme have similar working patterns to all teachers from the School Workforce Census.[22]

However, figure 8.2 shows that a larger proportion of missing teachers from the TPS have a non-permanent contract in comparison to all teachers from the School Workforce Census.

Figure 8.2: Teachers missing from TPS by contract type

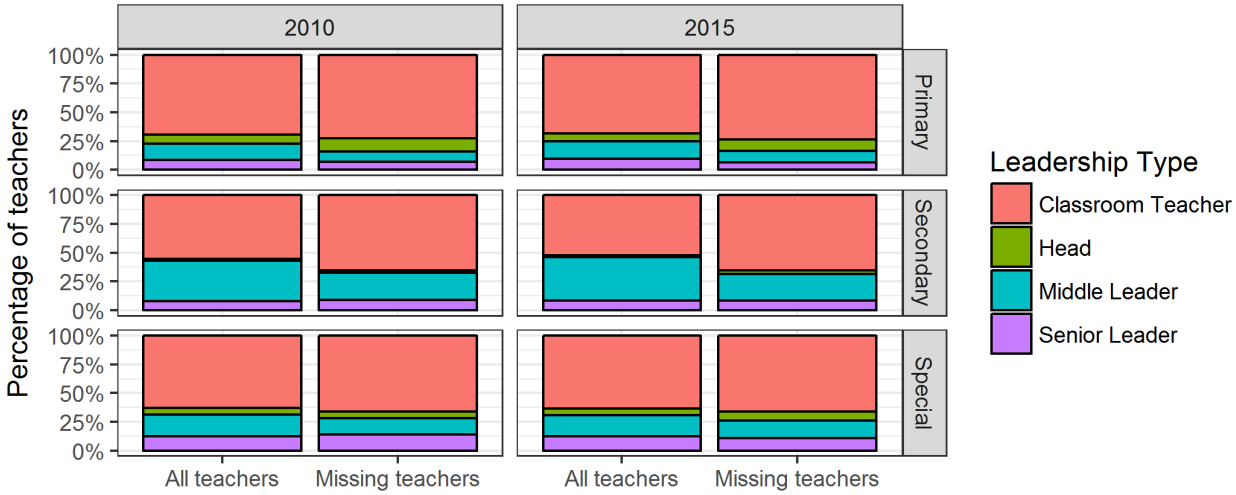


By leadership role

Figure 8.3 shows that in primary schools the proportion of Head Teachers is slightly higher in the missing teachers group than it is in the School Workforce Census. In secondary schools, the proportion of Middle Leaders is lower in the missing teachers group than in the School Workforce Census. In special schools both groups are similar.

[22] Data are taken from School Workforce Census. Outliers were corrected by capping hours worked at 60 per week

Figure 8.3: Teachers missing from TPS by Leadership role



In conclusion, teachers not recorded in the pensions data have probably opted out from the Teachers' Pensions Scheme and they are likely to be in two age groups, averaging 30-years and 55-years old as of 2015. They work similar hours per week as any other teacher in the School Workforce Census, but they have a higher likelihood of a non-permanent contract across all school phases. Finally, they probably have slightly different leadership roles in primary and secondary schools, as described above.

Analysis of teachers missing from the School Workforce Census

This section compares the number of teachers from the census dataset with the pensions dataset through matching individual teachers from the census with pension members using Teachers Reference Number (TRN), Local Education Authorities (LEA) and Establishment Numbers (ESTAB). This comparison includes teachers from primary, secondary and special schools and it explores characteristics of teachers missing from the census dataset, which are recorded in the pensions scheme. Again, data from the TPS in 2016 might not be complete so it should be not treated as typical.

On average, from 2010 to 2016, 6.07% of teachers in the TPS are not in the census, as per table 8.1. These could be teachers working in schools that did not return census data or schools for which the Local Authority Establishment number[23] in TPS is different from the one in SWC due to historical changes.

In terms of school comparison, an average of 6.24% schools are not in the census but are in the pensions dataset, and it is expected that some of them do not match because

[23] In Teacher Pensions Scheme database a school is identifiable through the Local Authority Establishment number.

of historical changes of the Local Authority Establishment number. It is also known that on average 0.91% of schools do not return census information.

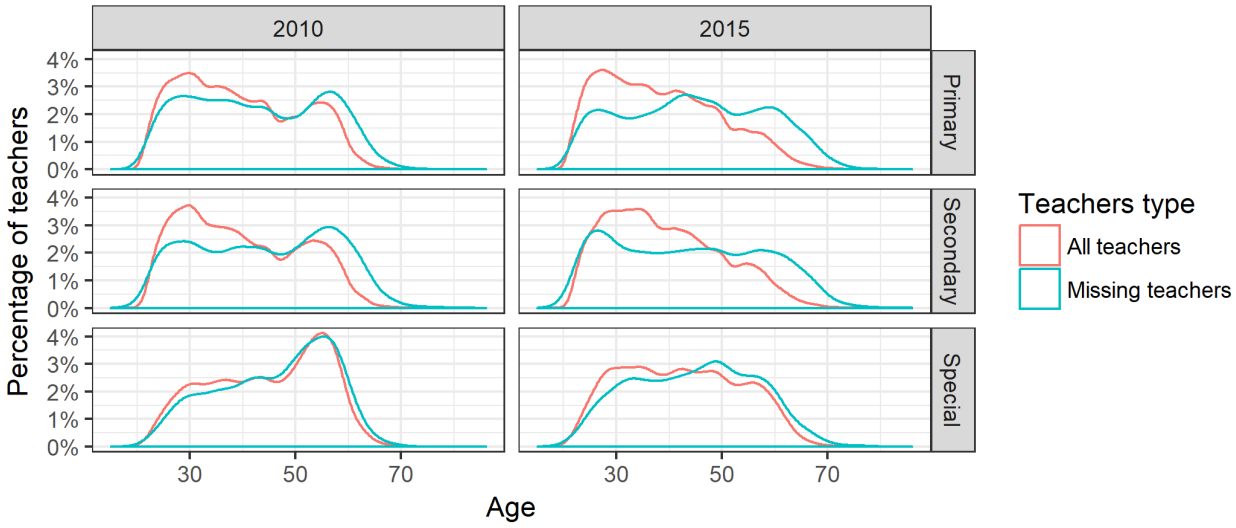
Table 8.1: Number of teachers not recorded in School Workforce Census

Year	All teachers in pensions	Missing from census	Proportion missing (%)
2010	438,648	27,490	6.27
2011	438,922	25,297	5.76
2012	445,838	24,704	5.54
2013	454,363	26,834	5.91
2014	464,738	29,115	6.26
2015	471,612	31,621	6.70
2016	454,248	30,830	6.79

By age distribution

Figure 8.4 below shows that the age distributions between teachers missing from the census and all teachers from the TPS in 2010 and 2015 were similar, with the exception of teachers in primary and secondary schools in 2015 where missing teachers have a slightly older population.

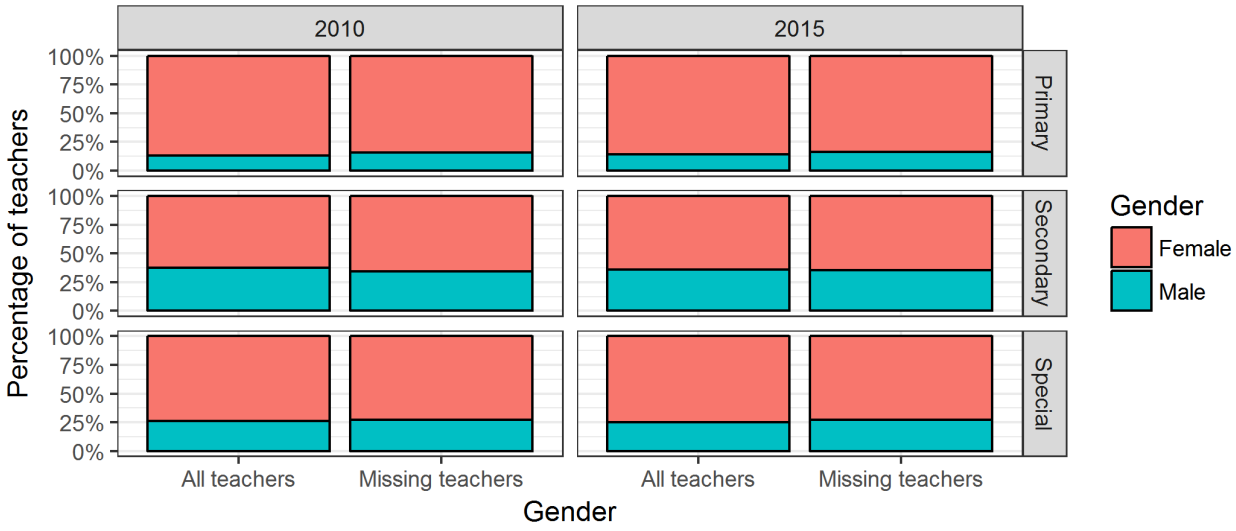
Figure 8.4: Age distribution for all teachers and those missing from SWC



By gender

Figure 8.5 shows that the proportion of female and male teachers for both groups of teachers are similar for all school phases.

Figure 8.5: Gender for all teachers and those missing from SWC



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